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"Stress Testing" Banks on Commercial Real Estate

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In a previous *Economic Synopses essay*,[1] we studied the concentration of commercial real estate (CRE) exposures in the US financial sector. More specifically, we showed that (i) banks tend to be the most exposed financial institutions and (ii) banks with larger exposures to CRE tend to be smaller, have lower liquidity ratios, and fewer loan loss provisions.[2]

The Dodd-Frank Act Stress Tests ("DFAST")

The Dodd-Frank Act, the major piece of legislation enacted in response to the Great Financial Crisis of 2007-08, aimed at tightening bank regulation to help prevent future financial crises. One of the main provisions of the act was the creation of "DFAST"—Dodd-Frank Act stress tests, conducted annually by the Federal Reserve. These stress tests consist of tracking the performance of the balance sheet of selected eligible banks through hypothetical adverse scenarios. These selected eligible banks (typically, between 20 and 40) tend to be large institutions.[3]

As a result of specific concerns regarding CRE risks, the Federal Reserve System included a scenario in the 2023 DFAST where CRE valuations dropped by 40%.[4] As our previous essay has shown, banks with over $100 billion in assets (the lowest cutoff for DFAST eligibility) have relatively small exposures to CRE, relative to their assets. This raises the possibility that current stress test eligibility requirements may be understating the true risks posed by CRE exposures, by focusing on larger institutions that tend to have smaller exposures.

We run a simplified stress test that includes all US bank holding companies (BHCs) that file the FR Y-9C form, which is a requirement for all BHCs with $3 billion or more in assets and BHCs that meet a number of other requirements.[5] The simplified stress test was simulated on 374 US BHCs—substantially smaller financial institutions than the ones eligible for DFAST. The average and median values of total assets are $69.5 billion and $7.2 billion, both significantly lower than the minimum threshold for DFAST eligibility.

Stress Testing CRE for Smaller BHCs

We conduct a simple stress test by formulating a hypothetical scenario that involves a drop in the value of CRE exposures held by banks. We define the CRE exposure as the sum of total CRE loans and the value of CRE-backed securities (such as commercial mortgage-backed securities) in a bank's balance sheet. (See our previous essay for a more detailed discussion of this measure.) In practice, DFAST consider more complex scenarios that involve shocks to different components of banks' balance sheets and to different business areas: It is, in principle, unlikely that CRE would experience large drops in value without disruptions in other parts of the economy and credit markets, such as residential real estate or commercial and industrial lending. In our simplified stress test, we abstract from shocks to other parts of the economy and focus only on changes in value of CRE exposures.

In our previous essay, we described how we compute the exposure of each BHC to CRE. We assume a large aggregate shock to CRE valuations such that all BHCs are affected in a way that is proportional to their exposures. We then compare the loss in value from this shock to CRE exposures to two measures of bank-level resilience: (i) capital buffers and (ii) tier 1 capital.

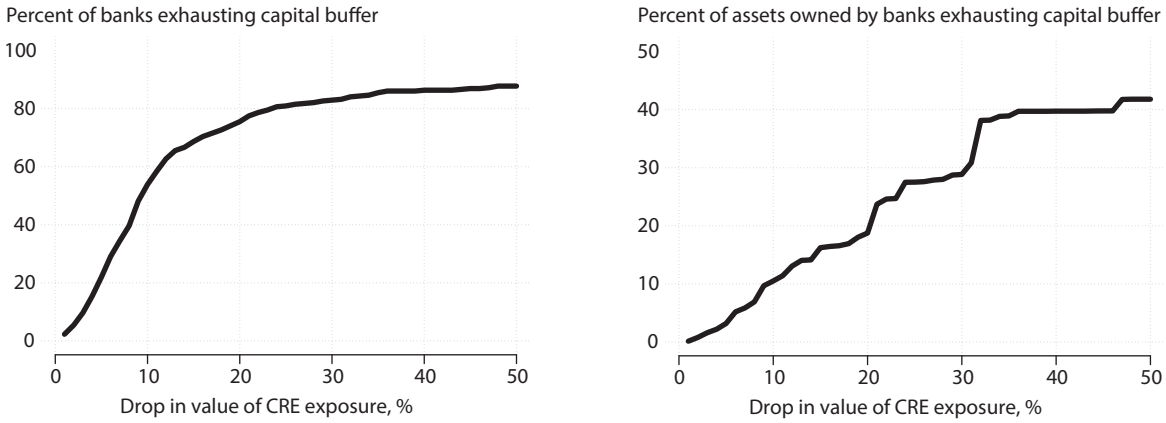
Tier 1 capital is a measure of bank solvency, and banks that experience a shock to the value of their assets that exceeds the amount of capital they hold are more likely to become insolvent and fail. The capital buffer of a bank is calculated as the following:

Capital Buffer = Tier 1 Capital – Minimum Tier 1 Capital

where the minimum tier 1 capital for a BHC is set by the Basel III regulations as implemented in the US. The capital buffer is the amount of capital owned by a bank over and above what is required by regulations. Thus, one can think of the capital buffer as the amount of capital that a bank can afford to lose before becoming subject to regulatory actions.

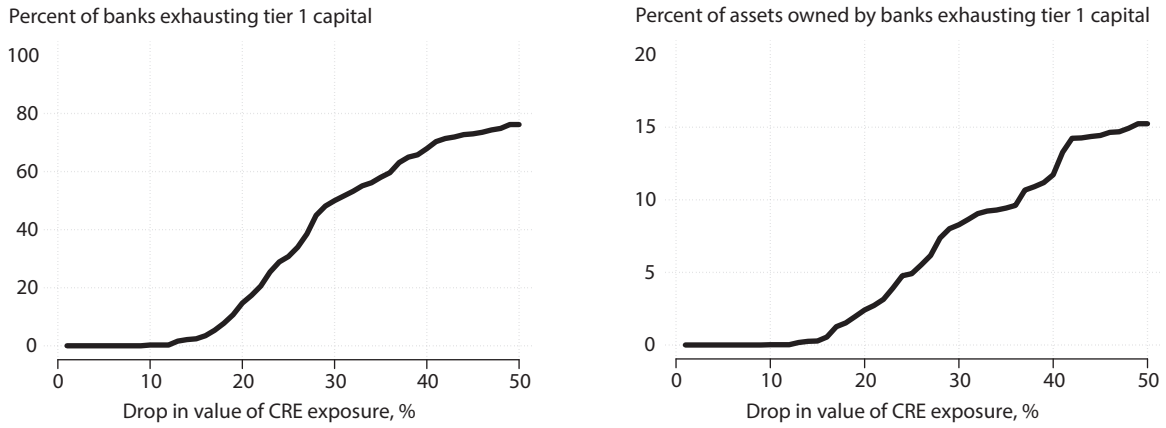
In Figure 1, we show the effects that different scenarios for drops in CRE valuations have on capital buffers. In each of the panels, the x-axis is the percentage drop in the value of CRE exposures. In the left panel, the y-axis corresponds to the number of BHCs that exhaust their capital buffers for a given drop in the value of CRE exposures. In the right panel, the y-axis corresponds to the percentage

Figure 1
Stress Testing Capital Buffers



SOURCE: FRY-9C, authors' calculations.

Figure 2
Stress Testing Tier 1 Capital



SOURCE: FRY-9C, authors' calculations.

of assets owned by banks that would exhaust their capital buffers for a given drop in the value of CRE exposures, as a share of total assets in the banking system.

Figure 2 plots the effects of the CRE valuation shock for total tier 1 capital (as opposed to just capital buffers as in Figure 1). Similar to Figure 1, the left panel of Figure 2 corresponds to the percentage of banks for whom a CRE shock of a given size completely exhausts their tier 1 capital, while the right panel plots the percentage of assets owned by those banks.

The Board's Scenario: A 40% Drop in CRE Prices

The two figures tell us what can happen to the US banking system for a range of drops in value of CRE exposures. To fix ideas, it is useful to focus on a specific scenario for the drop in value of CRE exposures. The 2023 DFAST scenarios included a 40% drop in CRE prices. Note that this does not necessarily imply a 40% drop in CRE exposures: most of these exposures are loans to companies and individuals that own CRE properties, and they may default on the loans or not, depending on the change in price. Since there is limited data on the details of BHC CRE exposures, particularly for the smaller banks, we make a few assumptions that help us map a change in CRE prices to a change in value of BHC exposures. In particular, we assume (i) an average loan-to-value ratio of 70%, consistent with recent aggregate market data, and (ii) borrowers default as soon as they are underwater.

These two assumptions imply that a 40% drop in CRE prices corresponds to a 10% drop in value of CRE exposures.[6] Figure 1 shows that a 10% drop in value of CRE exposures would result in about 55% of banks exhausting

their capital buffer. These are likely to be the banks with largest CRE exposures; and, as we discussed here earlier, these tend to be relatively smaller banks. Thus, the right panel of Figure 1 shows that those 55% banks own about 10% of total assets in the banking sector, which reflects the largest exposures among smaller banks. In terms of solvency, Figure 2 shows that a 10% drop in the value of CRE exposures would result in 2.7% of banks exhausting their tier 1 capital and becoming insolvent; these banks constitute 2% of total assets in the banking system.

This exercise shows that a large drop in CRE prices would result in (i) a significant number of BHCs becoming noncompliant, although these BHCs are a small fraction of total assets in the US banking system, and (ii) a relatively small number of bank insolvencies. Additionally, (iii) these noncompliant BHCs are a small fraction of total assets in the US banking system.

Additionally, it is worth pointing out that our very simple exercise is subject to a large number of caveats. First and foremost, our scenario considers a drop in CRE prices that happens "in a vacuum"; in practice, this would be accompanied by stresses in other parts of the economy that could affect many banks differently, depending on the composition of their own exposures. Second, even if the number of banks and the share of assets in insolvency looks small, it is well known that even small suspicions of stress in the banking system can trigger larger crises of confidence and even runs on banks that do not have major exposures to CRE. Third, this shock to CRE valuations may not be distributed uniformly among US regions, and different banks may be more or less exposed to specific geographical areas. Some of these caveats suggest that the true effects of this shock could be more severe than what is considered here. One mitigating factor, however, is that it is unlikely that such a large drop in CRE prices would materialize overnight, and banks could potentially have time to rebalance their portfolios and reduce their exposures as valuations dropped. ■

Notes

[1] Faria e Castro, Miguel and Sam Jordan-Wood. "Commercial Real Estate: Where are the Financial Risks?" Federal Reserve Bank of St Louis E*conomic Synopses*, No. 22, 2023.

[2] Here we use the term banks and bank holding companies (BHCs) interchangeably. BHCs may potentially own multiple banks and other types of financial institutions.

[3] Participation in the 2023 DFAST dropped to 23, down from 33 banks in 2022, as certain institutions are only required to participate every other year. Since 2018, eligibility criteria are such that institutions with total consolidated assets over $250 billion participate every year, while institutions with assets between $100 billion and $250 billion participate every other year.

[4] See 2023 Stress Test Scenarios, Board of Governors.

[5] See Federal Reserve Board - Reporting Forms for more information on reporting requirements.

[6] The assumption of an average loan-to-value ratio of 70% implies that a 40% price drop would generate a 10% negative gap between the value of the CRE property serving as collateral and the value of the debt owed. Our second assumption then implies that all CRE borrowers would default and creditors would seize properties whose value is 10% lower than the debt they owned—thus a 10% drop in the value of these CRE exposures.

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