

Evaluating the Capital Adequacy of Freddie Mac and Fannie Mae

CONCERNED ABOUT THE seemingly endless cost of rescuing the thrift industry after its collapse in 1989, Congress, in 1992, began taking a hard look at other financial institutions for ways to insulate taxpayers from potential financial claims. Federal taxpayers eventually ended up paying \$132 billion to resolve the savings-and-loan crisis. As part of its expanded efforts to bolster the stability of the housing-finance community, Congress created a federal regulator to ensure that Freddie Mac and Fannie Mae—the country’s two largest secondary-mortgage-market firms—both remain on strong financial footing.

One of the primary responsibilities the 1992 statute gave to the new supervisory authority—the Office of Federal Housing Enterprise Oversight (OFHEO)—was that of developing a **risk-based capital standard** to reflect each secondary-market company’s performance when confronted with stressful business conditions. A 1990 Treasury Department study fueled part of Congress’ motivation to replace the pair’s outdated, ratio-based **capital standard** with stronger risk-based requirements. The report



concluded that the two companies—though posing no imminent threats of insolvency—were too thinly capitalized to meet unforeseen contingencies.

The statute also patterned OFHEO’s supervisory authority after that of the bank and thrift regulators. OFHEO is empowered to administer multitiered capital requirements, enforced by its **prompt-corrective-action** powers and supplemented by an on-site examination process, allowing the agency to focus on the totality of each firm’s operations.

Despite similarities in the regulatory structures of OFHEO and bank and thrift supervisors, the actual capital standards by which OFHEO is evaluating Freddie Mac and Fannie Mae differ from those applied to the depositories by their regulators. In all, Freddie Mac and Fannie Mae are subject to three capital

standards, while the depositories must meet two. The enterprises currently must comply with **minimum capital** and **critical capital** standards. In the coming months, the two companies will need to adjust their capital to satisfy a risk-based level determined by a **stress test**, which OFHEO is now developing.

The Freddie Mac-Fannie Mae standards for minimum and critical capital are based on simple ratios (see “Avoiding Capital Trip Wires,” page 49). This concept is much the same as that used to calculate the **leverage limits** and **critical levels** to which banks and thrifts are bound. The proportion of capital that the enterprises must hold relative to **on-balance-sheet** assets is lower than that imposed on banks and thrifts, but the enterprises’ ratios are more far reaching in that they also incorporate **off-balance-sheet** obligations. Comparable requirements for banks and thrifts cover assets only.

The stress test that OFHEO is devising, unlike the depository leverage ratios, is tailored to the

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specific risks of each company—for example, it measures the risks associated with mortgages. Essentially, the stress-test approach focuses on the ability of each enterprise to withstand severe default and interest-rate stresses over a 10-year period. In contrast, the current risk-based capital standards for banks and thrifts rely on weighting asset types by a handful of risk categories using international standards recommended in the **Basle Accord** formulated by the Basle Committee on Banking Supervision.

Striking a Proper Balance

In creating a new regulatory structure for Freddie Mac and Fannie Mae, Congress attempted to balance the need for safety and soundness with the need for the enterprises to fulfill their public purposes. Freddie Mac and Fannie Mae are federally chartered institutions, singularly focused on providing funding assistance to residential mortgage lenders. Consequently, regulatory supervision of the enterprises is shared. OFHEO, an independent agency within the Department of Housing and Urban Development (HUD), is responsible for safety and soundness considerations. HUD, meanwhile, oversees the enterprises' public mission, in part by requiring the pair to meet specific affordable-lending goals. These goals are geared toward increasing the supply of mortgage credit for low- and

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moderate-income families and for residents living in areas where home loans may be difficult to obtain.

To assist the enterprises in their efforts to achieve their public purposes, Congress granted the two organizations special benefits. The marketplace, of its own accord, has decided that these benefits amount to an implicit government guarantee. That is, a widespread perception exists that the federal government will repay the financial obligations of either enterprise if the company cannot do so itself.

The belief within the financial community that Congress will come to the aid of a struggling Freddie Mac or Fannie Mae also influences how the companies fare. In one sense, the implicit guarantee serves to strengthen the financial soundness of Freddie Mac and Fannie Mae.

The implicit guarantee, for example, helps the enterprises fund virtually all loan maturities by issuing large amounts of **callable** and **noncallable debt** at attractive interest rates. These rates are lower than those offered by the most creditworthy private debt issuers and only slightly higher than those available on Treasury notes. This reduces the **liquidity risk** of the enterprises relative to fully private firms and also enables them to manage larger amounts of interest-rate risk.

Due to the implicit guarantee, the debt market imposes significantly less discipline on the enterprises than it does on fully privatized companies. Private firms must pay higher prices to borrow when they are too thinly capitalized to safely cover their risks. The marketplace, though, treats the enterprises' debt securities as very secure investments, regardless of the companies' financial health or degree of leverage.

A risk-based capital standard would go a long way toward providing the enterprises with market-like incentives, provided the capital measure adequately reflects the risks that Freddie Mac and Fannie Mae pose to the federal government and, by extension, to taxpayers. Mindful of that objective, OFHEO is employing state-of-the-art knowledge about stress testing to produce a risk-based capital standard that is forward-looking,

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Avoiding Capital Trip Wires

In terms of importance, the risk-based capital standard now in development will supersede but not eliminate the two regulatory standards already in place to measure the capital adequacy of Freddie Mac and Fannie Mae. To meet the risk-based capital requirement, the enterprises soon must also be able to survive a **stress test** that will correlate the firms' capital levels and risk exposures with greater precision. The two current standards—gauges of **minimum** and **critical capital** levels—are based on ratios and, therefore, focus on broad categories of risk against which the pair must hold sufficient capital.

The minimum capital level is calculated by adding together the results of two ratios—2.5 percent of aggregate **on-balance-sheet** assets and 0.45 percent of the unpaid principal balance of outstanding **mortgage-backed securities** and substantially equivalent instruments. (More complex rules apply to interest-rate contracts, foreign-exchange contracts and outstanding loan-purchase commitments.) The critical capital standard is roughly one-half the minimum capital standard.

For purposes of meeting the risk-based capital standard, capital is defined as **loan-loss reserves plus core capital**—common stock, certain preferred stock, **paid-in capital** and **retained earnings**. To gauge compliance with the minimum and critical capital requirements, the narrower core capital definition is used.

Failure to meet any of the three capital standards at any point in time will set in motion mandatory intervention by the Office of Federal Housing Enterprise Oversight (OFHEO). The severity of regulatory actions is determined by the degree to which an enterprise falls short of its capital requirements.

An enterprise would qualify as *undercapitalized* if it fails to meet its risk-based requirement, even if the company can satisfy the minimum capital standard. Until the risk-based

capital standard is in place, however, meeting the minimum capital standard is sufficient for an enterprise to receive an adequately capitalized designation. When undercapitalized, the enterprise must develop an acceptable plan to restore its capital position to a level at or above the risk-based requirement. Concurrently, the company may face limitations imposed by OFHEO on its ability to pay dividends.

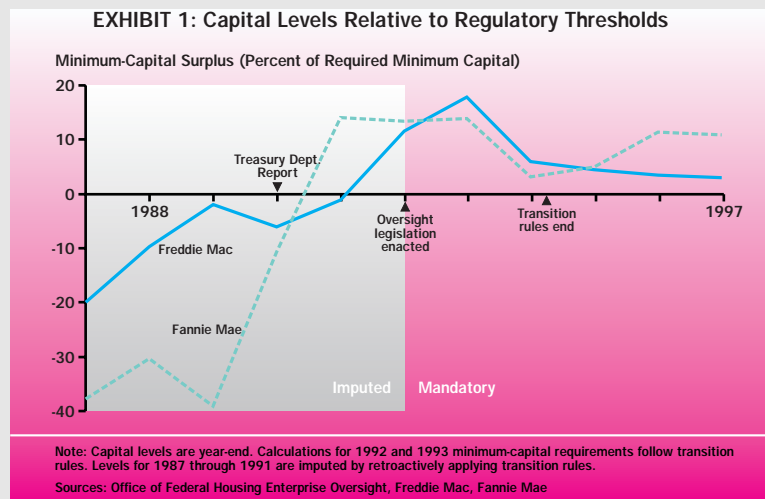
An enterprise would rate a *significantly undercapitalized* classification when its core capital fails to meet the minimum capital level and its risk-based capital fails to meet the risk-based capital level. If this condition occurs, OFHEO's enforcement authorities would expand to include operation constraints, such as restricting the company's business volume.

An enterprise would cross into the *critically capitalized* zone once the company's regulatory capital fails all three adequacy tests, including the critical capital requirement. As

the last capital trip wire, the critical capital test is intended to signal the point at which OFHEO generally should intervene directly and put a weak enterprise into **conservatorship**. In other words, the government is required to assume control of a company that fails to meet its critical capital requirement unless certain exceptional circumstances exist.

OFHEO has determined that both enterprises have met the minimum capital standard for every quarter since mid-1993, when OFHEO first became responsible for determining the capital

adequacy of the companies. The capital levels at the two companies were called into question some years earlier when a 1990 Treasury Department report concluded that the enterprises were undercapitalized. In the wake of that assessment, the companies significantly increased their capital positions (*Exhibit 1*).



Following the publication of an influential Treasury report in 1990, Freddie Mac and Fannie Mae began boosting their capital holdings. Consequently, once minimum capital requirements were enacted in 1992, both companies surpassed their regulatory thresholds and have continued to do so. In 1997, Freddie Mac set aside \$7.4 billion in core capital, exceeding the regulatory minimum by 4 percent. Fannie Mae, at twice the asset size, held \$13.8 billion in capital, clearing the 1997 regulatory hurdle by 9 percent.

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responsive to change and focused on the risks taken by the enterprises (see “Enough Is Enough: A Timely Look at Financial-Soundness Measures,” page 28).

Getting at the Risks in Risk-Based Capital

The risk-based capital standard will require Freddie Mac and Fannie Mae to hold sufficient capital to survive the expected effects of subjecting each enterprise’s current book of business to a 10-year stress test. The test will project credit losses from mortgage defaults and loss severities on a national scale comparable to the worst historical mortgage-default-loss experience in any region of the country. The statute defines this benchmark as the worst loss experience on mortgage loans for a period of at least two years in an area of the nation that includes at least 5 percent of the population. Using historical enterprise data, OFHEO has identified as a benchmark the 30-year, fixed-rate mortgages originated in Arkansas, Louisiana, Mississippi and Oklahoma in 1983 and 1984, just before oil prices collapsed. During the first five to six years into the lives of these loans, house prices in the region fell about 16 percent. As a result, the 1983 and 1984 vintage mortgages purchased from that region by the two companies experienced high levels of failure. OFHEO’s research shows that these mortgages defaulted at an

average 14.9 percent in their first 10 years, leading to dollar losses equaling 63.3 percent of the original principal balance of the loans—clearly a severe scenario and, therefore, a stringent benchmark.

In addition to simulating massive default losses, the statute requires the stress test to introduce sizable interest-rate shifts, with increases of as much as 75 percent and decreases of as much as 50 percent. Finally, the capital standard assumes the companies will encounter unspecified **management and operations risks** that will increase required capital by another 30 percent.

In designing the stress test, OFHEO’s charge was to identify and incorporate all significant credit and interest-rate risks to which the enterprises are exposed. To do this, OFHEO developed sophisticated econo-

metric models as well as software to project the cash flows associated with all of the enterprises’ assets, liabilities and off-balance-sheet activities. The stress test also credits the enterprises for various risk-mitigation activities and accounts for the use of callable debt and derivatives. The basic components of the resulting stress test are diagrammed in “Anatomy of a Stress Test,” opposite page.

The risk-based capital standard will bear no fixed relationship to the minimum capital standard, given its sensitivity to changing risk conditions. Theoretically, if the enterprises reduce their risk exposures sufficiently, the risk-based standard could produce a capital requirement below that of the minimum standard.

Viewing Capital Through a Prescient Lens

As a highly sophisticated form of capital regulation, a stress test is capable of capturing each enterprise’s specific exposure to credit and interest-rate risks. Unlike the capital requirements for banks and thrifts, which are built on ratio-based standards, the capital standard derived from stress testing is forward-looking and more sensitive to fluctuations in the economy, as well as to changes in an enterprise’s asset composition, funding strategies or off-balance sheet exposures (see “No Fair! Their Capital’s

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Anatomy of a Stress Test

Translating the economic shocks produced by a stress test into projected company performance is no simple task. The quality of the projections, not surprisingly, is critical to the veracity of the exercise.

To date, the Office of Federal Housing Enterprise Oversight (OFHEO) has built a financial simulation model to project separate financial performances for Freddie Mac and Fannie Mae. At present, OFHEO is projecting the performance of the enterprises using different starting-position data. This analysis helps OFHEO determine the appropriate assumptions regarding such factors as the shape of the Treasury yield

curve, the connection between Treasury rates and the companies' borrowing rates and the relationship between house prices and interest rates.

Exhibit 1 lays out the numerous steps involved in assessing how long a company's capital will last under stressful economic conditions that adversely impact the bottom line.

Step 1—Database: OFHEO standardizes and enters historical data obtained from the enterprises into models to determine the appropriate relationships between mortgage-risk factors and enterprise performance. Data on the enterprises' current books of business represent the starting positions for the stress test.

Step 2—Interest Rates: Interest-rate models built by OFHEO simulate future movements of Treasury yields and related interest rates and indexes that affect enterprise performance.

Step 3—House Prices: OFHEO includes past house prices and future house-price projections as part of the stress test because they directly affect the likelihood of mortgage default and prepayment and the magnitude of resulting losses. House prices are measured by indexes calculated from past house-price movements.

Step 4—Benchmark Loss Experience: OFHEO makes assumptions regarding default losses for the stress test that are based, by law, on the country's worst regional default-loss experience. Models of mortgage performance must produce

results that are consistent with this benchmark loss experience.

Step 5—Mortgage Performance: Models simulate whether and when a mortgage prepays or defaults, as well as the severity of any resulting default losses. These three factors translate directly into enterprise financial performance. OFHEO's models replicate the benchmark loss experience based on mortgage risk factors—

for both single-family and multifamily properties—taken from enterprise databases, interest rates and house prices.

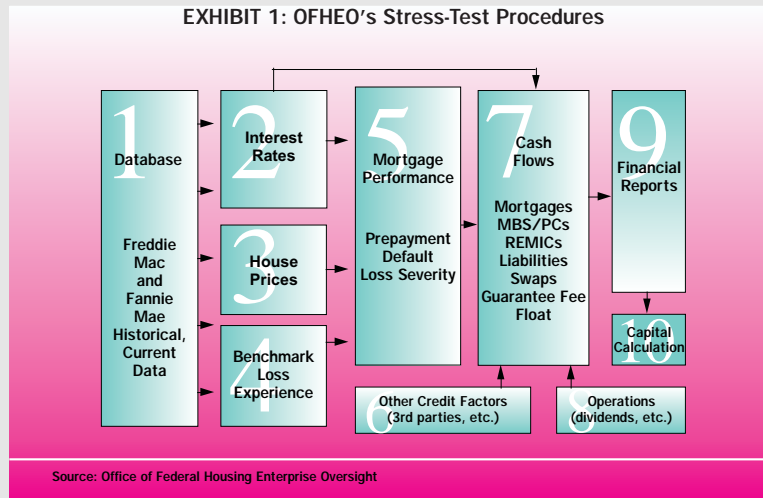
Step 6—Other Default Factors: Models simulate benefits of **third-party credit enhancements**, such as private mortgage insurance, as well as the creditworthiness of such third parties.

Step 7—Cash Flows: Models project cash flows from all enterprise assets, liabilities and off-balance-sheet activities.

Step 8—Operations: OFHEO assesses enterprise performance, in part, by accounting for key aspects of enterprise operations, such as dividend payouts and assumptions about operating costs, new financing and short-term investing.

Step 9—Financial Reports: Accounting software generates **pro forma financial statements** showing resulting capital levels for each period during the 10-year stress test. Results are based on cash-flow-model outputs and certain assumptions about enterprise operations.

Step 10—Capital Calculation: Given the results of the stress test, a computer program determines the additional amount of starting capital that the enterprise would need to pass the risk-based capital requirement.



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Lower Than Mine,” page 22).

OFHEO's stress test will relate economic conditions to mortgage performance and, ultimately, to required capital. House-price growth influences mortgage credit-loss rates, which, in turn, affect the bottom lines of Freddie Mac

and Fannie Mae. For example, when house prices increase, homeowner equity rises and the probability of borrowers defaulting on their mortgages declines. Therefore, rising house prices in and of themselves would suggest that the companies need to hold less capital in reserve. The opposite would be true when house prices fall. By administering the stress test on a quarterly basis and adjusting the pair's capital requirements accordingly, OFHEO will uncover changes in capital needs *before* house-price changes can impact the enterprises' balance sheets to any significant extent. In contrast, bank and thrift regulators must rely on static capital ratios that change only *after* loans have defaulted.

The stress test is more dynamic than the depositories' capital ratios because the entire

business portfolio of the enterprise—from assets and liabilities to off-balance-sheet obligations—is modeled. A change in interest rates, for example, alters the performance of the enterprises in a number of ways. On the asset side, changes in interest rates influence mortgage **prepayment** rates directly and default rates indirectly. In other words, falling interest rates result in good mortgages prepaying while bad mortgages remain in force; thus, the remaining book of business most likely will experience higher **conditional default rates**.

Changes in rates also affect income generated from existing **adjustable-rate mortgages** and other floating-rate assets. On the liability side, interest-rate shifts impact the enterprises' borrowing costs through new debt issuance and also influence decisions about when to exercise options on existing callable debt. From a regulatory perspective, the dynamic nature of the stress test facilitates OFHEO's understanding of how changes in the economy will impact the enterprises.

The holistic approach to modeling risks made possible through the stress test will help avoid creating unintended incentives for the enterprises to step up riskier activities or ignore safer activities by aligning capital requirements more closely with actual risks. The same is not true for depositories. Bank and thrift capital requirements, for example,

assign most mortgages to a single risk category, regardless of the down payments they carry. That provides an impetus for banks to book higher-risk loans—that is, those with smaller down payments—to obtain a higher return. Conversely, the indifference of the depositories' capital requirements to collateral amounts works against any tendency to book less risky loans with large down payments. The stress test, on the other hand, will differentiate down-payment and other mortgage features by risk. When other risk factors are equal, the stress test will generate a higher capital charge for smaller-down-payment loans than for larger-down-payment loans. This is consistent with the risk-based-pricing concept towards which the enterprises are moving (see “Get Set for Loan-Level Pricing,” *SMM*, July 1997).

A stress test also provides greater flexibility to meet regulatory capital requirements than do the current bank and thrift capital requirements. In modeling the liability side of the balance sheet, the stress test will encourage the enterprises to continue to use financial instruments such as callable long-term debt and derivatives to reduce their overall risk exposures.

Keeping Up with Market Changes

Reliance on a stress test alone to determine risk-based capital cannot ensure capital adequacy. A stress test, because it is based on

statistical models, is limited in important ways that must be understood before it can become an effective tool for regulatory oversight. Embedded in the stress test are a number of assumptions derived from the previous experiences of the enterprises. For one, OFHEO's stress test uses models of mortgage default and prepayment that are estimated using historical data on mortgages purchased by the enterprises. As a reflection of past borrower behavior, historical data may not provide the best basis for projecting the performance of new mortgage products or mortgages originated using new underwriting standards. In some cases, a significant period of time may pass before OFHEO can collect and analyze enough new data to appropriately update the stress test.

Changes in the behavior of the enterprises also can impact the effectiveness of the stress test. As reflected in their underwriting standards, Freddie Mac and Fannie Mae historically have operated in the **prime mortgage market**. The general uniformity among the mortgages traditionally purchased by the enterprises has enabled OFHEO to reasonably model borrower repayment performance by aggregating loans into broad categories, such as 30-year, fixed-rate, single-family mortgages. To the extent that the enterprises increase their presence in the **subprime mortgage market**, however, the modeling approach may require modifica-

tion because subprime products react differently than prime mortgages do to economic stress.

Another important deficiency in all risk-based capital standards, including ones that are based on a stress test, is that they best measure only known, quantifiable risks. Significantly, management risks



and operations risks do not lend themselves well to quantification. That is why the law behind the risk-based capital standard requires the pair to hold a sufficient amount of capital to pass the stress test plus an additional 30 percent to cover unspecified management and operations risks. It is important to incorporate a measure of these risks; management and operational errors probably do not endanger the enterprises in ways proportional to default risk and interest-rate risk. A more flexible approach to assigning capital for management and operations risks might work better.

Fortunately, OFHEO's other

essential regulatory tool, the on-site examination program, takes over where the stress test leaves off. OFHEO's staff of examiners can identify nonquantifiable risks that the stress test misses. Just as importantly, OFHEO's risk-based examination program ensures that Freddie Mac and Fannie Mae are following risk-management practices that work. After all, no reasonable amount of capital is sufficient to compensate for inadequate risk management. The profitability of the enterprises depends on their ability to effectively manage risk across the entire spectrum of risk-taking activities.

Looking Ahead

When implemented, OFHEO's stress test for the enterprises will provide the most advanced form of capital regulation in operation for any federally regulated financial institution. Though its strengths are many, the stress test is not perfect. Consequently, OFHEO is relying on its comprehensive risk-based examination program to complement its capital regulation. OFHEO expects the board of directors and executive management of each enterprise to promptly address any deficiencies uncovered by either the stress test or the examination process. Together, these efforts will enable OFHEO to provide the effective regulatory oversight necessary to ensure that the enterprises remain safe and sound. SMM