in the Enterprises' different activities. To this end, OFHEO will incorporate, to the extent feasible, consistent relationships between the economic environment of the stress period and the Enterprises' businesses. This will require modeling the Enterprises' assets, liabilities, and off-balance sheet positions at a sufficient level of detail to capture their various risk characteristics. Taking all this into consideration will require a balance between the complexity and realism of the stress test and its timeliness.

## **Solicitation of Public Comments**

OFHEO requests public comment on a number of subjects that must be addressed in its risk-based capital regulation. OFHEO will consider the comments received in response to this ANPR when developing a proposed rule. Following consideration of comments on the proposed rule, OFHEO will issue a final regulation. When addressing a specific question contained in this ANPR, OFHEO asks that commenters specifically note by number which question is being addressed.

## I. Credit Risk

The Enterprises face similar mortgage credit risk in their portfolio and securitization businesses. OFHEO defines mortgage credit risk as the risk of financial loss due to borrower default and subsequent foreclosure and liquidation of a mortgaged property. Losses are realized when the unpaid loan balance on a defaulted mortgage exceeds the net proceeds of a foreclosure sale, after deducting carrying and selling costs, less any recoveries from any private mortgage insurer, recourse agreement, or other credit enhancements.

Loans with high current LTVs, where the borrowers have little to no equity in their homes, are the most likely to default. For any given set of mortgage loans, the probability of default is typically low in the first year after origination, rises to a peak somewhere between the third and seventh year, and declines thereafter. If declining interest rates induce prepayments on a group of mortgage loans due to borrower

refinancing activity, defaults and losses on those mortgage loans likely will be reduced, because some of the prepaid loans would ultimately have defaulted. However, the remaining group of loans is likely to be at greater risk of default, because it includes all of the original loans where the borrower would not have qualified for refinancing, but only some of the loans where the borrower was eligible.

Economic downturns result in more frequent and severe losses in all categories of mortgage loans, especially in a period of house price declines. The stress test will incorporate changes in the economic environment and simulate the relationship of those changes to mortgage defaults.

## A. Defining a Stress Benchmark

The Act, in defining the risk-based capital stress test, refers to two time periods—a hypothetical ten-year "stress period" during which the Enterprises' capital should be sufficient to absorb losses and maintain a positive capital level while being subjected to adverse credit and interest rate risk scenarios, and the time period of "not less than two years" for which the "highest rates of default and severity of mortgage losses" occurred in a region containing at least five percent of the total population of the United States. 12 For the purposes of this ANPR, OFHEO characterizes the latter time period and region as a "stress benchmark." The stress benchmark will provide the basis for the development of the credit risk stress scenario that will be applied during the ten-year stress period.

The Act permits the identification of one or more stress benchmarks. A single benchmark is conceptually appealing but presents a number of difficult issues. A single benchmark may not include sufficient data on all Enterprise product types. Patterns of multifamily and single family mortgage losses differ (see "Mortgage Types" below) and a stress benchmark for multifamily mortgages representing the worst regional experience for those mortgages may not coincide with the benchmark for single family mortgages based on their worst experience. Finally, data limitations may prevent OFHEO from determining loss severities during the period of highest default rates; alternatively, highest loss severities may not coincide with highest rates of default by time period or region.

Although the Act does not refer to a particular mortgage product in its reference to "highest rates of default and severity," single family, 30-year, fixed-

rate mortgages have long comprised the bulk of Enterprise mortgages. OFHEO expects to define a stress benchmark for these mortgages on the basis of a weighted average (by unpaid loan balance of various LTV groups) of default rates.

Existing data on loss severities may be inadequate to contribute to establishing the timing or location of the worst regional experience. Systems for the storage and analysis of data on foreclosed properties are a relatively recent development. To overcome these data deficiencies, OFHEO will consider a number of approaches to determining loss severity rates during the stress benchmark. These approaches include the use of loss severity estimates obtained from different sources and for different time periods and regions than those used to estimate the benchmark default rates.

OFHEO may use models (see "Models of Default and Prepayment" and "Models of Loss Severity" below) to establish aspects of the benchmark for which data are insufficient or unavailable. These might include, in addition to loss severities for all products, default rates for mortgage products poorly represented or nonexistent in the stress benchmark. Econometric models for default, mortgage prepayment, and loss severity would facilitate consideration of the simultaneous impact of many factors on default rates, such as changes in LTVs, the impact of contemporaneous prepayments, and the impact of factors associated with mortgage product types. Models would provide a link between the performance of mortgages owned or guaranteed by the Enterprises during the stress period and performance during the stress benchmark, with due consideration of the economic circumstances of the stress period, e.g., interest rates and house prices.

## Data Issues

OFHEO has received access to detailed information about the loss experience on mortgages that the Enterprises owned or guaranteed from the mid-1970s through the present. The type of information on mortgages that OFHEO needs to develop the stress test includes date of origination, original LTV ratio, type of mortgage, location, nature and degree of any credit enhancements, date of last paid installment, termination type, e.g., default or prepayment, and the amount of any ultimate loss (including holding and selling costs). However, there are serious gaps in the data on loss severity through the early 1980s resulting from the lack of systems for the storage and

<sup>11</sup> For example, see C. Foster and R. Van Order, "An Option Based Model of Mortgage Default Rick," Housing Finance Review, 3(4):351–372, 1984; C. Foster and R. Van Order, "FHA Terminations: A Prelude to Rational Mortgage Pricing," AREUEA Journal, 13(3):273–291, 1985; and R.L. Cooperstein, F.S. Redburn, and H.G. Meyers, "Modelling Mortgage Terminations in Turbulent Times," AREUEA Journal, 19(4):473–494 For a review of the literature in this area, see R.G. Quercia and M.A. Stegman, "Residential Mortgage Default: A Review of the Literature," Journal of Housing Research, 3(2):341–379, 1992.

<sup>12</sup> Section 1361(a)(1) (12 U.S.C. 4611(a)(1)).