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January 17, 2002

*By Electronic Mail and Courier*

**Freddie  
Mac**

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Alfred Pollard, Esq.  
Office of Federal Housing Enterprise Oversight  
1700 G Street, NW  
Washington, DC

Re: Risk-Based Capital Proposed Regulation; RIN 2550-AA23

Dear Mr. Pollard:

Freddie Mac respectfully submits these comments to the December 18, 2001 proposal<sup>1</sup> by the Office of Federal Housing Enterprise Oversight ("OFHEO") to amend the risk-based capital rule published in the *Federal Register* on September 13, 2001 (the "Rule").<sup>2</sup>

Freddie Mac and Fannie Mae (the "Enterprises") serve a fundamental role in the nation's housing finance system. It is therefore vital to homebuyers, mortgage lenders, home builders, real estate professionals and others in the housing industry, as well as to the Enterprises, that OFHEO's risk-based capital rule appropriately relate capital to risk, operate effectively and accommodate innovation. We applaud OFHEO's efforts to better tie capital to risk and OFHEO's commitment to act expeditiously to remedy any technical and operational issues. Freddie Mac strongly supports a well-implemented risk-based capital standard that will ensure the continued flow of mortgage funds to America's families.

## **I. INTRODUCTION**

Congress passed the Federal Housing Enterprises Financial Safety and Soundness Act of 1992 (the "1992 Act") to modernize the regulatory structure of the Enterprises. The 1992 Act created OFHEO and established a minimum capital standard. It also granted OFHEO examination authority and other regulatory tools to assist OFHEO in its effort to

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<sup>1</sup> 66 Fed. Reg. 65146 (Dec. 18, 2001). (Subsequent references to provisions of the current proposal or its preamble will be to the specific section of the proposal or to the appropriate *Federal Register* page in the case of the preamble.)

<sup>2</sup> 66 Fed. Reg. 47730 (Sep. 13, 2001), *codified at* 12 C.F.R. Part 1750, Subpart B, Appendix A. (Subsequent references to provisions of the Rule or its preamble will be to the specific section of the Rule or to the appropriate *Federal Register* page in the case of the preamble.)

supervise Enterprise safety and soundness. The most innovative feature of the 1992 Act is its risk-based capital standard.

Unlike the ratio-based capital standards for other regulated financial institutions, the 1992 Act establishes a risk-based capital standard that requires Freddie Mac and Fannie Mae to hold sufficient capital to withstand ten years of specific, severely adverse economic conditions. The statutory stress test incorporates the Enterprises' major risks (interest-rate risk and credit risk) by way of specified stresses, provides that all other stress test specifications must be historically based and consistent with the statutory stresses, and adds another 30 percent to the capital requirement to account for management and operations risk. Addressing the risk of the Enterprises in an integrated and comprehensive manner, the stress test is the most robust, dynamic and rigorous capital standard in the industry – one few other financial institutions could pass.

Freddie Mac and OFHEO have consistently viewed the implementation of the risk-based capital standard against the following four shared objectives:<sup>3</sup>

- The risk-based capital test must be consistent with the 1992 Act;
- The risk-based capital test must appropriately tie capital to risk;
- The risk-based capital test must be operationally workable; and
- The risk-based capital test must accommodate innovation.

OFHEO's proposed amendments to the Rule principally address the objective of tying capital to risk. However, the risk-based capital test cannot effectively tie capital to risk unless its specifications are solidly grounded in historical facts. Congress recognized this in the 1992 Act by explicitly requiring any stress test specifications not specifically set forth in the statute to be based on accepted historical information and on reasoned analysis of that information.<sup>4</sup> Congress intended that "any methodology chosen be generally recognized by experts as valid, and that any assumptions employed be, to the extent possible, historically based and internally consistent."<sup>5</sup>

The stress test will most appropriately tie capital to risk if it captures the actual contractual terms of the applicable instruments, or uses a reasonable simplification that

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<sup>3</sup> These core principles were articulated by Freddie Mac's Chairman and CEO, Leland C. Brendsel, in remarks made on March 25, 1999 and in Freddie Mac's March 10, 2000 comments on OFHEO's Notice of Proposed Rulemaking on Risk-Based Capital, 64 Fed. Reg. 18084 (Apr. 13, 1999) ("NPR2") (Subsequent references to provisions of NPR2 or its preamble will be to the specific section of NPR2 or to the appropriate *Federal Register* page in the case of the preamble). Speaking to the Mortgage Bankers Association of America's Washington Leadership Conference on March 6, 2000, OFHEO Director Armando Falcon said, "I wholeheartedly agree with all four of these goals [be consistent with the law, be operationally workable, accommodate innovation and tie capital to risk]. OFHEO has shared those objectives from the beginning and I am confident that the final rule will meet those goals."

<sup>4</sup> See 1992 Act §§ 1361(a)(4), (b)(2).

<sup>5</sup> H.R. Rep. No. 102-206, at 65 (1991). See also S. Rep. No. 102-282, 21 (1992) (losses must relate to prevailing practices or, better, broad historical data).

captures the economic impact of those terms. Only in this way will the test meet the legal requirement that it be based on available information. Our comments reflect our shared goal of tying capital to risk, as well as our views on how that can best be accomplished.

## II. SUMMARY OF COMMENTS

Freddie Mac generally supports the changes that OFHEO proposes because they would move the Rule closer to the goal of tying capital to risk. The proposal also raises important issues that require modifications to the proposal prior to implementation to meet this goal. While those issues are substantial, they can readily be addressed prior to implementation of the proposal.

The proposal moves significantly closer to tying capital to risk in a number of areas.

- Counterparty Credit Risk. The treatment of counterparty credit risk (“haircuts”) has been improved. The proposal would recognize that the level of loss upon default by a counterparty would be reduced substantially by recoveries. The proposal also would phase in counterparty-credit-risk haircuts over the full ten years of the stress period, rather than over the first five years, in recognition of the likelihood that defaults would occur later during the stress period. In addition, the proposal would recognize the risk-reducing impact of master netting agreements, which permit netting of payments to and from a counterparty upon default.
- Multifamily. The proposal would improve the Rule’s multifamily mortgage models, by recognizing the economic and behavioral impact of contractual yield maintenance agreements and by making other improvements.
- Refunding Assumptions. The proposed new refunding assumption would be an improvement in one respect. That is, by selecting, as a long-term/short-term debt-mix target, an Enterprise’s actual long-term/short-term mix as of the start of the stress period, the proposal is closer to realistic mortgage funding than the 50-50 long-term/short-term debt mix target now specified in the Rule, which bears no relationship to prudent risk management.
- Contractual Terms. The proposal would recognize additional types of contractual terms in call and other options and would make a number of other improvements that can improve the Rule’s ability to tie capital to risk. Freddie Mac supports the approach of modeling contractual terms or a reasonable simplification when necessary.

The proposal also raises important issues that require OFHEO’s attention prior to implementation. If these issues are not addressed, the Rule will fail to tie capital to risk and will adversely affect markets and the availability of mortgage finance.

- Counterparty Credit Risk. Despite the changes in the proposal, important issues remain in the area of counterparty haircuts. There remains an excessive distinction between haircuts applicable to AAA- and AA-rated counterparties compared with historical differences in performance. Also, the proposal has not fully corrected the counterparty loss severity rates, which continue to exceed what historical data support. The proposal's treatment of non-derivative haircuts still would apply to mortgage-related securities in a way that can perversely increase capital requirements even when credit risk is reduced.
- Foreign Currency Swaps. The proposal raises issues in the way it proposes to apply haircuts to foreign currency swaps. It proposes to do so in a way that assumes, without any historical basis, that the U.S. dollar would devalue 100 percent against foreign currencies. The result could effectively cut American homeowners off from overseas sources of funds for financing mortgages.
- Enterprise Cost of Funds. The proposal would add, without any factual basis, a 10-basis point increase in Enterprise funding costs during the stress period. The result would be an unjustified tax on the financing of mortgages.
- Refunding Assumptions. The proposal's refunding assumption would effectively result in an additional 50-basis point increase in Enterprise funding costs based on an assumption that the Enterprises would make irrational decisions about what type of new debt to issue throughout the stress period. This also would be an unjustified tax on the financing of mortgages.

Again, while these issues are substantial and require modifications to the proposal prior to implementation to meet the goal of tying capital to risk, they are all susceptible to reasonable, readily implementable solutions, which we discuss in our comments below.

### III. COMMENTS

#### A. Counterparty Haircuts

OFHEO has proposed to revamp substantial portions of its current treatment of counterparty credit risk, and Freddie Mac supports the direction of the changes that would more closely align capital requirements with actual risks. These proposed improvements to the stress test specifications would move the Rule closer to the statutory requirement that "[l]osses or gains on other activities . . . be consistent with the stress period."<sup>6</sup> We are encouraged that OFHEO is now proposing to calculate haircuts on the basis of separate default and severity rates and to consider the effect of netting. Both of these changes are consistent with widely-accepted methodologies. In addition, OFHEO's proposed phase-in period for haircuts, while remaining conservative, is now more consistent with empirical data.

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<sup>6</sup> 1992 Act § 1361(a)(4).

Despite the positive direction of the proposed amendments to counterparty haircuts, certain provisions of OFHEO's proposal still fail to tie capital requirements to actual risks. The 1992 Act's stress test conditions are quite stringent, and OFHEO should not attempt to augment these stresses with specifications that deviate significantly from historical data or fail to model contracts (or make reasonable simplifications). Artificially high haircut charges will have substantial secondary effects and will introduce distortions that could reduce, rather than enhance, Enterprise safety and soundness. Dr. Frank Fabozzi has asserted:

By imposing haircuts far more severe than warranted, OFHEO significantly raises the cost of Freddie Mac's risk management strategy to lay off risk to third parties. Paradoxically, this sets up a perverse capital regime that rewards Freddie Mac for retaining *more* risk than it currently does.<sup>7</sup>

Freddie Mac believes that OFHEO should revisit several provisions in its proposed amendments and make appropriate adjustments in order to better align haircuts with accepted views of actual risks and historical experience. In the following paragraphs, we offer specific comments on OFHEO's proposed haircut-related amendments.

## 1. Default Rates for AA-Rated Counterparties

### Background

In NPR2, OFHEO proposed a 20 percent cumulative haircut on expected cash flows from AA-rated companies and a 10 percent cumulative haircut on expected cash flows from AAA-rated companies.<sup>8</sup> Implicitly, these haircuts corresponded to default rates of 20 percent and 10 percent, with a 100 percent loss-given-default. This 2:1 ratio was changed to a 3:1 ratio in the Rule, with OFHEO specifying a 15 percent haircut on obligations of AA-rated companies and 5 percent on obligations of AAA-rated companies.<sup>9</sup> In its current proposal, OFHEO would reduce the default rates for AA-rated entities to 12.5 percent, resulting in a 2.5:1 ratio of AA to AAA haircuts.

### Discussion

The Enterprises use contractual agreements with counterparties to reduce credit risk, interest rate risk and liquidity risk. There are very few AAA-rated counterparties in the market; accordingly, most of the counterparties the Enterprises currently use are AA-

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<sup>7</sup> Letter of Dr. Frank J. Fabozzi to Leland Brendsel, dated September 19, 2001, at 12 (attached as Appendix 1 to this comment).

<sup>8</sup> 64 Fed. Reg. at 18155.

<sup>9</sup> 66 Fed. Reg. at 47777; OFHEO also cut the phase-in period of these haircuts in half in the Rule, effectively increasing the cumulative haircuts charged during the stress period, notwithstanding a reduction in absolute haircut rates.

rated. While there is, of course, a distinction in the credit quality of AAA and AA counterparties, OFHEO's proposed amendment to the Rule continues to overstate this distinction significantly. The proposal therefore fails to meet statutory requirements, could have considerable adverse impact on the mortgage insurance industry and would create perverse incentives to retain risk.

In specifying default rates, OFHEO has sought to justify highly stressful specifications, even when reliable empirical evidence is not available to support its choices. In the case of counterparty haircuts, OFHEO reaches back to Depression-era data of questionable relevance and amplifies the impact of that experience through selective use of the data. Some fundamental problems with OFHEO's methodology include the following:

- The bond-rating industry was in its infancy in the early 1930s, available information and access to issuers was substantially different from the present and ratings criteria and standards certainly were less sophisticated. Accordingly, one cannot reasonably assume that the difference in creditworthiness of an AAA-rated issuer in comparison to an AA-rated issuer is the same now as it was then.
- There is disagreement among sources as to the actual difference in default rates between categories of issuers for the years that OFHEO uses. OFHEO cites Moody's as the source of its 2.5:1 ratio. However, W. Braddock Hickman's study shows that during stressful periods like the Great Depression, AA-rated defaults occurred at only about 1.5 times those of AAA-rated defaults.<sup>10</sup>
- OFHEO indicates that a "partially offsetting factor" (presumably justifying its selection of a 2.5:1 ratio) is that "defaults of AAA-rated issuers that occur within 10 years after the cohort is formed occur later in the 10-year period than those of AA-rated issuers."<sup>11</sup> This observation is completely irrelevant for purposes of calculating a *cumulative* default ratio, where the timing of defaults has no impact on the relative number of defaults for different categories of issuers at the end of the period. Furthermore, empirical evidence demonstrates that differences in the timing of defaults of AAA- and AA-rated counterparties during the past 30 years has been minimal, and defaults for both categories of counterparties occur predominantly during the last years of the ten-year period.<sup>12</sup>
- Loss experiences dating from the Great Depression are of limited relevance today – even if there were agreement about the magnitude of those experiences and it were possible to determine that ratings methodologies are comparable to those

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<sup>10</sup> W. Braddock Hickman, *Corporate Bond Quality and Investor Experience* (1958) at 190. Notably, OFHEO also cites this study but does not attempt to explain the substantial difference in observed ratios between the Moody's and Hickman studies or indicate why it is completely discounting the findings of the Hickman study. 66 Fed. Reg. at 65147.

<sup>11</sup> 66 Fed. Reg. at 65148.

<sup>12</sup> See Moody's Investor's Service, *Default and Recovery Rates of Corporate Bond Issuers: 2000* (Feb. 2001) at 47-58 (comparison of 10-year cumulative default rates of cohorts formed each year).

used today. Alan S. Blinder has asserted that “for a host of reasons, a macroeconomic situation as severe as the Depression is extremely unlikely in the future.”<sup>13</sup>

- Contemporary data strongly supports a minimal distinction between AA- and AAA-rated issuers. In recent recessions, performance of these two categories of issuers has been nearly identical.<sup>14</sup> In the 1978-85 period (the most recent stressful period), AAA and AA 10-year cumulative default rates were approximately 1:1.<sup>15</sup> Notably, bank regulators do not view the difference in credit risk between the two categories to be sufficiently large to justify a distinction between the two in setting regulatory capital requirements.<sup>16</sup>

Maintaining an artificially high distinction between expected defaults of AAA and AA issuers is inconsistent with the 1992 Act. OFHEO was assigned the express task of specifying stress test assumptions that are “consistent” with those set forth in the 1992 Act, based on available information.<sup>17</sup> While there is virtual unanimity among modern market participants, academics and regulators that distinctions between expected defaults of AAA- and AA-rated entities should be minimal, OFHEO adopts an outlying position, supported by a flawed analysis of decades-old data of questionable relevance. A stress test specification that is so at odds with prevailing views – and that OFHEO acknowledges is an outlying view<sup>18</sup> – cannot be characterized as “consistent with the stress period or based on available information.”

Two significant problems emerge from OFHEO’s specification of an excessive distinction in the haircut charges for AA- and AAA-rated entities. First is the likely secondary impact to Enterprise counterparties. AA-rated mortgage insurers have already expressed concerns that the haircuts specified in the Rule will have a substantial impact on their businesses and profitability, and potentially could force a restructuring of the industry. OFHEO’s current proposal ameliorates but does not eliminate these problems. We do not believe that it is OFHEO’s intention to favor or harm specific Enterprise counterparties, but such impacts are inevitable to the extent that risk-based capital requirements deviate from historical data and market participants’ views of risk.

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<sup>13</sup> Blinder, A.S., *Stress Tests, Default Risk, and the Macroeconomy* (Sep. 24, 2001) (attached as Appendix 2 to this comment).

<sup>14</sup> See Moody’s Investor’s Service, *Default and Recovery Rates of Corporate Bond Issuers: 2000* (Feb. 2001) at 45 (presenting default rates by letter grade between 1970 and 2000).

<sup>15</sup> *Id.* at 47-58 (comparison of 10-year cumulative default rates of cohorts formed each year).

<sup>16</sup> See, e.g., Basel Committee on Banking Supervision, *The New Basel Capital Accord* (Jan. 2001) at 10 (assigning the same risk weight to corporate issuers rated AAA to AA-).

<sup>17</sup> 1992 Act §§ 1361(a)(4), (b)(2).

<sup>18</sup> After identifying the single source to support its proposed 2.5:1 ratio, OFHEO acknowledges that another study would support a 1.5:1 ratio for the same Depression-era bonds. OFHEO then asserts, “More recent data, in relatively favorable economic circumstances, also show greater similarity in the performance of issuers in these two rating categories.” 66 Fed. Reg. at 65147-48.

Second, specification of an unsupported distinction in haircuts offers no clear safety and soundness benefit. OFHEO's outlying position on haircuts is presumably motivated by a view that a substantial distinction between categories of issuers is "conservative" because it creates an incentive for the Enterprises to use higher-rated counterparties. However, it is unrealistically simplistic to view excessive haircuts as necessarily enhancing safety and soundness. Rather, such haircuts are simply a tax on risk management, creating a perverse incentive to retain risk rather than laying it off to third parties. Distortions are introduced whenever a haircut charge is not consistent with actual risks, and the effects of these distortions will not always enhance safety and soundness.

### **Recommendation**

Freddie Mac recommends that OFHEO reduce the difference in default rates for AA- and AAA-rated entities to a ratio of 1.5:1. The modification would recognize the greater financial strength of AAA-rated entities, yet would be empirically supportable (recent experience has demonstrated a ratio of 1:1). This change also would be consistent with the prevailing views of most academics and other regulators and would not introduce needless market distortions. We recommend that OFHEO use a default rate of 7.5 percent for AA-rated entities.

### **2. Severity Rates for Non-Derivative Counterparties**

OFHEO's proposed addition of an express severity rate in all non-derivative haircut calculations is a substantial improvement to the Rule, making its haircut calculations more consistent with accepted methodologies. The implicit assumption in the Rule that every non-derivative counterparty default would result in a complete loss is inconsistent with historical recovery data and particularly inappropriate in consideration of the high quality of most Enterprise counterparties. Notwithstanding our strong support for an express consideration of severity rates, we believe that the severity rates OFHEO currently proposes remain inconsistent with actual risk.

### **Background**

In proposing non-derivative haircuts in NPR2, OFHEO focused on issuer default rates and considered recoveries following a default.<sup>19</sup> The preamble to the Rule mentions "mixed commenter opinion with respect to recoveries"<sup>20</sup> but incorporates no express severity calculation in its non-derivative haircut charges. In its current proposal, OFHEO adds an express calculation of severity in its haircut calculation, specifying a 70 percent severity rate for non-derivative counterparties and exposures.<sup>21</sup>

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<sup>19</sup> 64 Fed. Reg. at 18152-55 (mortgage credit enhancements); *id.* at 18160-61 (non-mortgage investments).

<sup>20</sup> 66 Fed. Reg. at 47775.

<sup>21</sup> *Id.* at 65148.

## Discussion

OFHEO's specification of a 70 percent severity rate for non-derivative haircuts is simply too high. OFHEO itself provides compelling data to support a severity rate less than the rate it is proposing.<sup>22</sup> Specifically:

- OFHEO indicates that historical recovery rates are 40 percent (presumably based on Moody's data from 1920 forward);
- OFHEO cites a 39 percent recovery rate reported by Moody's for the last 20 years;
- OFHEO acknowledges Standard and Poor's reported a 44 percent recovery rate from 1981 to 1997; and
- OFHEO notes the Hickman study found a 43 percent recovery rate from 1900 to 1943.

After acknowledging that Enterprise recoveries on their mortgage and asset-backed securities holdings and their mortgage insurance claims are likely to be "substantial,"<sup>23</sup> OFHEO turns to a questionable analysis in order to support its specification of stress period recoveries that are approximately 25 percent lower than historic averages. OFHEO cites two recovery rates for the period 1930 to 1943: 34 percent from a Hickman study and 36 percent from Moody's,<sup>24</sup> noting that recovery rates "fall as low as 20 percent during the 1930s."<sup>25</sup>

A closer examination of the Moody's data calls OFHEO's analysis into question. During the period 1930 to 1943, only three years (1931-33) had recovery rates below the historical average of 40 percent.<sup>26</sup> During the rest of the years of that period, recovery rates were equal to or above the historical average of 40 percent. Thus, OFHEO's 70 percent severity rate hinges on an extrapolation of three years of outlying data.

Furthermore, the seniority and security of particular bond issues introduce further complications to the assessment of an average rate of loss severity. Median recovery rates range from the low teens to the low 70s, depending on seniority and security.<sup>27</sup> In addition, evidence indicates that recoveries for AA- and AAA-rated bonds are substantially higher than are those of lower-rated bonds, regardless of the methodology

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<sup>22</sup> *Id.*

<sup>23</sup> *Id.*

<sup>24</sup> *Id.*

<sup>25</sup> *Id.* This assertion overstates actual severity; Moody's lowest reported recovery rate is 21 percent (not 20 percent) for a *single year* during the Great Depression. Moody's Investors Service, *Historical Default Rates of Corporate Bond Issuers, 1920-1996* (Jan. 1997) at 12 (table of yearly average defaulted bond prices).

<sup>26</sup> *Id.*

<sup>27</sup> Moody's Investors Service, *Default and Recovery Rates of Corporate Bond Issuers: 2000* (Feb. 2001) at 25 (table of default recovery estimates by seniority and security).

for measuring recovery.<sup>28</sup> Freddie Mac's counterparties are predominantly rated either AAA or AA.

Finally, the Hickman and Moody's recovery rates OFHEO uses (34 and 36 percent, respectively) are based on market prices for defaulted bonds. These prices would be depressed to reflect various uncertainties and the lack of a deep and liquid market for these bonds. In addition to selecting an outlying value, OFHEO uses data that is not representative of actual recoveries. Both of the selected rates presume that the bonds are sold on default. Relying on this value to compute severities assumes that the Enterprises would act irrationally and sell any defaulted bond in a "fire sale." Hickman shows that actual recovery rates for the *same* defaulted bonds included in his study are in the range of 50 to 60 percent (depending on the discount rate).<sup>29</sup> Hickman suggests that bonds were usually undervalued soon after default, leading to excessive losses for investors who were required to sell at that time.<sup>30</sup>

### **Recommendation**

We recommend that OFHEO use a 50 percent severity rate for non-derivative counterparties. This recommendation is consistent with a reasoned analysis of historic data.

### **3. Severity Rates for Non-Derivative Counterparties – Mortgage-Related Securities**

#### **Background**

For a general corporate obligation, the counterparty credit-risk exposure is the entire amount of the obligation less recoveries. In contrast, the potential counterparty credit-risk exposure on pass-through securities backed by mortgages is limited to the guarantee amount – the amount of the shortfall resulting from mortgage borrowers' failure to make payments, which the issuer has guaranteed, less recoveries. In the case of mortgage-revenue bonds, issued by state and local housing financing authorities, the potential credit-risk is further reduced by the fact that mortgages underlying the security typically are federally guaranteed, and those that are not are additionally credit enhanced; no mortgage-revenue bond rated AAA or AA has ever defaulted.

#### **Discussion**

While the proposal would be an improvement with respect to severity of loss upon default in the case of non-derivative counterparties (by assuming a severity rate of less than the 100 percent), the proposal would not accurately account for recoveries upon default in the case of mortgage-related securities.

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<sup>28</sup> W. Braddock Hickman, *Corporate Bond Quality and Investor Experience* (1958) at 192.

<sup>29</sup> *Id.* at 119.

<sup>30</sup> *Id.* at 20.

The Rule, even with the proposed modifications to non-derivative counterparty haircuts, would apply the non-derivative counterparty haircuts to the *entire* cash flows from the mortgage-backed securities, including the pass-through amount, rather than applying the haircut to the amount of the general corporate obligation of the issuer.<sup>31</sup> In doing so, the Rule would effectively assume that losses on mortgages would increase profoundly if they were placed into a security structure, and that the increase in losses would vary by the rating of the security. Clearly, there can be no factual basis for such an assumption.

As a result, an Enterprise could have a higher capital requirement for a pool of mortgages that is guaranteed by a third-party issuer than it would for the same pool of mortgages without the guarantee. This anomaly could create a perverse incentive for the Enterprises to negotiate with issuers of mortgage-backed securities to unwind mortgage-backed securities they purchase (*i.e.*, extinguish the third-party guarantees) and thereby reduce capital requirements.

### **Recommendation**

OFHEO could correct this anomaly by applying the single-family default, prepayment and severity models already in the Rule to project the stress-period cash flows on the underlying mortgages, calculate the monthly difference between monthly cash flows on the mortgages and the monthly cash flows on the securities, and then apply the non-derivative counterparty haircut applicable to the rating of the counterparty to the difference.

Alternatively, as an interim solution, OFHEO could apply the single-family default, prepayment and severity models already in the Rule to estimate a reasonable cumulative loss rate for the mortgages underlying mortgage-related securities, over the course of the entire stress period, assume that the difference between the mortgage cash flow and the securities cash flow would always be equal to that loss rate, and apply the non-derivative counterparty haircut to that estimated difference between the mortgage and security cash flows. In our view, a conservative estimate of a reasonable 10-year cumulative loss rate, even for very low quality mortgages, would not exceed 20 percent.

If the estimated loss rate for the mortgages underlying the securities were 20 percent, the difference between mortgage cash flows in and securities cash flows out would likewise be 20 percent of the securities cash flows. If one assumes, as we recommend in our discussion of non-derivative counterparty haircuts, above, that a conservative estimate of recovery rates upon counterparty default is 50 percent, the net severity rate to account for counterparty credit risk exposure would be 10 percent (20% \* 50%).

For example, if the expected cash flow under a mortgage-backed security were \$100, \$80 of the cash flow would be covered by mortgage borrowers' payments of principal and

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<sup>31</sup> Rule §§ 3.7.2.4, 3.7.3.3[a]3.

interest. The issuer guarantee then would cover only the \$20 difference. If one assumes that, even if the issuer defaulted, an Enterprise would ultimately receive 50 cents on the dollar, the severity of loss upon the issuer's default would be \$10 (half of the \$20 guarantee amount), or 10 percent of the cash flow under the security.

#### **4. Severity Rates for Derivative Counterparties**

OFHEO proposes a 10 percent severity rate for derivative securities. Such a loss severity rate is excessive given the collateral arrangements underpinning derivative contracts. Unrealistically high severity assumptions discourage the Enterprises from taking advantage of the proven benefits of using derivatives to manage risk.

#### **Background**

The Enterprises use industry-standard collateralization provisions that are designed to all but eliminate counterparty credit risk. With respect to virtually all of their derivative agreements, the Enterprises have the ability to require counterparties to post high-quality (*i.e.*, cash or cash equivalents) to cover the replacement cost of the contract. Typical Enterprise derivative contracts permit the Enterprises to require the posting of collateral based on "marking-to-market" on a daily basis. Failure to post collateral within three business days gives the Enterprise the right to close out the contract and take any previously-posted collateral. Thus, actual loss upon default by a derivative counterparty would be limited to the change in the market value of the contract between the time collateral was last posted and the time the contract is closed out.

#### **Discussion**

An outside date for closing-out a derivative contract is two weeks from the last posting (acknowledged by OFHEO<sup>32</sup>), although we believe it much more likely that a derivative contract would be closed out more quickly. Even adopting the conservative assumption of ten business days to close out a derivative contract, a numerical example illustrates how excessive OFHEO's proposed severity rates are. During the two-week period, two factors can affect the size of the loss: (1) change in interest rates over the two-week interval; and (2) the price sensitivity of the derivative contract to the interest rate change. A 50 basis point change in long-term interest rates over a two-week period would be an extreme move.<sup>33</sup> For a five-year swap, the change in value resulting from a 50 basis point rate move would be roughly 2 percent of the swap's notional value. Yet, even a 2 percent severity rate represents an extremely conservative assumption.<sup>34</sup> A 50 basis point move would not occur repeatedly during every month of the stress period. Thus, while

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<sup>32</sup> 66 Fed. Reg. at 65148.

<sup>33</sup> By comparison, the extreme 600 basis point one-year rate shock specified by the 1992 Act for the stress test produces a maximum 24 basis point rate change over a two-week period.

<sup>34</sup> In addition, the ultimate severity is further diminished by recoveries from the counterparty. As we describe elsewhere in this comment, a reasonable assumption of recovery from the counterparty would be 50 percent.

one might lose as much as 2 percent in a single adverse move, such a large loss would not occur repeatedly in the stress period as defaulting derivative contracts are liquidated. In addition, the sensitivity of a swap to rate changes declines as the swap ages. If, in the preceding example, the swap were three years into its five-year life, the same 50 basis point change in long-term interest rates would result in a loss of less than one percent of the notional value of the swap.

In sum, the extensive use of high-quality collateralization and the ability to close out derivatives contracts quickly make it highly unlikely for an Enterprise to lose 10 percent of a derivative contract's value upon a counterparty default. Even extraordinarily severe assumptions (a full two-week close out period and a rate change more than twice as extreme as that set by the 1992 Act) support only a 2 percent severity rate.

**Recommendation**

We recommend that OFHEO reduce its proposed derivative severity rate to 2 percent, a level consistent with the impact of the contractual terms of these instruments.

**5. Summary of Haircut Default and Severity Recommendations**

OFHEO has historically set cumulative haircuts based on assumed defaults for the credit ratings of classes of issuers. In its current proposal, OFHEO is expressly computing haircuts by multiplying assumed default rates for classes of issuers by severity rates (70 percent for non-derivatives and 10 percent for derivatives). The resulting proposed cumulative haircuts are shown below:

**OFHEO PROPOSAL**

Ratings Classification	Default Rate by Counterparty	Severity Rate by Instrument		Cumulative Haircut by Instrument	
		Non-Derivative	Derivative	Non-Derivative	Derivative
AAA	5%	70%	10%	3.50%	0.50%
AA	12.5%	70%	10%	8.75%	1.25%
A	20%	70%	10%	14%	2%
BBB	40%	70%	10%	28%	4%
Below BBB*	--	--	--	100%	100%

\*Includes unrated

Freddie Mac strongly supports OFHEO's decision to calculate haircuts through the accepted methodology of multiplying default rates by severity rates. We believe, however, that the haircuts remain too severe, notwithstanding the fact that OFHEO is proposing to reduce the haircuts from the levels set in NPR2 and the Rule.

In consideration of our preceding positions concerning default rates and severity rates, Freddie Mac recommends that OFHEO adopt the following haircuts:

**FREDDIE MAC RECOMMENDED HAIRCUTS**

Ratings Classification	Default Rate by Counterparty	Severity Rate by Instrument			Cumulative Haircut by Instrument		
		Non-Derivative	Derivative	Mortgage-Related Securities	Non-Derivative	Derivative	Mortgage-Related Securities
AAA	5%	50%	2%	10%	2.50%	0.10%	0.50%
AA	7.5%	50%	2%	10%	3.75%	0.15%	0.75%
A	20%	50%	2%	10%	10%	0.40%	2%
BBB	40%	50%	2%	10%	20%	0.80%	4%
Below BBB*	--	--	--	--	100%	100%	100%

\*Includes unrated

We believe that our proposed haircuts are reasonably related to actual risks and are consistent with OFHEO's statutory obligation to set stress test specifications that are consistent with the stress period, based on available information.

**6. Phase-In**

**Background**

In the Rule, OFHEO specified a five-year phase-in period for haircuts, with the maximum haircut in effect for the final half of the stress period.<sup>35</sup> NPR2 had proposed a ten-year phase-in period,<sup>36</sup> and none of the NPR2 comments received by OFHEO questioned this specification. The preamble to OFHEO's Rule offers no explanation for the shift from ten to five years. In the current proposal, OFHEO indicates that additional analysis of default information indicates that failures of investment-grade counterparties and securities are likely to be more evenly distributed throughout the stress period, supporting a revision to a linear phase-in of haircuts over a ten year period.<sup>37</sup>

**Discussion**

Freddie Mac supports OFHEO's decision to return to a ten-year phase-in. The existing five-year provision is empirically unsupportable, and OFHEO's unexplained change from its NPR2 specification is inconsistent with the requirements of the notice-and-comment rulemaking process. We believe that adoption of a ten-year phase-in period for haircuts will move capital requirements closer to actual stress period risks and move the Rule into greater alignment with the requirements of the 1992 Act.<sup>38</sup>

Notwithstanding OFHEO's assertion that "available data for especially stressful periods (e.g., the 1910s and 1930s) give little indication of timing,"<sup>39</sup> it is relatively easy to

<sup>35</sup> Rule § 3.5.3[a](3).

<sup>36</sup> NPR2 § 3.6.3.3[a].

<sup>37</sup> 66 Fed. Reg. at 65149.

<sup>38</sup> See 1992 Act §§ 1361(a)(4), (b)(2).

<sup>39</sup> 66 Fed. Reg. at 65149.

demonstrate through empirical data that a linear phase-in over the ten-year stress period is an extremely conservative assumption. The table below compares actual ten-year weighted average default rates for AAA- and AA-rated issuers for the periods 1920-1999, 1929-1931 and 1970-1999 with straight-line computed defaults:<sup>40</sup>

Period	Rating	Method	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1920-1999	AAA	Straight Line	0.13%	0.26%	0.39%	0.52%	0.65%	0.78%	0.91%	1.04%	1.17%	1.30%
		Actual	0.00%	0.00%	0.03%	0.09%	0.20%	0.34%	0.49%	0.73%	0.99%	1.30%
	AA	Straight Line	0.34%	0.69%	1.03%	1.38%	1.72%	2.07%	2.41%	2.76%	3.10%	3.45%
		Actual	0.09%	0.27%	0.45%	0.68%	1.07%	1.52%	2.03%	2.52%	2.97%	3.45%
1929-1931	AAA	Straight Line	0.51%	1.02%	1.54%	2.05%	2.56%	3.07%	3.58%	4.10%	4.61%	5.12%
		Actual	0.00%	0.00%	0.00%	0.55%	1.15%	1.88%	2.57%	3.34%	4.24%	5.12%
	AA	Straight Line	1.23%	2.45%	3.68%	4.91%	6.14%	7.36%	8.59%	9.82%	11.05%	12.27%
		Actual	0.11%	0.60%	1.37%	2.43%	4.67%	6.61%	8.65%	9.86%	11.23%	12.27%
1970-1999	AAA	Straight Line	0.09%	0.18%	0.28%	0.37%	0.46%	0.55%	0.64%	0.74%	0.83%	0.92%
		Actual	0.00%	0.00%	0.00%	0.00%	0.07%	0.22%	0.38%	0.55%	0.73%	0.92%
	AA	Straight Line	0.11%	0.23%	0.34%	0.45%	0.56%	0.68%	0.79%	0.90%	1.02%	1.13%
		Actual	0.00%	0.00%	0.07%	0.25%	0.42%	0.60%	0.76%	0.93%	1.05%	1.13%

The table demonstrates that, for any given year, straight-line computed defaults are almost always higher (in many cases, significantly) than actual defaults. These data strongly support a conclusion that virtually all of the Enterprises' counterparties would be able to continue making payments well into the stress period.

### Recommendation

Freddie Mac supports OFHEO's proposed return to a ten-year phase-in period for haircuts. OFHEO's proposed linear phase-in may well be a reasonable simplification; however we recommend that OFHEO consider implementing a non-linear assumption to account for the likelihood that most defaults of highly-rated counterparties would occur during the final years of the stress period.

## 7. Netting of Derivative Counterparty Exposures

### Background

In NPR2, OFHEO proposed that derivatives counterparty haircuts be modeled recognizing the terms of master netting agreements.<sup>41</sup> While no comments addressed this proposed feature of the stress test, it was not included in the Rule. In the current

<sup>40</sup> Table derived from Moody's Credit Risk Calculator.

<sup>41</sup> NPR2 § 3.9.4.3[g]; see also 64 Fed. Reg. at 18160 (preamble discussion of intended consideration of netting agreements).

proposal, OFHEO states, “[D]ue to a technical omission, OFHEO’s intent to model master netting agreements was not operationalized in the Rule.”<sup>42</sup> Accordingly, OFHEO indicates its intention to incorporate master netting agreement modeling into the Rule, and proposes an interim treatment for derivatives counterparty haircuts until the necessary software changes to implement netting are accomplished.<sup>43</sup>

## **Discussion**

Master netting agreements are customary when an entity (including either of the Enterprises) enters into significant numbers of contracts with the same derivatives counterparty. These agreements net obligations to and from a particular counterparty in the event of default, producing a single payment obligation. Because an Enterprise will normally have, at any given time, contracts that are both “in” and “out” of the money with any derivatives counterparty, the net obligation owed to that Enterprise is likely to be substantially less than the aggregate payment obligations under individual contracts. There should be no question that recognition of master netting agreements enhances the ability of the stress test to model Enterprise cash flows accurately. Freddie Mac therefore believes that incorporation of such modeling into the Rule is highly desirable.

OFHEO’s proposed interim treatment, in which haircuts for derivative counterparties are reduced by 40 percent until OFHEO is able to model master netting agreements, is a very conservative specification. However, given the indisputable and substantial risk-mitigation afforded by the use of master netting agreements, it is critical that some recognition of the use of these agreements be incorporated into the stress test immediately.

## **Recommendation**

Freddie Mac believes that OFHEO’s proposed interim 40 percent reduction in derivatives haircuts represents a very conservative approximation until actual modeling of cash flows under master netting agreements is accomplished. We believe that incorporation of such modeling should be relatively straightforward and we recommend that OFHEO make the necessary software changes as quickly as possible.

## **8. Currency Swap Haircuts**

When the Enterprises sell debt in foreign markets, they typically hedge exchange rate risk by entering into currency swaps. In order to calculate a haircut for foreign currency (“FX”) swaps, OFHEO has proposed a simplified methodology based entirely on an Enterprise’s swap payment obligation. This approach implicitly assumes that the U.S. Dollar (“USD”) weakens by 100 percent against the foreign currency, an assumption for which OFHEO has no factual basis. Our analysis demonstrates that even a 50 percent

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<sup>42</sup> 66 Fed. Reg. at 65149.

<sup>43</sup> Proposed §§ 3.5.3[a](3)(b), 3.8.3.10[c]; *see also* 66 Fed. Reg. at 65149-50 (preamble discussion).

weakening in the value of the USD would be a conservative stress period specification. Accordingly, we are recommending that OFHEO implement that assumption through a 50 percent reduction in the proposed FX swap haircuts.

## Background

Foreign currency denominated debt securities broaden and deepen the demand for Enterprise debt and improve the liquidity of Enterprise debt. A larger investor base and greater liquidity allow the Enterprises to take advantage of opportunities to raise funds in all market environments at the lowest possible costs. The benefits of issuing foreign denominated debt are passed on to America's housing markets, in the form of lower mortgage costs and a steady supply of mortgage funding. Access to foreign denominated debt offerings is likely to become an increasingly important mechanism for the Enterprises to fulfill their missions.

In order to manage exposure to currency exchange rate fluctuations associated with outstanding foreign currency denominated debt instruments, the Enterprises will enter into FX swap contracts. Similar to an interest rate swap, the counterparty credit risk associated with a typical FX swap is that a counterparty may default on its payment obligation and the collateral backing that obligation is insufficient.<sup>44</sup> For FX swaps, this risk occurs only when the USD has weakened in value against the foreign currency.

Because of difficulties associated with modeling foreign exchange rates during the stress period, NPR2 proposed to model hedged foreign currency denominated debt as synthetic dollar-denominated liabilities. Under this method, the dollar amounts owed by the Enterprises on FX swap contracts were grossed-up by a haircut amount.<sup>45</sup> OFHEO abandoned this approach when it adopted the Rule.<sup>46</sup> Instead, OFHEO applied a simplifying assumption that assigns no haircuts to FX swaps.<sup>47</sup>

In its current proposal, OFHEO revives its previously rejected methodology of increasing the pay side of an FX swap by the amount of the derivative haircuts.<sup>48</sup> OFHEO offers no supporting analysis to explain its re-proposal of this approach.

## Discussion

The problem with OFHEO's proposed approach is that it is inconsistent with the basic structure of an FX swap, in which both parties are obligated to make payments. OFHEO's proposal applies haircuts only to the pay side of the swap, using derivative

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<sup>44</sup> Like interest rate swaps, FX swaps are typically fully collateralized and subject to master netting agreements.

<sup>45</sup> NPR2 § 3.9.3.3[o].

<sup>46</sup> 66 Fed. Reg. at 47778.

<sup>47</sup> *Id.* OFHEO noted, however, that it "continues to believe that some haircut treatment is appropriate and will continue to explore whether some other methodology is more appropriate." *Id.*

<sup>48</sup> Proposed § 3.8.3.10[b].

haircuts that do not expressly model master netting agreements.<sup>49</sup> However, the pay side of the FX swap always overstates the counterparty's actual payment obligation, unless one assumes that the dollar depreciates 100 percent. OFHEO provides no support for such an assumption.

In order to approximate actual potential exposure, it is necessary to create a ten-year exchange rate stress scenario that calculates a realistic estimate of possible USD depreciation. Such a stress scenario can be constructed through an analysis of historical exchange rates over the past 25 years. Our analysis of this data indicates that the most adverse movements of the dollar against the Deutsche Mark, the Yen and the Sterling (Freddie Mac's principal FX exposures<sup>50</sup>) over a ten-year period are 47 percent, 46 percent and 35 percent, respectively.<sup>51</sup>

In consideration of our analysis of historical exchange rate movements, we believe that an assumed 50 percent weakening in the dollar would represent a severe ten-year exchange rate stress scenario. Incorporation of such an assumption into OFHEO's proposed methodology would be accomplished through a 50 percent reduction in the haircut charges applied to FX swaps. This reduction accounts for the fact that the payment obligation of the counterparty is directly proportional to the amount that the dollar has weakened.

### **Recommendation**

The best approach to setting FX swap haircuts is to model cash flows contractually in the up and down interest rate scenarios and under an exchange rate scenario based on historical data. However, until OFHEO is able to develop a better methodology to model FX swap haircuts, we recommend that OFHEO reduce its proposed FX swap haircuts by 50 percent. Without this adjustment, OFHEO's approach grossly overstates the risks associated with FX swaps.

OFHEO's proposed haircuts and appropriately adjusted FX haircuts are summarized in the following table:

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<sup>49</sup> OFHEO's use of derivative haircuts that incorporate a severity rate is based on the potential fluctuation in value of interest rate derivatives. This severity is excessive for FX swaps, which have historically demonstrated less volatility over the short period of time that it would take to liquidate the collateral.

<sup>50</sup> We believe the Deutsche Mark to be the best proxy for the Euro (our largest current FX exposure).

<sup>51</sup> Computed as the maximum change in a rolling series of percentage changes. The percentage changes were calculated by comparing the ten-year average exchange rate against the rate at the start of the ten-year period. Using a ten-year average is appropriate because OFHEO's approach presumes an immediate weakening of the USD that persists throughout the ten-year stress period.

Rating	Default Rate	Interim Severity**	OFHEO's Proposed Haircuts (Implicitly Assuming a 100% Decline in USD)	Recommended Haircuts (Assuming a 50% Decline in USD)
AAA	5%	6%	0.30%	0.15%
AA	7.5%*	6%	0.45%	0.23%
A	20%	6%	1.20%	0.60%
BBB	40%	6%	2.40%	1.20%
Below BBB	100%	100%	100%	100%

\* Modified to reflect the 7.5% default rate for AA-rated counterparties recommended earlier in this comment.

\*\* Severity rates used by OFHEO where there is not recognition of master netting. Our recommended severity for interest rate derivatives would result in lower FX haircuts.

## B. Multifamily Model

OFHEO proposes several changes to the multifamily model in the Rule. Multifamily lending is difficult to model precisely because of the variety of types of loans and because there is less historical data available than in the case of single family lending. Nevertheless, OFHEO is moving closer to crafting a model that ties capital to multifamily lending risks. Freddie Mac supports changes that would lead toward this goal. We urge OFHEO to continue studying data as they become available in the future and to continue to improve the Rule, as appropriate. We have the following specific comments on the proposals.

### 1. Yield Maintenance Agreements

OFHEO proposes a change that would accurately reflect loan contracts. Multifamily loans commonly have yield maintenance agreements that require borrowers to pay a premium in the event of a loan prepayment. These agreements protect lenders by deterring prepayments and by compensating lenders for lost interest income when prepayments occur.<sup>52</sup>

The Rule assumes that some multifamily loans prepay in the down rate scenario even while subject to yield maintenance agreements, but the Rule ignores income from those very same agreements. Ignoring this income is significant because borrowers demand, and receive, lower interest rates on their loans as compensation for signing yield maintenance agreements. Thus, the Rule recognizes only one side of the contractual terms, the costs. OFHEO now proposes to recognize of the other side as well, income from the agreements. With this proposal, the Rule would accurately reflect the contractual provisions of yield maintenance agreements, thereby tying capital to risk.

<sup>52</sup> Because yield maintenance agreements are secured by mortgage liens, borrowers cannot evade the agreements when refinancing with a different lender.

Freddie Mac therefore recommends that OFHEO adopt its proposal for multifamily yield maintenance agreements.

## **2. Other Multifamily Proposed Amendments**

OFHEO proposes a number of changes to the multifamily lending provisions of the Rule, discussed below.

### **Loss Severity Rates**

OFHEO proposes to re-estimate the loss severity rates applied to multifamily loans (which are currently based solely on Freddie Mac data from the 1980s) using a larger and more diverse sample of foreclosed properties from both Enterprises. Freddie Mac supports basing the Rule on the best data available. This proposal would make the capital calculation more realistic and therefore more closely aligned to risk. We strongly support this proposal.

### **Initial Vacancy Rate**

OFHEO proposes a correction to the starting vacancy rate in the first month of the stress period. This change would make the measurement of the initial vacancy rate more consistent with the measurement of rent growth rate for the first month of the stress period. Freddie Mac supports this change.

### **ARM Default Rates**

OFHEO proposes a refinement to the treatment of multifamily adjustable rate mortgage (ARM) loans that would more accurately measure defaults. Because this would more closely tie capital to the risks of those loans, Freddie Mac supports the proposal.

We note, however, that this area warrants further study. The Rule, even if amended as proposed, would still apply excessive multifamily ARM default rates in the up-rate stress test. Default rates for multifamily ARMs are disproportionately high compared with default rates on fixed-rate multifamily loans. We believe the magnitude of the difference in the default rates for the two loan types is not supported by either historical data or the underlying economics of multifamily lending. We urge OFHEO to continue to study ARM default rates as new data become available, and make future revisions as the data support them.

### **Default Rates**

OFHEO proposes to modify a variable in its model that increases default rates when property cash flows are projected to be negative. This proposal would moderate the stress test's excessive sensitivity to declines in cash flow. Freddie Mac supports this

change because it would result in more realistic default rates for certain multifamily loans.

Another determinant of multifamily loan default rates in the Rule is loan age, or loan seasoning. The Rule's default rates are excessively sensitive to loan seasoning. As a result, the capital required for a loan can increase over time even while the loan becomes less likely to default. Freddie Mac recommends that the Rule's default model measure loan age by the time since the last property inspection, rather than time since loan origination. This change would more closely tie capital to risk.

### **C. Yields on Enterprise Debt**

The Rule includes a methodology for projecting non-Treasury yields, including Enterprise yields, based on historical data. OFHEO proposes to add 10 basis points to the Enterprise yields otherwise projected under the Rule. OFHEO concedes that it has no factual basis for the add-on to Enterprise yields, but defends it with speculation of possible widening of Enterprise spreads relative to others in times of stress. In fact, recent events and expert opinion suggest, if anything, that Enterprise yields should be reduced relative to other non-Treasury yields during stressful times. We recommend that OFHEO eliminate the proposed add-on.

#### **Background**

During the stress period, the debt instruments funding an Enterprise's mortgage portfolio often mature or are called more quickly than an Enterprise's mortgage assets amortize, prepay or default. To balance the balance sheet, the Enterprises must issue new debt during the stress period. Therefore, the Rule must necessarily include assumptions about the yields on new Enterprise debt.

The 1992 Act, however, does not specify assumptions as to yields on new Enterprise debt. Rather, the statute provides that assumptions not specifically set forth in the statute "will be those determined by the Director on the basis of available information, to be most consistent with the stress period."<sup>53</sup> Similarly, the Administrative Procedures Act requires that there must be a rational basis for agency actions.<sup>54</sup>

The Rule projects stress-period yields on non-Treasury instruments, including debt issued by the Enterprises, based on average spreads to yields on Treasury instruments of comparable maturity, for the two years preceding the beginning of the stress period.<sup>55</sup>

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<sup>53</sup> 1992 Act § 1361(b)(2). Similarly, for any activities not specified in the risk-based capital statute, losses or gains on such activities, including interest-rate and foreign exchange hedging activities, "shall be determined by the Director, on the basis of available information, to be consistent with the stress period." *Id.* at § 1361(a)(4). The term "stress period," used in both standards, is defined in the statute to be the credit, interest-rate and new-business conditions and assumptions set forth in the risk-based capital statute. *Id.* at § 1361(a).

<sup>54</sup> See 5 U.S.C. § 706(2).

<sup>55</sup> See Rule § 3.3.3[a]3.

OFHEO now proposes to increase by 10 additional basis points the yield projected for Enterprise debt under the current methodology.

OFHEO has acknowledged that it lacks a factual basis for the add-on. For example, in declining to include in the Rule a 50-basis point add-on it had proposed in NPR2,<sup>56</sup> OFHEO stated the following:

[R]elevant historical data to support a new debt premium are also sparse. There has been only one, relatively brief, period of time in the early 1980s when one of the Enterprises experienced financial stress approaching the magnitude specified in the stress test. The only other similar event involved the Farm Credit System in the mid-1980s. In addition, it is conceivable, as some comments noted, that events that cause a widening of the spread between the Enterprises' debt rates and Treasuries might also cause other spreads to widen. These spreads have an important effect on the value of hedging instruments and some Enterprise asset returns.

*In light of these considerations, OFHEO has determined that there is too little historical experience on which to determine definitively whether other spreads to Treasuries would widen as much as the Enterprises' spreads or to base an estimate of how much Enterprises' spreads would widen. Consequently, OFHEO has decided not to include a premium on new debt in the final rule.*<sup>57</sup>

Similarly, in proposing the 10-basis-point add-on to the stress period spreads between Enterprise debt and Treasury instruments, OFHEO recognizes that it has insufficient information to estimate how much Enterprise spreads might widen during a stressful period.<sup>58</sup> Moreover, OFHEO also concedes that "spreads to Treasury rates of other interest rates may also widen in a stressful economic environment."<sup>59</sup>

OFHEO defends the add-on with speculation of possible widening of Enterprise debt spreads to Treasuries relative to the debt spreads of other issuers to Treasuries. Specifically, OFHEO proposes the 10-basis point add-on as a "simplifying assumption, which gives some effect to the *possibility* that stress period market conditions could impact an Enterprise more adversely than the rest of the market."<sup>60</sup> OFHEO further supports the add-on by observing that "the stress test is designed to be especially stressful to the Enterprises."<sup>61</sup>

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<sup>56</sup> NPR2 § 3.3.3.5.

<sup>57</sup> 66 Fed. Reg. at 47755 (emphasis added).

<sup>58</sup> *Id.* at 65153 ("OFHEO conceded that data upon which to base such a premium may be too sparse to determine definitively whether other spreads to Treasuries would wide as much as the Enterprises' spreads or to estimate how much the Enterprises' spreads would widen.").

<sup>59</sup> *Id.*

<sup>60</sup> *Id.* (emphasis added).

<sup>61</sup> *Id.*

## Discussion

OFHEO's proposed 10-basis point add-on does not have a factual basis and so fails to meet the requirements of the 1992 Act or the Administrative Procedures Act. A mere possibility does not substitute for a factual basis.<sup>62</sup>

Nor does the observation that the stress test is designed to be especially stressful to the Enterprises absolve OFHEO from the obligation to meet its statutory requirement. Congress crafted a statute designed to cover the entire scope of the stress test by explicitly specifying especially stressful assumptions and then including explicit catch-all provisions requiring that all "other activities" and all "characteristics of the stress period other than those specifically set forth in [the 1992 Act],"<sup>63</sup> must be based on "available information" and be "consistent with the stress period."<sup>64</sup> In doing so, Congress clearly foreclosed the discretionary introduction of arbitrary additional stresses into the stress test not supported by facts.<sup>65</sup>

Dr. Richard Roll, Allstate Professor of Finance at the Anderson School of UCLA and a leading finance and capital management expert Freddie Mac engaged to analyze this issue, concluded that one might reasonably have a factual basis for, if anything, reducing Enterprise spreads relative to other issuers.

There is no reason why the Enterprises should, under the specified stress conditions of increasing or decreasing interest rates, pay proportionately higher rates than other borrowers. In fact, the Enterprises are known for skill in managing interest rate risks by astute portfolio structuring of assets and liabilities, hedging with a plethora of interest rate derivatives, and judicious market timing. If anything, one might expect their relative borrowing costs to decline as interest rates increase or decrease dramatically. There is certainly no historical evidence to the contrary (as OFHEO freely admits.) Although 10 bp appears on the surface to

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<sup>62</sup> See *Edison Electric Institute v. EPA*, 2 F.3d 448, 446 (D.C. Cir. 1993) (finding that agency justification for rule "consists of speculative factual assertions" and requiring that agency "at least provide some factual support for its conclusion that such a mismanagement scenario is plausible."); *Leather Industries of America v. EPA*, 40 F.3d 392, 405 (D.C. Cir. 1994) ("The EPA has failed to demonstrate a rational relationship between its highly conservative exposure assumptions and the actual usage regulated by those assumptions.").

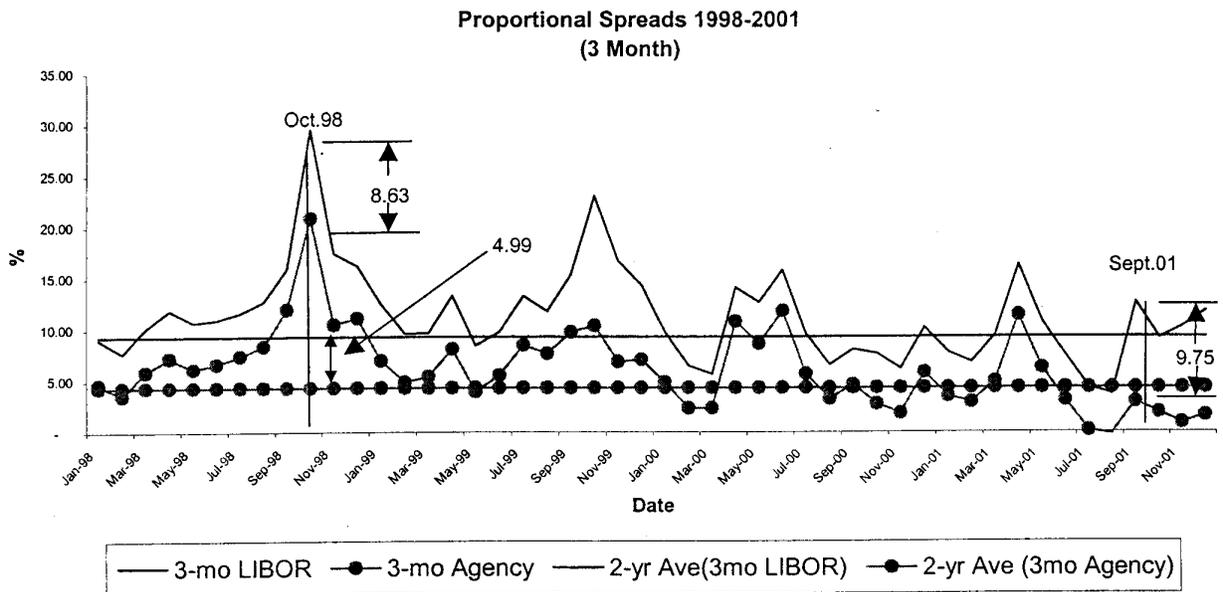
<sup>63</sup> See 1992 Act § 1361(a)(4), (b)(2).

<sup>64</sup> *Id.* at § 1361(a)(4), (b)(2). The only add-on authorized by the risk-based capital statute is the 30 percent add-on designed "to provide for management and operations risk." *Id.* at § 1361(c)(2).

<sup>65</sup> Moreover, the fact that the 1992 Act specifies especially stressful conditions does not necessarily mean that the Enterprises would be in distress during the stress period. The principal stresses of the stress test are mortgage credit risk and interest-rate risk. The Enterprises actively manage those risks. An Enterprise that meets this capital standard will have to be able to maintain positive capital throughout the stress period, despite the stressful conditions, and typically an Enterprise that passes the stress test will also more than meet its minimum capital requirement throughout the entire period. Therefore, it is entirely reasonable to assume at a minimum that the Enterprises are no worse off during the especially stressful stress period than other corporations, particularly considering the stress test's specifications for counterparty credit risk.

be relatively “modest,” a term employed by OFHEO in its explanation, the resulting dollar capital requirement would be significant. Without any theoretical or empirical justification, the 10 bp add-on amounts to an unwarranted and unjust penalty.<sup>66</sup>

Dr. Roll’s view is supported by data on the recent stressful events of October of 1998 and the period immediately following September 11, 2001, which show that the spread between Treasuries and Enterprise debt was affected far less than the spread between Treasuries and LIBOR.



*Under recent stressful conditions, Enterprise (“Agency”) spreads narrowed compared with LIBOR spreads.*

Freddie Mac also asked Dr. Frank J. Fabozzi, Adjunct Professor of Finance at Yale University’s School of Management, to analyze OFHEO’s proposal, and specifically to consider the data on recent stressful events. He similarly concluded that the 10-basis point add-on is unsupported by the facts.

The fact that OFHEO advances no empirical justification in support of a 10 basis point debt add-on is not surprising. In fact, all recent evidence regarding the capital market’s response to stressful conditions suggests that, if anything, OFHEO should add a *discount* to the GSEs’ cost of borrowing. Empirical research that Freddie Mac previously furnished to OFHEO in its comments on the original, 50 basis point add-on proposal unassailably demonstrates that, during times of interest-rate volatility and market stress, investors have exhibited a

<sup>66</sup> R. Roll, *Comments About OFHEO’s Proposed Debt Refunding Rule For the Government Sponsored Enterprises* (Jan. 14, 2002) at 7 (attached as Appendix 3 to this comment).

significant preference for GSE securities over those of other capital market participants (excluding, of course, Treasury securities). Recent evidence from the market's response to the bond defaults in the fall of 1998 and the September 11 attack entirely confirm the empirical case and conclusively demonstrate that OFHEO's surcharge is groundless.<sup>67</sup>

In sum, OFHEO has added a costly premium on Enterprise debt yields based on a mere possibility, unsupported by evidence. It not only fails to meet the requirements of the 1992 Act, it also fails to meet the most basic requirements of the Administrative Procedure Act.<sup>68</sup> In addition, it fails to tie capital to risk.

### **Recommendation**

We recommend that OFHEO retain the methodology under the current Rule, which projects yields on Enterprise debt based on historical spreads to Treasury, using the same methodology used to project all other non-Treasury yields.

### **D. Proposed Refunding Assumptions**

To balance the balance sheet during the stress period, the stress test must make assumptions about what new debt an Enterprise would issue during the stress period. OFHEO's proposal assumes that throughout the stress period the Enterprises would maintain the same long-term/short-term debt mix it had at the start of the stress period. This proposed target debt mix is superior to the 50-50 long-term/short-term mix currently specified in the Rule.

However, the proposal raises new issues regarding the Rule's assumptions as to the type of long-term debt the Enterprises would issue during the stress period, because it would result in the issuance of substantially more new long-term debt during the stress period. Without a factual basis, the Rule assumes that all new long-term debt is five-year debt, callable at par, with a 50-basis point call premium added to the yield. The Enterprises, however, would issue callable debt to match the callability of the mortgages being funded. This callable debt would have a substantially lower cost than the 50-basis point premium assumed by OFHEO. The 50-basis point call premium results, therefore, in an arbitrary and unnecessary cost added to financing mortgages. We recommend that the

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<sup>67</sup> Letter of Frank J. Fabozzi to Alfred Pollard, dated January 16, 2002 at 14 (emphasis in original) (attached as Appendix 4 to this comment).

<sup>68</sup> See *Appalachian Power Co. v. EPA*, 249 F.3d 1032, 1053-54 (D.C. Cir. 2001) ("There must be an actual reason articulated by the agency at some point in the rulemaking process."); *Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d 506, 535 (D.C. Cir. 1983) ("the agency must explain the assumptions and methodology used in preparing the model and, if the methodology is challenged, must provide a complete analytic defense") (internal quotations omitted); *Leather Industries of America v. EPA*, 40 F.3d 392, 405 (D.C. Cir. 1994) ("Although EPA is not held to a standard of precise refinement, it is held to one of rationality and it must supply a reasoned basis for its regulatory choices.").

call premium be adjusted downward, consistent with a supportable level of callability in new debt issuances.

## Background

The refunding assumptions form a very important element of the stress test specifications. During the stress period, the debt instruments funding an Enterprise's mortgage portfolio often mature or are called more quickly than an Enterprise's mortgage assets amortize, prepay or default. Therefore, to balance the balance sheet, the Enterprises have to issue new debt during the stress period. The Rule, therefore, must include assumptions about the types of new debt the Enterprises would issue during the stress period to fund the remaining assets ("refunding assumptions").

The 1992 Act does not specify any refunding assumptions. Rather, the statute provides that assumptions not specifically set forth in the statute "will be those determined by the Director on the basis of available information, to be most consistent with the stress period."<sup>69</sup> Similarly, the Administrative Procedures Act requires that there must be a rational basis for agency actions.<sup>70</sup>

OFHEO proposes to assume that the Enterprises would maintain the same long-term/short-term debt mix it had at the start of the stress period throughout the stress period, measuring effective long-term and short-term debt as adjusted by the use of swaps.<sup>71</sup>

## Discussion

OFHEO's proposed target debt mix is superior to the 50-50 long-term/short-term mix assumed in the current Rule. While we continue to believe that an appropriate refunding assumption would assume different behavior in the up- and down-rate scenarios,<sup>72</sup> the

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<sup>69</sup> 1992 Act § 1361(b)(2). Similarly, for any activities not specified in the risk-based capital statute, losses or gains on such activities, including interest-rate and foreign exchange hedging activities, "shall be determined by the Director, on the basis of available information, to be consistent with the stress period." *Id.* at 1361(a)(4). The term "stress period," used in both standards, is defined in the statute to be the credit, interest-rate and new-business conditions and assumptions set forth in the risk-based capital statute. *Id.* at 1361(a).

<sup>70</sup> 5 U.S.C. § 706(2).

<sup>71</sup> 66 Fed. Reg. at 65153, 65161-62. Our views and comments on OFHEO's proposed refunding assumptions are based in part on our understanding that OFHEO intends to apply the stress test to swaptions in a manner that accurately reflects their impact on the measurement of long-term and short-term debt consistent with the treatment of callable debt.

<sup>72</sup> A prudent, low-risk funding strategy calls for varying the mix of long-term vs. short-term debt as the expected lives of mortgages change in response to past changes in interest rates. Freddie Mac manages these risk dimensions according to guidelines approved by our Board of Directors. The net impact is that, while the guidelines remain fixed even as interest-rates change, the refunding decisions resulting from the application of those guidelines will vary with changes in the interest-rate environment. Thus, we have suggested in past comments that OFHEO should incorporate in the refunding rule an assumption that Freddie Mac would issue primarily long-term debt as the duration of the mortgages increase in the up-rate

proposal takes an important step in the right direction by defining the debt mix target in terms of the Enterprises' actual long-term/short-term debt mix, albeit at a single point in time. As a result, the Enterprises would issue both new long-term and new short-term debt throughout the stress period. In contrast, the 50-50 target mix effectively assumes that the Enterprises would issue only short-term debt, until very late in the stress period,<sup>73</sup> an almost identical assumption to that proposed in NPR2 (NPR2 proposed to assume that the Enterprises issue only six-month debt). As OFHEO has concluded, this is not at all realistic.<sup>74</sup>

The 50-50 target mix also would be too lenient on an institution with large interest-rate risk exposure, such as the typical short-funded thrift of the 1970s. Starting in the first month of the stress period, the 50-50 target debt mix would allow the thrift to convert half of its debt (all short-term at the start of the test) into long-term. The thrift would have gone from a risky unhedged portfolio to a lower risk, partially hedged portfolio in a month. As a result, the thrift's capital requirement would be understated. Under the proposal, however, the short-funded thrift would be forced to live with its short funding throughout the 10-year stress period, dramatically increasing its capital requirement consistent with the risk of its funding strategy.<sup>75</sup>

While the proposed new target debt mix better ties capital to risk than the current 50-50 long-term/short-term debt mix, it does raise a substantial issue with respect to the Rule's assumption as to what type of new long-term debt an Enterprise would issue during the stress period. The Rule's long-term debt assumption had little impact under the 50-50 target mix because under that assumption the Enterprises would issue virtually no long-term debt. Under the proposal the Rule's long-term debt assumption has a very large impact because the proposal would effectively assume that the Enterprise would issue a substantial amount of new long-term debt during the stress period.

The long-term debt assumption in the Rule currently assumes that any new long-term debt the Enterprises issue during the stress period would consist solely of 5-year debt,

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stress test. Similarly in the down-rate stress test OFHEO should assume that Freddie Mac would issue almost all short-term debt as mortgage durations shorten. This reaction to past interest rate changes should not be confused with foresight or the ability to predict future rate movements in the stress test. *See also* Freddie Mac, *Comments on NPR2* at 146-52 (March 10, 2000).

<sup>73</sup> This result occurs because the Enterprises' debt mix would typically include between 60 and 90 percent long-term debt as of the start of the stress period. Therefore, the Enterprises would start the stress test with a proportion of long-term debt far above the target. The only way to reduce that proportion is to wait until the long-term debt matures or is called, which takes time. Exacerbating the time problem is the fact that the balance sheet shrinks over the stress period, turning the same amount of long-term debt into a greater percent of the overall debt as the stress period progresses. The net result is that the percentage of long-term debt in the total debt portfolio does not fall to 50 percent until the end of the stress period. Until that point, the Enterprises would issue only six-month debt.

<sup>74</sup> *See* 66 Fed. Reg. at 65153.

<sup>75</sup> We note that this more realistic long-term/short-term debt mix will result in better aligning capital to risk only if the same methodology is used to establish the starting-position debt mix as is used throughout the stress period. The proposal would do so explicitly. *See* proposed §§ 3.10.3.1[b]3.c, [b]3.i; 66 Fed. Reg. at 65161-62.

callable at par after one year (5 no-call 1), and that the yield on that debt would include a 50-basis point call premium. OFHEO offered no factual basis for such an assumption,<sup>76</sup> and we believe that no facts could support it because it would be inconsistent with any rational funding of a mortgage portfolio to issue such debt.

As OFHEO acknowledges, the Enterprises use callable debt (and other instruments that create optionality) to match the optionality of the debt funding mortgage purchases with the prepayment optionality of the mortgages.<sup>77</sup> Mortgages typically include an option to prepay, without penalty, prior to contractual maturity. Borrowers are very likely to exercise that option when mortgage rates fall below the coupon on the mortgage (*i.e.*, when they can replace the mortgage with one at a lower rate). As a result, a pool of mortgages converts from a long-term asset to a short-term asset when mortgage rates fall below the mortgage coupons, and it converts from a short-term asset to a long-term asset when rates rise above the mortgage coupons. The Enterprises use callable debt and other instruments to create optionality in the debt that matches that prepayment optionality in the mortgage assets.

For example, an Enterprise balancing the prepayment optionality on a portfolio of 7-percent-coupon mortgages in a 12 percent interest-rate environment would want to issue 5-year debt that would not be called unless and until mortgage rates reach below about 6.5 percent, the point where rapid prepayments would be expected to begin to convert long-term mortgage assets into short-term assets.

In contrast, to issue nothing but callable debt that could be called at *par* (*e.g.*, at 12 percent) would be to purchase unnecessary insurance against the risk that 7 percent mortgages would prepay rapidly in a 12 percent environment. Such an assumption would be comparable to assuming that the owner of a \$10,000 car would purchase an auto insurance policy to cover up to \$100,000 in damages to the car—ten times full coverage. Just as the extra insurance cost would bear no relation to risk for the owner of the car, the proposed refunding assumption's long-term debt assumption would be a baseless addition to the cost of funding mortgages.

Our conclusions are supported by the analysis of leading experts. For example, we engaged Dr. Roll to analyze this issue, and he concluded that the 50-basis point add-on

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<sup>76</sup> The entirety of OFHEO's explanation is the following two sentences: "The Enterprises issue a variety of debt with maturities greater than one year, but with average maturities generally far less than ten years. Also, they increasingly have come to rely upon callable debt to balance the prepayment optionality in their loan portfolios." 66 Fed. Reg. at 47784. The only discussion in the record supporting the 50 basis points cost of callability simply notes that the 50-basis points add-on to the Enterprise Cost of Funds was dropped between NPR2 and the final rule, and that the final rule would assume a 50-basis points call premium on callable debt. *See id.* at 47755 ("Consequently, OFHEO has decided not to include a premium on new debt in the final rule. The final regulation does, however, apply a 50-basis-point call premium on new five-year callable debt.").

<sup>77</sup> 66 Fed. Reg. at 47784 (The Enterprises "increasingly have come to rely upon callable debt to balance the prepayment optionality in their loan portfolios.").

for callability was completely unwarranted<sup>78</sup> and that “the Enterprises would never be tempted to issue such debt under the stipulated stress test conditions.”<sup>79</sup> Rather, Dr. Roll concluded that the Enterprises would issue debt with much different call features for which the stated yield add-on would be no more than 5 basis points in the up-rate.

Dr. Roll further noted that introducing an incremental capital requirement for any callability-induced yield premium represents an elementary financial error.

The stated yield on a callable bond is not a true interest cost at all. It is an accounting fiction. The cash flow return a rational investor expects from such a bond is strictly less than the stated yield. It follows that any decrement to an issuer’s capital is also less than the apparent “yield.” Any interest rate volatility at all will lead to a much lower cost of financing than the stated yield.<sup>80</sup>

We also engaged Dr. Fabozzi to analyze this issue and he developed similar conclusions. Dr. Fabozzi concluded that “no prudent portfolio manager would ever issue the debt on identical terms in up-rate and down-rate scenarios with a previous debt mix in mind.”<sup>81</sup> Dr. Fabozzi similarly concludes that the 50-basis point add-on for a call premium throughout the stress period is unsupported, stating that “the 50 basis point premium represents unnecessary insurance that no reasonable risk manager would ever buy.”<sup>82</sup> He further notes that the appropriate call premium in the up-rate scenario would drop from 39 basis points at the first month of the stress period to a steady 6 basis points from the twelfth month onward. In the down-rate scenario, the Enterprises would issue short-term debt, but would purchase a put option to permit it to lengthen the term of its debt should rates rise. The cost of the put options would be 48 basis points at the start of the stress test and would drop to a steady 5 basis points above the short-term yield from the twelfth month onward.<sup>83</sup>

In sum, the unsupported, and unsupported, 50-basis point add-on for a call option on long-term debt is arbitrary, fails to meet the standards set forth in the 1992 Act and is an unnecessary cost added to homeownership. It is clear that no rational risk manager would pay that premium for callability during the stress period. The assumption not only fails to meet the statutory standard under the 1992 Act, it also fails to meet even the basic

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<sup>78</sup> See Roll, *supra* note 66 at 2.

<sup>79</sup> *Id.* at 8.

<sup>80</sup> *Id.* We note that the lack of interest-rate volatility in the stress test’s specifications is inconsistent with the interest-rate volatility underlying OFHEO’s rationale for haircuts for derivative counterparties (where OFHEO implicitly assumes greater than worst-case volatilities, on a monthly basis). The two sets of volatilities cannot *both* be “most consistent with the stress period.”

<sup>81</sup> *Id.* at 8.

<sup>82</sup> *Id.* at 11.

<sup>83</sup> One year non-callable debt plus a put swaption is equivalent to in-the-money callable debt. The 5 basis point “call” premium would be relative to one-year debt. This amounts to about –45 basis points relative to the yield on 5-year debt.

requirements under the Administrative Procedures Act.<sup>84</sup> In addition, it would not tie capital to risk.

### **Recommendations**

OFHEO should implement its proposal to replace the 50-50 target debt mix with the proposed target of the actual starting-position long-term/short-term mix, where long-term and short-term debt are measured consistently at the starting period and throughout the stress period. While not the best approach, it is far superior to the arbitrary 50-50 target mix.

OFHEO also should adjust the assumed amount of the call premium, consistent with the estimates of reasonable costs of appropriate callability under the stress period conditions.<sup>85</sup> Our analysis demonstrates that the cost can be approximated very closely by reducing call premium on the 5-year callable debt from an initial cost of 50 basis points to 5 basis points over the first 12 months of the up-rate scenario and from an initial cost of 50 basis points to -45 basis points over the first 12 months of the down-rate scenario.<sup>86</sup> Even an identical reduction in the call premium to 5 basis points, in both the up- and down-rate scenarios, would be a significant improvement in tying capital to risk.

### **E. Option Exercise**

The Rule allows for the exercise of options on coupon payment dates, without regard to contractual terms. It also specifies an exercise rule for whether the option is exercised on these dates that does not vary by contractual terms. OFHEO now proposes to allow exercise of options on dates based on contractual terms, to accommodate additional types of contractual terms (*i.e.*, American and European type options). We recommend conforming changes to the exercise rule to fully accommodate these additional option types.

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<sup>84</sup> See *supra* note 67.

<sup>85</sup> Alternatively, OFHEO could devise a means of incorporating a measure of callability into the starting position snapshot of each Enterprise's debt portfolio, and then use the starting-position callability as the target throughout the stress period (and specify additional instruments the Enterprises could issue to achieve such a target). However, measuring callability consistently at two institutions, and devising the appropriate assumptions for maintaining a callability target are sufficiently complex as to suggest that it would be appropriate to seek public comment on such an approach prior to implementation.

<sup>86</sup> These cost estimates above are not surprising. As rates rise to 12 percent, it becomes less likely that 5-year debt callable at 6.5 percent will be called. The debt will then look and act more like non-callable 5-year debt. The market would then price it accordingly, charging only a minimal 5-basis point premium above the 5-year rate against the risk that rates will drop so low that it would be called. Similarly, as rates fall to 3 percent, it becomes more likely that 5-year debt callable at 6.5 percent will be called. The debt will then look and act more like 1-year debt. The market would then price it accordingly, charging only a minimal 5-basis point premium above the 1-year rate against the risk that rates will rise so high that it would not be called. Because of the shape of the yield curve in the down-rate stress test environment, the yield on 1-year debt plus 5 basis points would translate to the yield on 5-year debt, less 45 basis points. Freddie Mac's analysis was based on option prices derived from Yield Book™.

## **Background**

The Rule generally models instruments according to their contractual terms. In the case of nonmortgage instruments, OFHEO states, “For nonmortgage investments, outstanding debt securities, and liability-linked derivative contracts, payments of principal and interest are calculated for each instrument based on contractual terms and stress test interest rates.”<sup>87</sup> However, the Rule made at least one exception to this general approach by making a simplifying assumption in modeling nonmortgage instruments having embedded options, such as callable debt.

The Rule’s simplifying assumption for option modeling was to treat all options on nonmortgage instruments other than those having no coupon (*e.g.*, zero coupon bonds) as if they were Bermudan style options. Bermudan style options are exercisable only on certain specified days during their lives, usually on coupon payment dates. In contrast, other option varieties include European style options, which are exercisable only on a single date, and American style options, which are exercisable anytime after the lockout period.

In its current proposal, OFHEO changes the modeling treatment of options to recognize the contractual differences in option exercise dates across the three types of options. In so doing, OFHEO comes closer to making true the Rule’s statement, “There are three standard Exercise Convention Types, all of which are accommodated in the Stress Test.”<sup>88</sup>

## **Discussion**

Freddie Mac supports this change to more accurately model contractual option terms as an improvement in tying capital to risk. Freddie Mac’s portfolio of callable debt and callable swaps is dominated by American style options, with Bermudan and European style options making up a smaller percentage. Since American style options are more costly given the additional flexibility they provide, that flexibility should be recognized in the stress test as such options would likely be exercised sooner than Bermudan options. The opposite holds for European style options.

### ***Conforming Amendment Needed to Option Exercise Rule***

However, the proposed change should be accompanied by conforming changes to the option exercise rule to fully accommodate the additional option types. The option exercise rule contains an evaluation of whether the option as of the exercise date is sufficiently “in-the-money” to be exercised.

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<sup>87</sup> 66 Fed. Reg. at 47736.

<sup>88</sup> Rule § 3.8.3.7[a].

Under the simplifying assumption of the Rule, where all options were treated as Bermudan, all options have exercise opportunities on each coupon payment date and are exercised if at least 50 basis points in-the-money.<sup>89</sup> This 50 basis point requirement recognizes that Bermudan options have time value remaining at the exercise date, so long as there is another exercise opportunity in the future, and thus will be exercised only if rates have changed sufficiently to justify giving up the future exercise opportunity. Thus, for example, the embedded call option in callable debt would only be called on any given coupon payment date if the market interest rates on Enterprise debt of same maturity had fallen to 50 basis points or more below the bond equivalent yield on the callable debt instrument.

In contrast, under the proposal European options would now, appropriately, have only one exercise opportunity and, therefore, no time value remaining after the exercise date. Thus, the 50 basis point in-the-money threshold should be changed to fully accommodate European options. That is, the Rule should specify that European options, unlike Bermudan and American options, should be exercised if they are even one basis point in-the-money on the option exercise date.

#### ***Further Refinement of Option Exercise Rule for New Callable Debt Issued During the Stress Period***

For callable debt existing at the start of the stress period, the option exercise decision (or “call rule”) based on a 50 basis point in-the-money threshold for American and Bermudan options and zero basis points in-the-money threshold for European options may be roughly appropriate. However, the same rule applied to callable debt that is newly issued in the stress period leads to anomalous results. Under the Rule, callable debt issued in the up-rate stress test after month 12 would always be called at the first opportunity, even though rates remain constant and the Enterprises would incur issuance fees as a result of calling the debt. That is, debt would be called even though there would be no benefit, only cost in calling it, effectively resulting in one-year funding at excessively high cost.

The anomaly in the Rule results from not having a more refined call rule that recognizes the value remaining in the call option and the replacement cost of the debt being called. A refined call rule would recognize that 5-year callable debt with a one-year lockout (5 no-call 1) becomes 4-year callable debt with no lockout (4 no-call 0) as of the first exercise date. In evaluating whether to call the 4 no-call 0 instrument and replace it with a new 5 no-call 1 instrument, the call rule fails to recognize that the Enterprise would be giving up the opportunity to call the debt for a year, which has value.

If OFHEO adopts Freddie Mac’s recommendation on refunding, the Enterprises will issue out-of-the money callable debt in the up-rate stress test and that debt will

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<sup>89</sup> *Id.* at §§ 3.8.3.1[a]3.a, 3.8.3.7[b].

appropriately never be called even using OFHEO's call rule. On the other hand, if OFHEO were to keep the inappropriate assumption that new long-term debt issued during the up-rate stress test would be at-the-money callable debt, OFHEO's call rule would inappropriately call all callable debt issued after month 12 at the first call date and add unnecessary funding costs by churning debt.

### **Recommendation**

Freddie Mac recommends that OFHEO adopt its proposal to recognize American and European options, and that OFHEO make a conforming amendment to the Rule to assume that European options are exercised when the equivalent-maturity Agency debt rate is lower (higher) than the bond equivalent yield of the callable (puttable) instrument.<sup>90</sup>

In addition, Freddie Mac recommends that OFHEO modify the refunding assumptions as we describe elsewhere in this comment to assume that the Enterprises issue callable debt that matches the characteristics of the mortgage portfolio. With this change, the call rule would work as expected. If OFHEO does not adopt this change, we recommend that OFHEO override its call rule to ensure that *new* callable debt issued in the up-rate stress test would never be called.

### **F. Fixed Assets**

Under generally accepted accounting practices ("GAAP"), a corporation normally incurs an expense to reflect the depreciation of fixed assets. Likewise under GAAP, that depreciation expense causes an equal decrease in the value of the underlying fixed assets. For example, an asset originally worth \$100 on the balance sheet may depreciate 10 percent during its first year. At year end, the asset is written down to \$90, and the corporation incurs a \$10 depreciation expense.

The Rule includes the depreciation of fixed assets as an operating expense during the stress period but does not decrease the balance sheet value of fixed assets. Using the example above, the Enterprise would incur a \$10 depreciation expense but balance sheet fixed assets would remain at \$100. The Enterprises would need to have liabilities to fund the undepreciated value of the assets during the ten years of the stress period, even while incurring an asset depreciation expense.

OFHEO explains in the proposal that this treatment assumes that the Enterprises would replace fixed assets, such as computers, during the stress period.<sup>91</sup> Because the Enterprises would add new assets, the total value of fixed assets would not decrease as other, older assets depreciate. In the example, an Enterprise would incur a \$10 depreciation expense, the fixed asset would decline by \$10, but the Enterprise would purchase a new fixed asset worth \$10, thus replenishing total fixed assets back to \$100.

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<sup>90</sup> *Id.* at § 3.8.3.7[b]4.

<sup>91</sup> 66 Fed. Reg. at 65154.

OFHEO now proposes to change its assumption that the Enterprises would fully replace all fixed assets during the ten-year wind down. OFHEO proposes to decrease fixed assets 75 percent on a straight-line basis over the ten years of the stress period. The remaining 25 percent of fixed assets would not change. Depreciation expenses under the Rule also would not change.

Freddie Mac believes that this proposal is more realistic than the treatment in the Rule because the stress test assumes the Enterprises conduct no new business. The proposal would slow the assumed speed at which an Enterprise would add fixed assets in a wind-down scenario. However, Freddie Mac believes that a straight-line decrease in asset value does not represent economic reality as well as would a decrease that occurs faster in early years than in later years. Freddie Mac strongly supports a risk-based capital rule that accurately reflects economic reality.

Freddie Mac recommends that OFHEO adopt this proposed improvement in the fixed assets calculation, but consider using an accelerated rate of decrease in fixed assets because it would be more economically realistic.

#### **G. Float Income and Expense**

The Enterprises receive pass-through payments on securities they issue, and send payments to the security holders. The Enterprises derive float income, or incur float expense, due to timing differences of those payments. Sometimes an Enterprise repurchases securities it issues. In these cases, the Enterprise receives the pass-through payments, but keeps them rather than sending them to an outside security holder.

Float calculations are complex because of the variety of payment cycles and the number of payments that determine float. While the Rule attempts to capture float income and expense accurately, OFHEO proposes to refine its float calculation for additional accuracy. Freddie Mac applauds OFHEO's attempt to increase accuracy in this area.

The Rule includes in its calculation of float income and expense the payments that an Enterprise receives and makes on securities it issues, without regard to who owns the security. OFHEO states in its proposal that this treatment would overstate float income or expense. OFHEO therefore proposes to reduce float income or expense on pass through securities that an Enterprise both issues and repurchases by the percentage of that Enterprise's ownership interest in the security. Freddie Mac agrees with this proposal, although it is appropriate only if interest receivable balances are not elsewhere considered in float calculations.

We note only that the formulas set forth in proposed Appendix § 3.6.3.7.3[a]9.b would not fully implement the proposed change. It would reduce float income on repurchased securities, but would not accurately make the corresponding reduction in float expense on

the same securities. To fully implement the proposal, the formula for Prepayment Interest Shortfall (PIS) should be:

$$\begin{array}{l} \text{If FDP is } \geq 30 \text{ then} \\ \text{PIS}_m = \text{PPR}_{m1} \times \frac{\text{PTR}_m}{12} \times (1-\text{FREP}) \end{array}$$

$$\begin{array}{l} \text{If } 15 \leq \text{FDP} < 30 \text{ then} \\ \text{PIS}_m = \text{PPR}_{m1} \times \frac{\text{PTR}_m}{24} \times (1-\text{FREP}) \end{array}$$

During the process of validating that the computer code that implements the stress test accurately calculates capital as the Rule requires, it is possible that some inaccuracies in the float calculation could surface. To the extent that any such inaccuracies are due to imperfections in the Rule, Freddie Mac believes that a timely rulemaking is the appropriate solution.

#### **H. House-Price Growth Factor**

Freddie Mac agrees that the most appropriate version of OFHEO's House Price Index ("HPI") to apply to determine current loan to value ratios is the most recent version available *as of the start of the stress period*,<sup>92</sup> and that OFHEO should clarify that fact. We also agree that for mortgages originated after the time period covered by that version of the HPI, it is reasonable for the Rule to specify a house-price growth rate of 1.0. We recommend that OFHEO clarify the applicable HPI version, and new specification, in all of the relevant provisions of the Rule.<sup>93</sup>

#### **IV. CONCLUSION**

Freddie Mac appreciates the opportunity to comment on OFHEO's proposed changes to the Rule. We support having a risk-based capital regulation that will appropriately tie capital to risk. In this way, the regulation will preserve the safety and soundness of the Enterprises and promote homeownership for American families. We appreciate OFHEO's dedication to making regulatory changes necessary to implement a strong capital standard.

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<sup>92</sup> See Rule § 3.7.3.1[c]5.

<sup>93</sup> See *id.* § 3.6.3.4.3[a]2 (provision OFHEO proposes to amend); see also *id.* at §§ 3.6.3.6.2.1[d], 3.7.2.3, 3.7.3.1[c]5; see also *id.* at Tables 3-6, 3-22, 3-34, 3-60 and n.1 (other HPI-related provisions).

Comment of Freddie Mac  
January 17, 2002  
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Thank you for the opportunity to comment. If Freddie Mac can be of any further assistance, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink that reads "Maud Mater". The signature is fluid and cursive, with a long horizontal line extending to the right.

Maud Mater  
Executive Vice President and General Counsel

Attachments

- Appendix 1: Letter of Dr. Frank J. Fabozzi, September 9, 2001
- Appendix 2: Paper of Dr. Alan S. Blinder, September 24, 2001
- Appendix 3: Comments of Dr. Richard Roll, January 14, 2002
- Appendix 4: Letter of Dr. Frank J. Fabozzi, January 16, 2002

# APPENDIX I

## *Frank J. Fabozzi Associates*

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*Frank J. Fabozzi, Ph.D., C.F.A.  
558 Tower View Circle, New Hope, P.A 18938  
Direct: (215) 598-8924 FAX: (215) 598-8932 e-mail fabozzi321@aol.com*

September 19, 2001

Mr. Leland Brendsel  
Chairman and Chief Executive Officer  
Freddie Mac  
8200 Jones Branch Drive  
McLean, VA 22102

Dear Mr. Brendsel:

I am writing in response to your request that I comment on the non-derivative and derivative "haircuts" contained in the final risk-based capital regulation made available by the Office of Federal Housing Enterprise Oversight (OFHEO) in July 2001 and published in the Federal Register on September 13, 2001. Having reviewed the rule, I am deeply concerned by the severity of these haircuts and the unintended effects they will have. They will create powerful incentives for Freddie Mac to retain higher levels of risk and will have a chilling effect on financial markets, particularly on the multi-trillion dollar derivatives market. Ultimately, they will raise costs for mortgage consumers. I trust this analysis will be useful in demonstrating why OFHEO's haircuts must be corrected.

As I describe in detail below, the methodology and assumptions used by OFHEO in developing these haircuts are fundamentally flawed. In simplest terms, a haircut can be developed by multiplying the probability of counterparty default by the estimated level of losses that result once the default occurs, known as the severity of the default. Unfortunately, OFHEO rejects this straightforward approach and bases its contrived methodology on two erroneous assumptions:

- *Unrealistically high defaults.* OFHEO bases its entire calculation of haircuts on an extremely high default rate dating back to 1912 that is more reflective of turn-of-the-century economic conditions than of our modern financial era.
- *Unrealistically high severities.* In the case of non-derivative haircuts, OFHEO assumes 100 percent losses upon default, which is not based on any empirical evidence. Failure to adequately account for recoveries is particularly egregious in the case of derivatives, which are collateralized with high-quality liquid instruments.

The haircuts resulting from these compounded errors are excessive and fail to recognize the significant difference in credit risk between non-derivative and derivative instruments. I am surprised that, after many years in which regulators have come to understand how derivatives can be employed to manage a wide range of financial risks, OFHEO has taken a major step backwards.

I have spent my career working with such matters. Over the past 20 years, I have written more than 30 books on the subject of fixed income securities and portfolio and risk management.<sup>1</sup> Currently I am an Adjunct Professor of Finance at Yale University's School of Management. I am also on the board of directors of the BlackRock complex of funds, of which several funds specialize in mortgage-backed securities. Finally, I have served as an expert witness on behalf of the U.S. Securities and Exchange Commission and the U.S. Department of Justice in matters involving mortgage instruments and risk management.

## Background

Freddie Mac plays a critical role in the housing finance system by ensuring a stable supply of low-cost mortgage funds. This business entails two primary risks: credit risk and interest-rate risk. Freddie Mac is exposed to the credit risk associated with the mortgages in its total mortgage portfolio. Freddie Mac guarantees its investors the repayment of principal – even when borrowers default on their loans.

Freddie Mac is also exposed to interest-rate risk, which arises primarily from the ability of mortgage borrowers to prepay their mortgages, without penalty, at any time. While this prepayment “option” is a great benefit to homeowners, it exposes Freddie Mac to the risk of a potential mismatch in the duration of its mortgage assets and liabilities for the entire life of a fixed-rate mortgage. Because interest rates are likely to vary substantially over 30 years, Freddie Mac strives to manage any funding gaps in order to minimize its risk exposure.

In mitigating these risks, Freddie Mac employs numerous risk management strategies, including laying off risk to third parties. In the case of mortgage credit risk, Freddie Mac is required in its charter to share risk on low downpayment mortgages with private mortgage insurers or other financial institutions. To reduce its exposure to interest-rate risk, Freddie Mac uses a mix of callable and non-callable debt instruments as well as various types of derivative instruments.

In basic terms, a derivative is a financial contract between two parties that provides for an exchange of cash flows *derived* from the value of the underlying asset or index. In the case of an interest rate contract or “swap” (the type of derivative used almost exclusively by Freddie Mac), Freddie Mac is obliged to

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<sup>1</sup> A full listing of my publications is provided at Appendix A.

make or receive a payment to the counterparty based on the interest rate specified in the contract. Derivatives significantly improve Freddie Mac's ability to match the cash flows from debt financing with the expected cash flows from its investments. By using derivatives in this way – as a so-called end-user – Freddie Mac is able to disperse interest-rate risk through its counterparties to global financial markets.<sup>2</sup>

Laying off risk to third parties carries its own incremental risk, of course. In reducing its total exposure to mortgage credit risk and interest-rate risk, Freddie Mac accepts a smaller degree of risk in the form of exposure to institutional counterparties, that is, the risk that its counterparties fail to fulfill their obligations to Freddie Mac under the terms of specific contracts or agreements. To minimize counterparty risk, Freddie Mac requires its non-derivative counterparties to maintain a high credit rating. In addition, Freddie Mac typically requires its derivative counterparties to post a substantial level of high-quality collateral.

The Federal Housing Enterprises Financial Safety and Soundness Act of 1992 required OFHEO to develop an innovative stress test that ties capital to risk. By law, Freddie Mac must maintain sufficient capital to withstand a ten-year period of extreme swings in both credit and interest-rate risks. Given Freddie Mac's propensity to share risk with counterparties, this test necessarily needs to incorporate certain assumptions about how these arrangements will fare over the ten-year period of severe economic stress. A common way to assign capital commensurate with this risk is to apply a factor known as a "haircut." The haircut serves to reduce the expected cash payments owed to Freddie Mac, resulting in a greater capital requirement.

No one disputes the use of haircuts – the question is one of degree. Regrettably, OFHEO makes several erroneous assumptions about how these counterparty arrangements will perform in stressful periods. The resulting haircuts are far more severe than warranted by the risks presented and will lead to unintended negative consequences for Freddie Mac, financial markets and consumers.

### **OFHEO's Development of Non-Derivative Haircuts**

As proxies for risk, haircuts are based on explicit assumptions about the likelihood of counterparty default and losses in high-stress periods. In simplest terms, a haircut can be developed by multiplying the probability of counterparty default by the estimated level of losses that result once the default occurs, known as the severity of the default. For the purpose of the risk-based stress test, one might expect OFHEO to pick benchmark default and loss rates representative of the stress period it chose for the credit risk portion of the stress test, *e.g.*, 1983

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<sup>2</sup> The use of derivatives to manage interest-rate risk stands in sharp contrast to the use of derivatives for speculative purposes.

and 1984.<sup>3</sup> This would be in keeping with the 1992 law's requirement that characteristics of the stress period not specified in the law be "consistent with the stress period."<sup>4</sup>

Based on my reading of the final rule, OFHEO rejected this straightforward approach and instead developed haircuts that bear no resemblance to the default experience of the stress period they are supposed to reflect. This contrived methodology is described below:

#### *Faulty Default Methodology and Assumptions*

- *Selection of "stress" period default rates.* A reasonable proxy for the performance of non-derivative counterparty arrangements over a ten-year stress period is a ten-year cumulative default rate for corporate bonds. Without justification, OFHEO chose a *four-year* default rate experienced between 1912 and 1915. At 7 percent, this appears to be the single highest default rate OFHEO could find in a 1958 academic study of corporate bond performance.<sup>5</sup> OFHEO's decision to use this extremely high four-year rate as the basis for all further calculations, without considering rates available from much more recent and reliable corporate bond data, is unsupportable. Not only are the data terribly old and representative of a completely different financial era, the aberrantly high default rate was primarily driven by the experience in one sector: railroads. To be more precise, OFHEO used as its benchmark the railroad default experience of primarily small bond issues of less than five million dollars.<sup>6</sup> There is no evidence supporting OFHEO's implicit conclusion that the default rate of pre-Federal Reserve era, small railroad-issuer bonds even faintly resembles the likely default rate of the portfolio of financial instruments and obligations held by Freddie Mac.

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<sup>3</sup> For the credit risk part of the stress test, the statute requires OFHEO to choose the worst consecutive two-year default and loss experience for mortgages in adjoining geographic areas with five percent of the U.S. population. OFHEO chose the default experience of Arkansas, Mississippi, Louisiana and Oklahoma during 1983 and 1984.

<sup>4</sup> Section 1361 of the 1992 safety and soundness legislation requires in several places that characteristics of the stress period other than those specified in the legislation are to be "consistent with the stress period."

<sup>5</sup> W. Braddock Hickman, *Corporate Bond Quality and Investor Experience* at 189 (1958).

<sup>6</sup> The table on page 189 of the Hickman study on which OFHEO relies shows that public utilities and industrials each had less than five issues in 1912-1915 time period, with the remaining bond issues comprised entirely of railroad bonds. This period's default rate is further inflated by a 12.6 percent default rate among investment grade small issuances. *Ibid.* Hickman shows that the default rates for all large bond issues in the two highest investment grades were less than half the 7 percent rate, at 3.8 percent for bonds in grade I and 2.7 percent for bonds in grade II. *Ibid.*, table 36, page 190. This impeaches OFHEO's use of the 1912 data for these purposes.

- *Manufacturing of ten-year default rate.* To make its four-year default rate usable in the ten-year test, OFHEO extrapolates the four-year rate to a ten-year equivalent default rate of 23.7 percent. This rate is obtained by multiplying the 1912 rate of 7 percent by the ratio of four-year and ten-year cumulative default rates that OFHEO describes as “normal” (cumulative ten-year default rates from 1920-99, as published by Moody’s).<sup>7</sup>

While this may appear to be an innocuous arithmetic calculation, it exaggerates the already high 1912 four-year default rate. To assume that, over a ten-year period, bonds will experience the same default rate as they experienced during a four-year, historically high default period is not empirically sound. By locking defaults into this arbitrary pattern, OFHEO further skews the default rate upon which both non-derivative and derivative haircuts are based.

- *Crude use of “stress” multiple.* OFHEO then compares its ten-year extrapolated stress default rate of 23.7 percent to an average default rate experienced during “normal” periods. OFHEO’s proxy for normal bond performance is Moody’s historical average ten-year rate for 1920-99 of 4.85 percent.<sup>8</sup> Since the extrapolations for stressful periods are 4.9 times greater than the historical average, OFHEO applies an approximate 5:1 ratio for default rates in stressful vs. non-stressful time periods *across* all ratings categories.

Several problems immediately come to mind. First, the “normal” period of 1920-99 is inconsistent with the stress period of the 1980s. A better proxy for normal bond performance would be Moody’s historical average ten-year cumulative default rates from 1970 to the present.<sup>9</sup> Using data from the modern financial era has the added benefit of being more reliable as well as representative of the counterparty risk Freddie Mac is likely to face in a stressful period.

Second, it is misleading to apply a single stress “multiple” to all rating categories. Bonds of different rating categories perform very differently, particularly in periods of stress. Given that AAA-rated bonds experience essentially zero defaults during normal periods, the incremental increase in defaults that AAA bonds experience in stress periods will be disproportionately higher than the increase in defaults on lower-rated instruments. For example, for the most recent stressful period, 1978-1985, Moody’s shows that the ratio of AAA to AA ten-year cumulative default rates

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<sup>7</sup> Moody’s Investors Service, “Historical Default Rates of Corporate Bond Issuers: 1920-1999” (January 2000).

<sup>8</sup> *Ibid.* at 27, exhibit 30.

<sup>9</sup> Moody’s Investors Service, “Default and Recovery Rates of Corporate Bond Issuers: 2000,” at 25 (February 2001).

narrowed from 3:1 to approximately 1:1. By using a constant stress multiple, OFHEO distorts the true performance of bonds during stressful periods. (In the discussion in footnote 19, I describe a more realistic set of stress multiples that account for this fact.)

*Failure to Account for Recoveries*

As shown below, OFHEO multiplies the “normal” default rates by its stress multiple of 5 to arrive at its non-derivative haircuts. Without explanation, it makes no allowance for the recoveries Freddie Mac could expect to obtain following default.

**OFHEO’s Non-Derivative Haircuts Phased In Over 5 Years**

Rating	Moody’s Average Rates 1920-99	Stress Multiple	Non-Derivative Haircuts
AAA	1.09	5	5
AA	3.1	5	15
A	3.61	5	20
BBB	7.92	5	40
Below BBB			100

The failure to account for post-default recoveries undermines the credibility of OFHEO’s methodology. By excluding an estimate of loss severity, OFHEO implicitly assumes that every counterparty default results in a loss of 100 percent of principal and interest. This assumption is flatly contradicted by all available empirical evidence and is inconsistent with industry practice that typically (and quite correctly) assumes a certain level of recoveries. According to Moody’s, from 1981 to 2000, default severities on corporate bonds averaged 56 percent across all credit grades, with lower losses on investment grade securities.<sup>10</sup> In a stress situation, some level of recoveries should be assumed; for example, the 1958 study used by OFHEO shows a healthy level of recoveries.<sup>11</sup>

*Imposition of Five-Year Phase-In Period*

OFHEO’s final error is to reduce the ten-year phase-in period to five years. I could not determine any empirical or other justification for this step. Given that all of OFHEO’s calculations – and, indeed, the stress test itself – relate to ten-year periods, I cannot conceive why OFHEO would phase in the haircuts so

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<sup>10</sup> *Ibid.*

<sup>11</sup> The 1958 Hickman study indicates that the average price at default of those bonds rated as investment grade one year before default for the periods studied (1912-1939) was 58 percent – meaning that, upon default, investors were able to immediately recover 58 cents on the dollar. This reflects a reasonable net present value recovery rate. Hickman study, tables 37 p. 193.

rapidly. The five-year phase-in makes the haircuts that much more severe and out of proportion to the actual risks experienced in the first five years.

### **OFHEO's Development of Derivative Haircuts**

The final rule provides even fewer insights into OFHEO's methodology for developing derivative haircuts. However, I have attempted to "piece together" key assumptions and calculations.

#### *Unfounded Assumption regarding Relative Default Rates*

OFHEO implicitly assumes that derivative transactions will default at the same rate as corporate bonds, since it adopts for derivatives the default probabilities that it used in calculating the non-derivative haircuts. Given that OFHEO's non-derivative haircuts are based on default rates from 1912 – some sixty years before the concept of derivative contracts was even devised – there is no empirical basis for this assumption. In my opinion, the assumption that derivative contracts default at the same rate as corporate bonds is unfounded and unsupported. I am not aware of any research showing that derivative instruments are subject to default at rates approaching those of the overall corporate bond market. In fact, the evidence of the past twenty years strongly suggests that derivatives default at a significantly lower rate than corporate bonds.<sup>12</sup> Nevertheless, for the purposes of this discussion, I have assumed that the *incidence* of default would be the same for derivative and non-derivative counterparties.

#### *Failure to Adequately Recognize Loss Mitigation of Collateral and Netting*

In contrast to its non-derivative haircuts, OFHEO claims to provide some level of reduction in the derivative haircuts in recognition of the loss mitigation benefits of Freddie Mac's collateral requirements for derivative counterparties. A comparison of the haircuts in the proposed and final rule indicates that OFHEO implicitly assumes a 40 percent severity for derivatives.<sup>13</sup>

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<sup>12</sup> Freddie Mac informs me that it has never experienced a default by a derivative counterparty. This does not surprise me or any other knowledgeable observer, since Freddie Mac's counterparties consist exclusively of major broker/dealers and insured depository institutions. There is no material instance of which I am aware in which such an institution defaulted on a derivative contract.

<sup>13</sup> In its proposed rule, OFHEO provided an 80-percent discount from the non-derivative haircut levels for the derivative haircuts, implying a 20 percent loss severity on these instruments. This resulted in a 5:1 ratio between non-derivative and derivative haircut percentages for each rating category. However, in the final rule, OFHEO determined, without any explanation, that it would phase-in both types of haircuts in the first five years of the stress test, while at the same time significantly reducing the level of non-derivative haircuts. As a result, the ratio of non-derivative

I strongly disagree that Freddie Mac would lose 40 percent on each defaulted derivative instrument. OFHEO's unsubstantiated method of recognizing the potential for recoveries is completely at odds with the prudent and widely recognized risk management practices of obtaining collateral and entering master netting agreements. Derivative haircuts premised on such an unfounded recovery assumption would provide a significant disincentive to Freddie Mac's use of derivative instruments as a mechanism for laying off interest-rate risk. What should be apparent is that these are not controversial issues. Anyone familiar with derivative contracts would reach the same conclusion.

- *Collateralization.* The terms of derivatives instruments substantially reduce the risk of loss compared with non-derivative counterparty credit risk. In entering a derivative transaction, Freddie Mac obtains contractual terms that permit it to calculate a "mark-to-market" position on a daily basis, meaning that the net exposure on the transaction is calculated every day. When this calculation shows that a counterparty would owe money to Freddie Mac if the derivative were to be realized upon at that time, the contract requires the counterparty to post cash or cash equivalents as collateral in an amount equal to more than 100 percent of the potential exposure.<sup>14</sup> A counterparty's failure to post required collateral within three business days of Freddie Mac's demand gives Freddie Mac the legal right to close out the contract and appropriate any collateral that the counterparty has already posted. As a result, Freddie Mac's actual exposure to the institutional credit risk of the counterparty is limited to an amount equaling the net change in market value of the contract between the time collateral was last posted and the time the contract is closed out.<sup>15</sup>

For example, assuming a 5-year swap, an extremely large move in market prices would leave Freddie Mac relying on the counterparty for only about 2 percent of the swap's notional value. The 2 percent is derived by computing the change in value of a 5-year swap after an extreme adverse two-week change in five-year interest rates of 50 basis points, assuming no collateral is

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to derivative haircuts now stands at 2.5:1, effectively raising the 20 percent loss severity to 40 percent.

<sup>14</sup> In this respect, the issues that arise in valuing collateral such as corporate bonds or other instruments having meaningful credit risk do not arise in connection with Freddie Mac's practices, because it requires Treasuries, cash or its own securities to be posted as collateral.

<sup>15</sup> Freddie Mac completes a daily mark-to-market analysis of its derivative positions. For typical exposures, Freddie Mac will exercise its contractual right to demand the posting of additional collateral on a weekly basis. However, Freddie Mac's contracts give it the right to demand collateral at any time. Therefore, because collateral posting is done weekly (or more frequently), Freddie Mac theoretically could face a net counterparty exposure of at most eight to nine business days, since Freddie Mac's contracts permit it to "close-out" a counterparty position and liquidate collateral three days following the failure to post required collateral.

posted. A movement of 50 basis points is severe compared to what is assumed in the stress test. The test's 600 basis point interest rate "shock" equates to a weekly movement of 12 basis points, or 24 basis points for two weeks. By assuming a 50 basis point movement, this example shows that a 2 percent loss severity is more than adequate to account for the likelihood of loss.

- *Netting.* Counterparty credit risk exposure is further reduced by master netting agreements, under which all positive and negative positions are netted out in an event of default. Master netting agreements take account of the fact that, at any point in time, Freddie Mac is likely to have numerous contracts with any given counterparty.<sup>16</sup> For example, Freddie Mac may owe a counterparty \$X on a swap and be owed \$Y by the counterparty on a different swap. OFHEO's specification assumes that Freddie Mac continues to pay the \$X it owes to the counterparty on the one contract in the event of default, even as the counterparty makes good on only a fraction of its obligation on the other contract, despite a contractual arrangement permitting Freddie Mac to "net" or offset its total contractual obligations with the counterparty. This treatment fails to recognize the actual contract, and is contrary to both good industry risk management practice, and to common sense.<sup>17</sup>

Financial regulators routinely recognize the full value of these risk-reducing mechanisms in establishing capital requirements. For example, the major U.S. and international financial regulators all recognize collateral and netting on a dollar-for-dollar basis and the Basel Committee on Banking Supervision clearly recognizes these risk mitigation practices in the New Basel Capital Accord. According to William J. McDonough, President and Chief Executive Officer of the Federal Reserve Bank of New York, "Greater recognition of the benefits of risk mitigation techniques – such as collateral, guarantees, credit derivatives and netting – also is at the forefront of the Committee's [Basel Committee on Banking Supervision] work in revising the Accord."<sup>18</sup>

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<sup>16</sup> Indeed, given the prevailing practice in the financial markets, in which derivative counterparties continuously enter into new contracts to mitigate changes in interest-rate risk positions, Freddie Mac is likely to have hundreds of individual contractual arrangements with numerous of its derivative counterparties.

<sup>17</sup> It is also worth noting that the 1992 safety and soundness legislation created a 30-percent capital "add-on" for management and operations risk. An assumption that Freddie Mac would continue paying a counterparty on one contract despite the counterparty's default on another contract certainly qualifies as an operational risk.

<sup>18</sup> Remarks by William J. McDonough, President and Chief Executive Officer, Federal Reserve Bank of New York, before The 4th Annual Supervision Conference of The British Bankers Association, London, United Kingdom, June 19, 2000.

## Recommended Haircuts

In my professional opinion, the errors made with respect to non-derivative and derivative haircuts are so significant that they impeach the credibility of OFHEO's stated intention to tie capital to risk. No one would choose this convoluted method used for creating non-derivative haircuts unless one sought to create exceedingly high haircuts. Moreover, no one would fail to recognize basic, prudent risk mitigation practices such as collateralization and master netting unless they sought unreasonably high derivative haircuts.

As I mentioned earlier, there are simpler and more accurate ways to calculate haircuts. With respect to non-derivative haircuts, OFHEO easily could have compared the highest average ten-year default rate for all investment-grade bonds to a normal default rate consistent with the stress period. According to Moody's, the highest recent average cumulative ten-year default rate for investment grade bonds was 5.08 percent in 1982. By comparison, the average ten-year default rate for investment grade bonds from 1970 to 2000 was 2.21 percent. Thus, whereas OFHEO's contrived methodology produced a stress multiple of five, the Moody's assessment based on more recent data shows that stress period defaults are less than 2.5 times the "normal" level.

An even better way to determine haircuts would be to assign default and severity percentages by individual rating categories. As shown below, using default probabilities commensurate with the stress period chosen by OFHEO and assuming a highly conservative level of recoveries upon default would produce haircuts that are much more reflective of the actual risks. I also recommend a ten-year phase-in period, since the five-year period adopted in the OFHEO rule creates haircuts in the first five years that are much too severe.

### Recommended Non-Derivative Haircuts

Rating Classification	10-Year Cumulative Default Rates <sup>19</sup> Consistent with Stress Period	Loss Severity	Haircut (Ten-Year Phase-In)
AAA	2%	60%	1.2%
AA	2%	75%	1.5%
A	4%	75%	3.0%
BBB	8%	100%	8.0%

With respect to derivative haircuts, I recommend a loss severity of 2 percent, in accordance with the reasoning and methodology described above. This change brings the relationship between derivative and non-derivative haircuts far more in line with the actual risks. Whereas OFHEO proposes a ratio of non-derivative to derivative haircuts of 2.5:1, a ratio on the order of 30:1 would be far more reflective of the actual loss severity probabilities. As shown in the table below, the recommended derivative haircuts assume a ten-year phase-in period, correcting the five-year phase-in period that OFHEO imposed without explanation in the final rule (similarly to non-derivative haircuts).<sup>20</sup> It should be noted that these recommended haircuts assume the same underlying default rates as assumed for corporate bonds. In fact, derivative default rates are likely much lower than non-derivative default rates, and, thus, the derivative haircuts set forth below are more conservative than warranted. For this reason, a 30:1 ratio should be regarded as a minimum ratio and a much higher ratio may better align capital requirements with the actual underlying risks.

<sup>19</sup> These cumulative default rates were determined as follows: I begin by averaging 10-year cumulative default rates experienced during the period of severe economic stress from 1978-85, as reported by Moody's. (See relevant cohort years in Exhibit 43, Moody's Investors Service, "Default and Recovery Rates of Corporate Bond Issuers: 2000," February 2001.) I then compare these average cumulative 10-year default rates for stress periods to those experienced in a "normal" period (Moody's cumulative 10-year default rates from 1970 to 2000, as shown in Exhibit 41.) In contrast to OFHEO's assumption that cumulative default rates are 5 times greater in stressful periods across all credit ratings, this comparison yields a ratio of about 3:1 for AAA and about 2:1 for AA and A.

<sup>20</sup> In addition, the recommended haircuts also should be applied to *net* positions on a counterparty-by-counterparty basis (rather than a contract-by-contract basis).

### Recommended Derivative Haircuts (Assuming Equivalent Default Rates)

Rating Classification	Worst Case 10-Year Cumulative Default Rate	Loss Severity	Haircut (Ten-Year Phase-In)
AAA	2%	2%	0.04%
AA	2%	2%	0.04%
A	4%	2%	0.08%
BBB	8%	2%	0.16%

### Conclusion

By imposing haircuts far more severe than warranted, OFHEO significantly raises the cost of Freddie Mac's risk management strategy to lay off risk to third parties. Paradoxically, this sets up a perverse capital regime that rewards Freddie Mac for retaining *more* risk than it currently does.

Overly severe haircuts will also have a negative impact on consumers. For example, Freddie Mac has advised me that it would have to charge AA-rated mortgage insurers approximately 10 basis points more than AAA-rated mortgage insurers to account for the artificial distinction in risk that OFHEO's rule imposes via the haircuts.<sup>21</sup> These costs likely would be passed on to low-downpayment borrowers in the form of higher monthly mortgage insurance payments.<sup>22</sup>

Likewise, overly severe derivative haircuts could create an incentive to transfer interest rate risks back to the consumer (*e.g.*, by a shift toward adjustable rate mortgages or by the increased use of prepayment penalties on 30-year, fixed-rate mortgages). Seeking a substitute for interest-rate swaps by issuing more callable debt, for example, may raise Freddie Mac's funding costs to the extent that consumers experience higher mortgage rates for fixed-rate mortgages. In June 2000, then-Treasury Secretary Larry Summers, testifying before Congress on the Commodity Futures Modernization Act, noted that the use of derivatives "can help lower mortgage payments, insurance premiums and other financing costs for American consumers and businesses."<sup>23</sup> The OFHEO

<sup>21</sup> Similar to the approach recognized by bank regulators, Freddie Mac currently does not differentiate in price between mortgages insured by AA and AAA rated institutions.

<sup>22</sup> Research shows that even small increases in mortgage costs affect homeownership. For example, a 0.5 percent increase in mortgage costs would decrease the U.S. homeownership rate for low- and moderate-income and minority families by as much as 3 percent. See R. Quecia, G. McCarthy and S. Wachter, "The Impacts of Affordable Lending Efforts on Homeownership Rates," (June 2000).

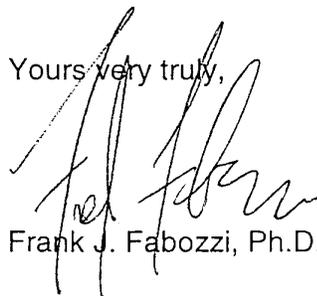
<sup>23</sup> Testimony of Treasury Secretary Larry Summers, Joint Senate on the Commodity Futures Modernization Act, June 21, 2001.

rule will damage Freddie Mac's ability to use derivatives to lower mortgage payments.

Finally, as an anomaly among financial safety and soundness regulation, OFHEO's overly severe haircuts represent a setback for the dispersion of risk through the world's capital markets. In February 2000, in testimony before the Committee on Agriculture, Nutrition and Forestry, United States Senate, Chairman Greenspan stated: "Over-the-counter (OTC) derivatives have come to play an exceptionally important role in our financial system and in our economy. These instruments allow users to unbundle risks and allocate them to the investors most willing and able to assume them."<sup>24</sup> My views are completely in line with these statements.<sup>25</sup>

Given the large body of opinion recognizing the important role derivatives play in our financial system, and, in particular, in the delivery of low-cost mortgages, it would seem reasonable that OFHEO would set haircuts that align capital to risk – without penalizing the use of these instruments intended to manage risk. Unfortunately, the haircuts mandated by OFHEO far exceed the actual risk of these risk-sharing arrangements, as I have demonstrated. Overly severe haircuts will have the paradoxical effect of creating powerful incentives for Freddie Mac to retain higher levels of risk. OFHEO's haircuts will also raise costs for mortgage consumers and will have a chilling effect on markets. Haircuts at the levels recommended here would be more than sufficient to account for the level of counterparty credit risk associated with a ten-year period of severe economic stress – without impeding the smooth functioning of markets.

Yours very truly,



Frank J. Fabozzi, Ph.D.,CFA

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<sup>24</sup> Testimony of Chairman Alan Greenspan, "Over-the-Counter Derivatives," before the Committee on Agriculture, Nutrition and Forestry, United States Senate, February 10, 2000.

<sup>25</sup> See. F. Fabozzi, F. Modigliani, and M. Ferri, *Foundations of Financial Markets and Institutions: Second Edition* at 13 (1998); F. Fabozzi and F. Modigliani, *Capital Markets: Institutions and Instruments: Second Edition* at 15 (1996): "The existence of derivative instruments is the key reason why investors can more effectively implement investment decisions to achieve their financial goals and issuers can more effectively raise funds on more satisfactory terms. Several of the financial innovations and strategies discussed throughout this book rely on the market for derivative instruments."

## ATTACHMENT A: SELECTED BOOKS AUTHORED AND EDITED BY FRANK J. FABOZZI

### *Books Authored*

1. Frank J. Fabozzi, Franco Modigliani, Frank J. Jones, and Michael Ferri, *Foundations of Financial Markets and Institutions* (Prentice-Hall, Englewood Cliffs, N.J. 2001: Third edition).
2. Leland Crabbe and Frank J. Fabozzi, *Managing a Corporate Bond Portfolio* to be published by John Wiley & Sons in October 2001.
3. Frank J. Fabozzi, *Bond Portfolio Management* (Frank J. Fabozzi Associates, Second Edition, 2001).
4. Frank J. Fabozzi and John Dunlevy, *Real Estate Backed Securities* (Frank J. Fabozzi Associates, 2001).
5. Frank J. Fabozzi and Steven V. Mann, *Introduction to Fixed Income Analytics* (Frank J. Fabozzi Associates, 2001).
6. Geoffrey Buetow, Jr. and Frank J. Fabozzi, *Valuation of Interest Rate Swaps and Swaptions* (Frank J. Fabozzi Associates, 2001).
7. Frank J. Fabozzi and Steven V. Mann, *Floating Rate Securities* (Frank J. Fabozzi Associates, 2000).
8. Frank J. Fabozzi, *Fixed Income Analysis for the Chartered Financial Analyst Program* (Frank J. Fabozzi Associates, 2000).
9. Frank J. Fabozzi and James Grant, *Equity Portfolio Management* (Frank J. Fabozzi Associates, 1999).
10. Frank J. Fabozzi and David Yuen, *Managing MBS Portfolios* (Frank J. Fabozzi Associates, 1998).
11. Frank J. Fabozzi, *Investment Management* (Prentice Hall, New Jersey, Second Edition, 1999).
12. Frank J. Fabozzi and Franco Modigliani, *Capital Markets: Institutions and Instruments* (Prentice Hall, New Jersey, 1996, Second Edition).
13. Pamela P. Peterson and Frank J. Fabozzi, *Analysis of Financial Statements* (Frank J. Fabozzi Associates, 1999).
14. Frank J. Fabozzi, *Duration, Convexity, and Other Bond Risk Measures* (Frank J. Fabozzi Associates, 1999).
15. Bruce Collins and Frank J. Fabozzi, *Derivatives and Equity Portfolio Management* (Frank J. Fabozzi Associates, 1999)

16. Frank J. Fabozzi, *Measuring and Controlling Interest Rate Risk* (Frank J. Fabozzi Associates, 1996).
17. Frank J. Fabozzi and Gifford Fong, *Advanced Fixed Income Portfolio Management: State of the Art* (Probus Publishing, 1994).
18. Frank J. Fabozzi, *Fixed Income Securities* (Frank J. Fabozzi Associates, 1997).
19. Frank J. Fabozzi and Franco Modigliani, *Mortgage and Mortgage-Backed Securities Markets* (Harvard Business School Press, Boston, 1992)
20. Frank J. Fabozzi, *Bond Markets, Analysis and Strategies* (Prentice-Hall, 1999, Fourth Edition).
21. Frank J. Fabozzi, *Valuation of Fixed Income Securities and Derivatives* (Frank J. Fabozzi Associates, 1998, Third).
22. Frank J. Fabozzi and Chuck Ramsey, *Collateralized Mortgage Obligations: Third Edition* (Frank J. Fabozzi Associates, 1999).
23. Frank J. Fabozzi, *Treasury Securities and Derivatives* (Frank J. Fabozzi Associates, 1998)
24. Richard W. Wilson and Frank J. Fabozzi, *Corporate Bonds: Structures and Analysis* (Frank J. Fabozzi Associates, 1996).
25. Frank J. Fabozzi and Mark B. Wickard, *Credit Union Investment Management* (Frank J. Fabozzi Associates, 1997).
26. Frank J. Fabozzi, Dessa Fabozzi, and Sylvan Feldstein, *Municipal Bond Portfolio Management* (Irwin Professional Publishing, 1994).
27. Frank J. Jones and Frank J. Fabozzi, *The International Government Bond Markets* (Probus Publishing, 1992).
28. Mark Pitts and Frank J. Fabozzi, *Interest Rate Futures and Options* (Probus Publishing, Chicago, IL 1990).
29. Ravi Dattatreya and Frank J. Fabozzi, *Active Total Return Management of Fixed Income Portfolios* (Irwin Professional Publishing, Burr Ridge, IL 1995, Second edition) [translated into Japanese].
30. Frank J. Fabozzi, *Fixed Income Mathematics: Analytical and Statistical Techniques* (McGraw Hill Publishing, 1997, Third Edition). (First edition translated into Japanese; third edition translated into Chinese.)
31. Frank J. Fabozzi and Richard W. Wilson, *The New Corporate Bond Market* (Probus Publishing, Chicago, IL 1990).
32. H. Gifford Fong and Frank J. Fabozzi, *Fixed Income Portfolio Management* (Dow Jones-Irwin, Homewood, IL, 1985) [translated into Japanese].

## *Books Edited – Contributing Editor*

1. Frank J. Fabozzi (editor), *Accessing Capital Markets through Securitization* (Frank J. Fabozzi Associates, 2001).
2. Frank J. Fabozzi (editor), *Investing in Asset-Backed Securities* (Frank J. Fabozzi Associates, 2000).
3. Frank J. Fabozzi (editor), *The Handbook of Fixed Income Securities: Sixth Edition* (McGraw Hill, 2000)
4. Frank J. Fabozzi (editor), *Fixed Income Readings for the Chartered Financial Analyst Program* (Frank J. Fabozzi Associates, 2000).
5. Frank J. Fabozzi (editor), *The Handbook of Mortgage-Backed Securities* (Irwin Professional Publishing, Burr Ridge, IL, 1995- Third Edition) [first edition translated into Japanese; parts of second edition translated into Japanese).
6. Frank J. Fabozzi (editor), *Handbook of Portfolio Management* (Frank J. Fabozzi Associates, 1998).
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# **Stress Tests, Default Risk, and the Macroeconomy**

by

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## **Summary**

This paper considers the likely macroeconomic backdrop that underlies the proposed stress test for Freddie Mac. It concludes that (a) the conditions presumed in the “downrate” stress test are reminiscent of the Great Depression, (b) for a host of reasons, a macroeconomic situation as severe as the Depression is extremely unlikely in the future and, therefore, most likely too pessimistic to be reasonable and (c) the degree of counterparty risk assumed in the stress test (due to default and loss given default assumptions) for a well-diversified and high quality portfolio of debt instruments is in excess of a reasonable "worst case" scenario.

## **The stress test**

There can be little doubt that a stress test is an appropriate—indeed, an exceedingly useful—component of any effort to develop risk-based capital standards for a large financial institution. Stress tests are employed regularly (though not always successfully) in private-sector risk management and also by a variety of regulators, both in the U.S. and abroad. But the details matter. Among the key questions for designers of stress tests are:

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\* Alan S. Blinder is a consultant to Freddie Mac, which requested the analysis in this paper. The conclusions, however, are Blinder’s alone and should not be attributed to any organization with which he is affiliated.

- ◆ the *severity* of the hypothesized stress: If the presumed scenario is not sufficiently adverse, the resulting test will be too easy to “pass.” If, on the other hand, it is excessively harsh, then requiring enough capital to pass the test may eliminate much of the enterprise’s profit and/or the public benefit that accrues from its operations.
- ◆ the *nature* of the hypothesized stress: Does the test focus on the relevant risks going forward or does it, like the proverbial general, focus on fighting the last war? This question is, of course, intimately related to the nature of the shock or shocks—whether economy-wide or sectoral—that are (tacitly or explicitly) thought to lead to the stressful situation.

Section 1361 of the Federal Home Loan Mortgage Corporation Act specifies that the risk-based capital test for Freddie Mac should embody, among other things, the following conditions:

- a. a stress period that lasts 10 years
- b. mortgage loan losses on a nationwide basis equivalent to the worst two-year experience of any region containing at least 5% of the U.S. population (the so-called ALMO region).
- c. (in the *downrate* scenario) what amounts to a 50% *decrease* in the interest rate on 10-year Treasuries, with commensurate changes elsewhere along the yield curve.<sup>1</sup>
- d. (in the *uprate* scenario) what amounts to a 75% *increase* in the interest rate on 10-year Treasuries, also with commensurate changes elsewhere along the yield curve.
- e. “a correspondingly higher rate of general price inflation.”<sup>2</sup>

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<sup>1</sup> Campbell’s (1998) statistical analysis suggests that changes in the yield curve slope would not be dramatic.

### *The macroeconomic scenario*

From a macroeconomic perspective, these five conditions immediately suggest three observations about the underlying situation that is tacitly subsumed in the stress test:

1. Condition e should probably be interpreted as calling for the inflation rate to rise or fall nearly as much as the (nominal) interest rate. After all, real interest rates rarely move by magnitudes anywhere near as large as the changes in nominal rates contemplated in Conditions c and d—and they virtually never do so for periods as long as a decade.<sup>3</sup> Thus this aspect of the shock is best thought of as a sizable change in the *inflation rate*, rather than as a large swing in real interest rates.

2. Conditions a and b suggest an extraordinarily long period of extremely weak macroeconomic performance—at least in the housing market (more on this below). After all, the worst postwar recession in U.S. history (1981-1982) lasted only 16 months, and the economy began growing rapidly shortly after the trough. A stress period of ten years, with rampant defaults on mortgages, seems comparable only to the Great Depression.

3. It is difficult to imagine how an economy could be depressed for a decade and yet still suffer from high inflation—that is, it is hard to imagine a macroeconomic situation that combines Conditions a and b with the inflationary situation implied by the uprate scenario. That would presumably require a severe and amazingly long lasting “supply shock,” such as an oil shock. Thus, in terms of possible defaults, the most consistent and important part of the stress test would appear to be the downrate scenario,

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<sup>2</sup> As long as the interest rate changes are at least 50%, which they are.

<sup>3</sup> Both Darby (1997) and Campbell (1998) make this point.

which is redolent of the Great Depression.<sup>4</sup> After all, financial institutions fail more often in weak economies than in strong ones.

This paper concentrates on the downrate scenario because the likely losses from default in that case are almost certainly larger than the likely default losses in the uprate scenario.<sup>5</sup> In developing macroeconomic underpinnings for such a stress test, it is natural to look back at the most adverse episodes in U.S. economic history—making due adjustments for relevant structural and institutional changes since then. Of course, the Great Depression stands out as by far the worst macroeconomic situation this country has ever faced. So an extremely stringent stress test might utilize a macroeconomic environment similar to the Depression. I emphasize the adverb “extremely” in the previous sentence, however, for I believe that the overwhelming majority of economists would rate the probability of repeating the Great Depression as negligible.<sup>6</sup> Such an extreme event is probably rarer than the proverbial hundred-year flood. Not only was the Great Depression far worse than any *postwar* recession, it was also the deepest (though not the longest) of *any* recession in the entire NBER business cycle chronology—which dates all the way back to 1854.<sup>7</sup>

To reinforce this point, Table 1 compares the contractionary phase of the Great Depression to selected aspects of the worst business cycle experiences in the United

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<sup>4</sup> However, the downrate scenario cannot be viewed as a *replication* of the Great Depression. As will be noted below, too many structural features of the U.S. economy have changed since then.

<sup>5</sup> I do not mean to imply, however, that the uprate scenario is inappropriate. Proper risk management requires assessing Freddie Mac’s exposure to *both* increases *and* decreases in interest rates.

<sup>6</sup> The doleful experience of Japan over the last decade is *not* evidence to the contrary. Neither the decline in real GDP nor the deflation in modern Japan is in any way comparable to what happened in the U.S. (and elsewhere) during the Great Depression.

<sup>7</sup> See Moore and Zarnowitz (1986), Table A.4, pp. 760-763.

States since then.<sup>8</sup> In every case, the differences are dramatic. The Depression lasted almost three times as long and was more than 11 times as deep, when measured by the decline in real GNP/GDP.<sup>9</sup> The Federal Reserve, which is commonly blamed for letting the Depression get out of hand, allowed the money supply to shrink 27 - 30%, whereas the money supply has virtually never declined in any postwar recession. The cumulative deflation between 1929 and 1933, which seriously exacerbated the plight of debtors, was also extraordinary—including the decline in the prices of (newly constructed) houses. Interestingly, the only criterion on which the worst postwar experience is in any way comparable to that of the Great Depression was in the volume of homebuilding<sup>10</sup>—which declined 84% from peak to trough in 1929-1933 versus 32% in 1973 - 1975, for a ratio of “only” 2.6:1. This observation underscores the wisdom of focusing, in the stress test, on extreme weakness in the housing market, as OFHEO does. Combining a “sectoral shock” to the housing market with a general macroeconomic shock seems entirely appropriate in this context.

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<sup>8</sup> According to the National Bureau of Economic Research, the peak quarter was 1929:3 and the trough was in 1933:1. The worst recession since then, both in terms of length and depth, was in 1981-1982. But other recessions have scored worse on several of the other criteria in Table 1.

<sup>9</sup> It was about six times as deep when measured by the rise in the unemployment rate.

<sup>10</sup> Of course, there are numerous other criteria that are not shown in the table. The table was constructed to highlight the macroeconomic variables most relevant to the performance of Freddie Mac.

**Table 1**  
**Comparisons between the Great Depression and Postwar Recessions**

Criterion	Great Depression	Worst Postwar Recession	Which Recession?
Length of contraction (months)	43	16	1981-1982
Decline in real GDP (percent)	-32.6	-2.8	1981-1982
Rise in unemployment rate (percentage points)	+21.7	+3.6	1981-1982
Decline in M1 (percent)	-27.3	-0.4	1948-1949
Decline in M2 (percent)	-30.0	-0.3	1948-1949
Decline in GDP deflator (percent)	-26.9	-2.1	1948-1949
Decline in wholesale prices (percent)	-37.4	-6.4	1948-1949
Decline in spending on residential structures (percent)	-84.2	-31.9	1973-1975
Decline in deflator for residential structures (percent)	-33.1	-2.6	1948-1949

*Sources:* Moore and Zarnowitz (1986), Balke and Gordon (1986), and Bureau of Economic Analysis

In sum, while there are not enough recessions in U.S. history to make the kinds of statistical judgments that are desirable in quantitative risk management (e.g., what is a “three-sigma” event?), my opinion is that a repeat of the Great Depression is an excessively pessimistic macroeconomic scenario. Perhaps something a bit worse (and lasting longer) than the 1981 - 1982 recession, with special difficulties in the housing market, would be a more appropriate backdrop.

More than just a perusal of U.S. business cycle history supports this view. It is well known that the U.S. and other nations have put in place a number of institutional and policy innovations designed to make a repetition of the Great Depression next to impossible. While this is not the place for a lengthy disquisition on this subject, it is worth listing a few of the more important ones:

- ◆ federal deposit insurance, plus the entire web of bank supervision and regulation designed to minimize bank failures and eliminate contagion;
- ◆ automatic fiscal stabilizers such as the personal income tax and unemployment insurance;
- ◆ improvements in the performance of discretionary fiscal and, especially, monetary policy as macro stabilizers.

None of these features were present in 1929, and all are important now. Regarding the last of them, a number of economists have recently observed that the U.S. economy has been much more stable since the recovery from the 1981 - 1982 recession—and especially in the 1990s—than it was before. They attribute a good part of this decreased volatility to improvements in stabilization policy, principally monetary policy.<sup>11</sup> So do I.

***The housing sector: Is the experience of the Great Depression still relevant?***

Because homebuilding amounts to only about 4% of GDP, the above short list of post-Depression innovations did not include changes in the mortgage market. But those have been quite remarkable.<sup>12</sup> For example: The Federal National Mortgage Association (the predecessor of Fannie Mae) was established as a government agency in 1938. Fannie Mae and Freddie Mac followed in 1968 and 1970, respectively, as federally chartered corporations designed to create a secondary market in mortgages. In the late 1970s and early 1980s, the authority to issue adjustable rate mortgages—which shift some of the risk from lenders to borrowers—was first granted and then liberalized. Regulation Q ceilings on interest rates disappeared in stages between 1978 and 1986. In

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<sup>11</sup> See, for example, Blanchard and Simon (2001) and Taylor (2001).

<sup>12</sup> For a recent summary and analysis, see McCarthy and Peach (2001).

1983, Freddie Mac issued the first Collateralized Mortgage Obligation (CMO). And so on.

It is no exaggeration to say that these and other financial innovations revolutionized the housing finance system in the United States—especially since the mid-1980s. In the process, they transformed the mortgage market from one dominated by thrift institutions that both originated mortgages and held them on their balance sheets to one dominated by mortgage bankers and brokers and securitized mortgage instruments that are traded as capital-market instruments. They also transformed a market subject to frequent credit rationing and episodes of sharp “disintermediation” when the Fed tightened monetary policy into one that behaves more like a normal, price-mediated capital market. One result of all these legal and institutional changes has been a less volatile housing market—which, of course, was precisely what was intended.

The conclusion is *not* that a severe housing slump is now impossible. Rather, it is that the terrible experience with mortgage defaults in the 1930s would appear to be even *less* relevant to the housing market than the Great Depression is to the economy as a whole.

### **Default rates and counterparty risk**

More specific questions pertain to Freddie Mac’s counterparty risk. In particular, questions have been raised about the “haircuts” (which represent assumed losses) in the stress test. This is not the place to engage in a lengthy discussion of the details, but a few remarks relating this specific issue to the underlying macroeconomic scenario are in order.

First, I have just argued that the general macroeconomic conditions of the Great Depression are most likely too pessimistic to be reasonable. Thus, both the default and loss (given default) rates experienced during the 1930s should be taken as very generous *upper bounds* on plausible default and loss rates during the stress period. Where would such upper bounds be?

The best available information pertains to default rates on *corporate bonds*, which naturally vary by credit rating. Moody's has estimated that the 10-year cumulative default rate on *all* U.S. corporate bonds in the decade 1930 - 1940 was 20.4%. Unsurprisingly, that rate peaked (at around 33%) for the cohorts in existence around 1929 - 1931 and then fell rapidly as more "good years" were added to the 10-year period. The 20.4% average figure for the decade is comparable to (though slightly below) the loss rates assumed in the OFHEO stress test—which reinforces the view that the test contemplates a scenario similar to the Great Depression.

However, the average 1930 - 1940 default rate is highly skewed by the extremely adverse experience of speculative-grade bonds. The corresponding ten-year default rate for *investment-grade* bonds—which are much more germane to Freddie Mac's counterparties<sup>13</sup>—was just 10.7%. The *worst* 10-year experience for such bonds (the 1930 cohort) was a default rate of 19.7%. Hickman's (1958) study of bond defaults between 1912 and 1943 found *four-year* default rates for investment grade corporate bonds of 6.2% in the four years spanning 1932 - 1935.<sup>14</sup> But performance was much better in the quadrennia immediately before (1928 - 31 which includes the first two years of the Depression) and after (1936-1939 which were still Depression years)—just 1.4%

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<sup>13</sup> Freddie Mac's counterparties are concentrated in the AAA class and very few are rated lower than A.

and 3.3% respectively. All this suggests that a presumed default rate *for investment grade bonds* of, say, 10.7%, lasting for a decade, is, if anything, on the high side for a forward-looking stress test.

Second, a corporate default does not normally lead to 100% loss of the investor's principal and interest. Moody's (2001, p. 24) study found average loss rates of 47% for senior secured bonds, 53% for senior unsecured bonds, and 68% for subordinated bonds over the 1981 - 2000 period. Surprisingly, these loss rates are roughly comparable to those found by Hickman (1958) for the period 1900 - 1943. So perhaps this is one area in which the earlier experience—which includes the Great Depression—is still relevant. However, the approximately 50% loss rate suggested by experience is roughly half the 100% loss rate that appears to have been used in the stress test.

Third, and finally, there turns out to be surprisingly little correlation between default rates on corporate bonds and the overall macroeconomic situation—at least in the more recent data. Figure 1 illustrates this fact by plotting default rates (from Moody's) against the growth rate of real GDP over the 1970 - 2000 period. The correlation, while negative, is evidently extremely weak. (It is, in fact, -0.23.) Adding more lags of GDP growth, or switching to the unemployment rate instead (scatter plots not shown), does not appreciably increase the correlation. Thus corporate default rates seem to have a life of their own, wholly apart from the overall business cycle. For example, while the three highest default rates shown in Figure 1 pertain to 1990, 1991 and 1970 (in that order), which were all recession years, defaults ran far lower during the much more severe recessions of 1973 - 1975 and 1981 - 1982. Furthermore, default rates were rather high

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<sup>14</sup> See his Table 35, p. 189. Actually, this was not the period of highest default rate. Some 7.0% of corporate bonds defaulted in the 1912-1915 quadrennium.

in the two most recent “boom years” 1999 and 2000. The historical lesson may be that defaults tend to run high after long booms (in the 1960s, the 1980s, and the 1990s) lead to “irrational exuberance,” less cautious lending, and high leverage.

### **Conclusions**

The main conclusions of this short paper are easy to summarize:

1. Simple macroeconomic analysis suggests that the most worrisome scenario for the credit risks faced by an institution like Freddie Mac would be a severe and lengthy recession with particular problems in the housing market. This is rather similar to the “downrate” scenario in the stress test. But macroeconomic conditions as dire as those of the Great Depression seem entirely too pessimistic.

2. A variety of institutional and policy changes have made both the overall economy and the housing sector in particular more stable today than they were in the 1930s. So even if the same sorts of severe “shocks” were to occur today (e.g., a 1929-style stock market crash, an international financial calamity), their effects would be less devastating.

3. Cumulative *10-year* default rates on *investment grade* corporate bonds appear to have averaged around 10% during the 1930s. Coupled with a (roughly) 50% recovery rate, that implies total investor losses of around 5%. That seems to be a reasonable assumption for a “worst case” scenario going forward, as long as the portfolio of debt instruments is well-diversified and of reasonably high quality. The haircuts in OFHEO’s rule are well in excess of this level.<sup>15</sup>

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<sup>15</sup> The following calculation may help put a more contemporary perspective on what a 5% loss rate means. Moody’s (2001, p. 27) default study combined 1970 - 2000 average default rates and 1981 - 2000 average recovery rates to estimate typical *one-year* loss rates of 0.1% on Baa bonds and 0.9% on Ba bonds. This means that a hypothetical *low-quality* portfolio consisting of 50% Baa bonds and 50% Ba bonds might have

4. Surprisingly, the two constituent rates in the above calculation (default and recovery) do not appear to be terribly cyclical, although the bond default rate was extraordinarily high during the 1930s.

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suffered an average *10-year* loss rate of about 5% over the last three decades. (Performance over the *worst* 10 years would have been worse than this, of course.)

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**Comments About**  
**OFHEO's Proposed Debt Refunding Rule**  
**For the Government Sponsored Enterprises**

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## **Introduction.**

These comments focus exclusively on certain assumptions about debt refunding under OFHEO's proposed risk-based capital rule for the Government Sponsored Enterprises (GSEs). Specifically, I argue, first, that a 50 bp add-on for the callability option embedded in new GSE debt is completely unwarranted and, second, that there is no justification for the 10 bp credit premium on new GSE debt over yields paid by other borrowers. The 50 bp proposed yield add-on is far larger than would logically be required under the stress test's conditions. Moreover, it appears to be based on confusion between true interest costs and stated yields on callable securities. OFHEO's justification for the 10 bp credit spread is based on a dubious and inconsistent argument entirely unsupported by either logic or empirical evidence.

## **The yield add-on for callable debt.**

The Enterprises would never issue callable debt with the characteristics assumed by OFHEO, but rather debt with much different call features for which the stated yield add-on would be no more than 5 basis points. In addition, an incremental capital requirement for any callability-induced yield premium represents an elementary financial error. The stated yield on a callable bond is not a true interest cost at all. It is an accounting fiction. The cash flow return a rational investor expects from such a bond is strictly less than the stated yield. It follows that any decrement to an issuer's capital is also less than the apparent "yield." Any interest rate volatility at all will lead to a much lower cost of financing than the stated yield.

*The Enterprises would issue callable debt with a stated yield add-on of less than 5 bps.*

Prudent risk management has strong implications about the appropriate type of Enterprise financing and about the characteristics of call options embedded in their callable debt

financing. The Enterprises' assets consist of long positions in non-callable annuities (the promised mortgage cash flows) plus short positions in call options (prepayments) on those annuities. To hedge such assets, the Enterprises must structure their borrowings so that promised outflows are duration-matched to the non-callable mortgage annuities while the call options embedded in their borrowing match the prepayment options.

Hedging mortgages is a complex business because homeowners, who are not usually finance professionals, decide when to exercise prepayment options. Nonetheless, the general principle is clear. If the mortgage prepayment option is in-the-money, prudent risk management requires that call options embedded in Enterprise debt also be in-the-money, and vice versa. Under an increasing interest rate stress test, mortgages in Enterprise portfolios will have coupons below the coupon on new mortgage originations; hence, their prepayment options will be out-of-the-money. Logically, the Enterprises should then issue debt with equally out-of-the-money call options.

A new 5NC1 bond callable at par after one year has an embedded option at-the-money and so would be an inappropriate hedging vehicle under the stipulated conditions of the stress test. The bond's effective duration would be too short relative to the mortgage assets. This would expose the Enterprises to unnecessary risk induced by subsequent interest rate volatility, a risk they could and would easily avoid.<sup>1</sup>

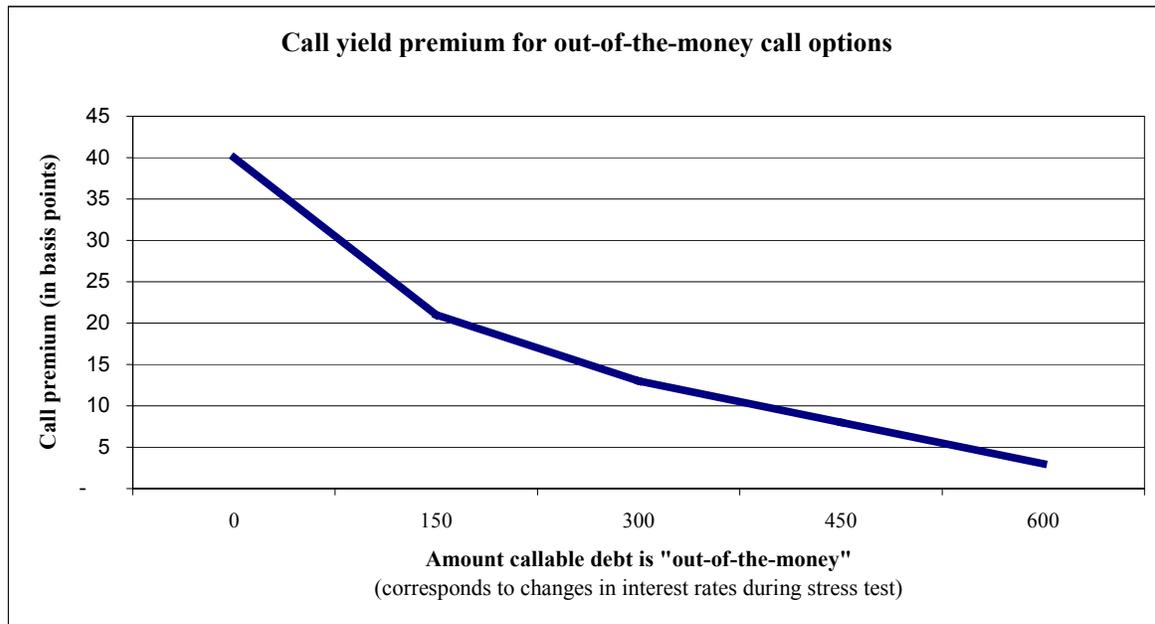
Out-of-the-money callable debt can be engineered either through the bond indenture (i.e., callable only at a significant premium over par), or by using discount debt callable at par with a below-market coupon. In either case, the relatively low value of the embedded call option implies only a small premium of stated yield over otherwise equivalent non-callable debt. The graph below depicts the callability-induced stated yield premium for various interest rates relative to the bond's coupon.<sup>2</sup> For example, by month 12 of OFHEO's stress test where interest rates have increased by almost 600 basis points, the

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<sup>1</sup> If the Enterprises did finance out-of-the-money mortgages with at-the-money debt, they would make extraordinary profits should interest rates decline. They would be able to refund the debt at lower rates comfortably before the vast bulk of their mortgages began to prepay.

<sup>2</sup> Source: Freddie Mac Research Department.

premium is less than five bp, nowhere near the 50 bp proposed by OFHEO. In the next section, I argue that even this small premium is not a reflection of true interest costs, which are what really matter in terms of financial stress. True interest costs would, in fact, be lower than the stated yield.



Out-of-the-money amount (bps)	0	150	300	450	600
Call Premium (bps)	40	21	13	8	3

Notes:

Call Premium Calculated from Yield Book™: calculated as difference between bullet yield and callable yield with call at a premium.

Interest-rate curve: 1/04/02 swap yield curve, with curve flattening per rule as interest rates increase.

Implied volatility: Yield Book™ 2-factor term structure of volatility, constant OAS.

### *The Stated Yield on Callable Debt Overstates Expected Interest Costs.*

Callable yield overstatement follows directly from an important assumption behind every yield calculation: viz., all cash received prior to the maturity of the bond can be reinvested at the initial yield. Because yields change unpredictably, this implicit reinvestment assumption is not generally valid for any bond, callable or not. However, for non-callable bonds reinvestments at higher future yields seem roughly as likely as reinvestments at lower future yields. To the extent that favorable and unfavorable reinvestment rates cancel each other on average, the initial stated yield is an indicator,

albeit a noisy indicator, of the expected total return over a non-callable bond's lifetime including earnings on reinvestments.

The situation for a callable bond is completely different. Bonds are called when interest rates decline below the initial yield while they are not called when interest rates increase. Hence, large reinvestments are likely at rates below the initial yield. Averaged over all possible interest rate scenarios and payments, the result is an anticipated total return over the bond's life strictly less than the initial yield.

If interest rates happen to increase after a bond's issuance and remain higher until maturity, the total return will be somewhat higher than the initial yield because coupon payments can be reinvested at more favorable yields. But in the event of declining interest rates, there is a severe erosion of return because both coupons and called principal can only be reinvested at lower yields. The overall impact is well understood by issuers and investors; callable bonds have lower values than non-callable bonds with identical coupons and maturity.

The lower value results, quite understandably, in a lower market price. Since the yield is simply the internal rate of return which discounts stated future cash flows, (i.e., coupons and principal on their scheduled dates) and equilibrates their aggregate to the current market price, the so-called yield is higher as the price discount is greater.

In an efficient bond market, there would be no cash flow difference on average between a callable and an otherwise identical non-callable bond from the same issuer. It is merely an artifact of OFHEO's stress test, the utter absence of interest rates volatility, which makes callable debt appear to be more expensive for the Enterprises.

The risk profile of a callable bond is identical to the combined profile of a non-callable bond with the same maturity and coupon less a call option on the non-callable bond. From option theory, we know it is possible to design a portfolio consisting of a long position in the underlying asset and various short positions in call options resulting in an

infinity of different risk profiles. It is even possible to construct a risk-free portfolio. But in every case, there is no sense in which one portfolio has a greater risk-adjusted return than any other portfolio. In other words, since the non-callable bond and the option are fairly priced, the callable bond is priced fairly too; otherwise there would be a money pump.

### **The 10 bp yield add-on.**

Under the 1992 statute, there is already a 30% capital requirement for “management and operations risk” in addition to core capital and allowances for projected losses under severe interest rate and credit conditions. It is not clear to this observer why there should be an additional 10 bp yield premium relative to other issuers on new debt issued by the Enterprises, whatever the interest rate and credit conditions might be.

The argument adduced to support this add-on<sup>3</sup> begins with a less than compelling observation that “...the preamble to the Rule suggested that such premium might be appropriate...” It is then admitted that “...data upon which to base such a premium may be too sparse to determine definitively whether other spreads to Treasuries would widen as much as the Enterprises’ spreads or to estimate how much the Enterprises’ spreads would widen.”

The subsequent discussion mentions problems that would be induced if such a yield premium did arise, but the only statement pertinent to whether it should arise is, “The stress test involves factors, such as a decline in housing prices, that might not affect the debt costs in other sectors of the economy as much.”

The final explanatory paragraph admits that “...An ideal stress test might model different spreads for different rate series, a complex approach that OFHEO could not implement in the foreseeable future. The ten-basis-point premium, therefore, can be viewed as a

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<sup>3</sup> See *Federal Register*, Vol. 66, No. 243 (Tuesday, December 18, 2001), p. 65153.

simplifying assumption, which gives some effect to the possibility that stress period market conditions could impact an Enterprise more adversely than the rest of the market.”

In other words, the OFHEO hasn't a clue about the appropriate size of any incremental credit yield premium nor even about whether it might be positive or negative. The 10 bp premium appears to be a pure concoction, not even a “simplifying assumption.”

There is no reason why the Enterprises should, under the specified stress conditions of increasing or decreasing interest rates, pay proportionately higher rates than other borrowers. In fact, the Enterprises are known for skill in managing interest rate risks by astute portfolio structuring of assets and liabilities, hedging with a plethora of interest rate derivatives, and judicious market timing. If anything, one might expect their relative borrowing costs to decline as interest rates increase or decrease dramatically. There is certainly no historical evidence to the contrary (as OFHEO freely admits.) Although 10 bp appears on the surface to be relatively “modest,” a term employed by OFHEO in its explanation, the resulting dollar capital requirement would be significant. Without any theoretical or empirical justification, the 10 bp add-on amounts to an unwarranted and unjust penalty.

### **Conclusions.**

Risk-based capital requirements must, of course, be based on sound financial reasoning and historical empirical evidence. Simulated conditions of financial stress for the GSEs should be as realistic as possible. This does not appear to be the case for certain assumptions about refunding Enterprise debt under conditions of increasing interest rates.

There is no reasonable justification nor any historical evidence to support an across-the-board 10 bp credit yield spread on Enterprise debt relative to the debt of other borrowers.

The proposed 50 bp yield spread for the assumed 5NC1 bond overstates the true interest costs of the Enterprises for two reasons. First, the Enterprises would never be tempted to issue such debt under the stipulated stress test conditions, but would instead issue out-of-the-money callable debt with a stated yield spread of no more than 5 bp. Second, whatever the callability-induced yield spread happens to be, it does not represent a true incremental borrowing expense. The actual interest cost of callable debt is always strictly less than the stated yield. In fact, callable and otherwise identical non-callable debt of the same issuer should have exactly the same true interest cost.

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January 16, 2002

Alfred M. Pollard, Esq.  
General Counsel  
Office of Federal Housing Enterprise Oversight  
1700 G Street, NW  
Washington, DC 20552

Re: Risk-Based Capital Proposed Regulation; RIN 2550-AA23

Dear Mr. Pollard:

At the request of Freddie Mac, I have completed an independent analysis of certain aspects of the proposed rule published in the *Federal Register* on December 18, 2001 that would amend OFHEO's final Risk-Based Capital Regulations published on September 13, 2001. I have focused my comments on two aspects of the proposed rule: OFHEO's assumptions regarding the type of debt Freddie Mac and Fannie Mae (the "GSEs") would issue during the rule's hypothetical 10-year stress period and the calculation of non-derivative and derivative "haircuts" as proxies for institutional counterparty risk.

While the proposed changes represent an improvement over earlier versions, the risk-based capital stress test continues to fall well outside the boundaries of prudent risk management. To be sure, no model can perfectly simulate the complex world of mortgage finance. Nevertheless, OFHEO's continual reliance on simplistic and mechanistic assumptions is irresponsible. As I will demonstrate below, the crude nature of the test creates perverse incentives for the GSEs to actually increase risk in order to lower their capital requirement! In addition, it will result in significant and unjustified additions to capital that can only serve to increase mortgage costs for consumers.

The most serious flaws are highlighted here:

- *Unrealistic assumptions about the issuance of new debt.* The rule blindly assumes that the GSEs will maintain their initial debt mixture over the ten-year stress period – regardless of dramatic swings in interest rates. If the GSEs issued the type of debt assumed in the proposed rule, their basic competence would be called into question.

- *Unrealistic assumptions about the use and cost of callable debt.* The rule inexplicably assumes that the GSEs will issue long-term debt only as expensive callable debt, even when interest rates are rising and there is little need to hedge a portfolio of low-rate mortgages. Given the terms and conditions of the stress test, no competent risk manager would do this.
- *Unsubstantiated 10 basis point premium on borrowing costs.* The rule assumes that GSE debt costs will increase during the stress period relative to other issuers by a fixed 10 basis point add-on. While certainly an improvement over the 50 basis point premium included in earlier versions, the 10 basis point add-on has no empirical basis and serves only to impose needless costs on the mortgage finance system.
- *Unrealistically high defaults and severities.* OFHEO continues to base its entire calculation of counterparty haircuts on extremely high default rates dating back to 1912. Although OFHEO's belated recognition of recoveries on defaulted bonds is a step in the right direction, its across-the-board assumption of a 70 percent loss severity lacks any empirical basis. Failure to adequately account for recoveries is particularly egregious in the case of derivatives, which are collateralized with high-quality liquid instruments.<sup>1</sup>

In summary, without greater semblance to prudent risk management behavior, the risk-based capital stress test will always remain suspect, and its results specious.<sup>2</sup> This outcome would be regrettable, since OFHEO has a unique opportunity to put forth the world's most sophisticated risk-based capital stress test, which will serve as model for financial regulation for years to come. To ensure that the rule lives up to its billing and serves to accurately tie capital to risk, additional changes are urgently needed. It is well worth the effort to get this rule right.

I have spent my career working with such matters. Over the past 20 years, I have written more than 30 books on the subject of fixed income securities and portfolio and risk management.<sup>3</sup> Currently I am an Adjunct Professor of Finance at Yale University's School of Management. I am also on the board of directors

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<sup>1</sup> My comments here supplement a letter I furnished to Freddie Mac on September 19, 2001 addressing haircuts. A copy of this letter is provided at Appendix I.

<sup>2</sup> Perhaps I simplistically assume that the test should mimic prudent and rational risk management behavior. However, it is my understanding that irrational and irresponsible behavior is already accounted for in the statutory requirement that the GSEs to hold 30 percent in capital for management and operations risk *over and above* that required by the stress test itself. This is a significant capital surcharge that greatly exceeds comparable management and operations risk capital standards applying to any other financial institutions. OFHEO should not attempt to duplicate this capital surcharge through arbitrary and biased assumptions about the type and cost of new debt the GSEs issue during the stress test.

<sup>3</sup> A full listing of my publications is provided at Appendix II.

of the BlackRock complex of funds, of which several funds specialize in mortgage-backed securities. Finally, I have served as an expert witness on behalf of the U.S. Securities and Exchange Commission and the U.S. Department of Justice in matters involving mortgage instruments and risk management.

## **I. OFHEO's Proposed Debt Issuance Assumptions Are Wrong**

The problems with OFHEO's proposed debt issuance assumptions will be obvious to any reader with a basic understanding of two things. First, one needs to grasp the fundamentals of the risk-based capital stress test, particularly the rules governing the issuance of new debt during the hypothetical ten-year stress period and OFHEO's reasons for adopting these rules. Second, one needs to understand how real-world debt managers replenish their funds by issuing new debt instruments in order to prudently manage a mortgage portfolio's interest-rate risk. The strong contrast between these two scenarios demonstrates that OFHEO's assumptions are both unrealistic and inconsistent with fundamental risk management principles.

### **A. Background**

As set forth in the 1992 Act, the risk-based capital stress test is a method for calculating GSE capital requirements. The hypothetical stress test assumes extremely severe credit and interest-rate conditions that prevail uninterrupted for a period of ten years (the "stress period"). The risk-based capital requirement is determined by running the GSEs' current book of assets, liabilities and off-balance-sheet obligations through the test and calculating the amount of starting capital needed for a GSE to survive the test for the full ten years. (The credit risk portion of the test is immaterial to our discussion here, which relates solely to the interest-rate portion of the test.)

Congress directed the stress test's interest-rate risk to include both a sharply rising interest-rate risk environment (the "up-rate scenario") and a sharply declining interest-rate risk environment (the "down-rate scenario"). Whichever rate scenario results in the highest capital charge is deemed applicable in calculating each GSE's capital requirement.

- In the up-rate scenario, interest-rates would rise during the first year of the stress period up to 600 basis points (6 percent) over prevailing interest rates, to an interest-rate yield no greater than 175 percent of the prevailing yield, and remain that way for the next nine years of the test. For example, if rates were at 8 percent at the beginning of the test, the stress test assumes interest rates would rise to 14 percent within a year and stay there for the next nine years.

- In the down-rate scenario, interest rates would decline during the first year of the stress period to 50 percent of the prevailing yield, and remain that way for the next nine years of the test. For example, if rates were at 8 percent at the beginning of the test, the stress test assumes interest rates would drop to 4 percent within a year and stay there for the next nine years.

The interest-rate scenarios in the stress test represent very dramatic and sustained fluctuations in interest rates and impose highly stressful conditions on the GSEs. This is largely due to the fact that the GSEs hold sizable investment portfolios of mortgages as a means of fulfilling their statutory purposes. The GSE fund the purchase of these mortgages by issuing debt.

Most U.S. residential mortgages permit the borrower to prepay the mortgage at any time over the life of the loan, generally up to 30 years. This ability to prepay at any time is an extraordinary benefit most homeowners take for granted. No country matches the U.S. in commonly offering both a 30-year term *and* a fixed interest rate for the life of the loan. This benefit is only available because the investor in fixed-rate mortgages (*e.g.*, in this case, the GSE) takes on the “optionality” associated with the loans. That is, when interest rates rise, borrowers are less likely to pay off their loans, meaning that the mortgages behave like long-term assets and remain on the GSE’s books for a longer period of time. When interest-rates decline, however, many borrowers elect to prepay, thus removing the mortgage assets from the GSEs’ books.

The high degree of optionality requires a prudent funding strategy that keeps the mortgage portfolio in balance. In a rising rate environment, for example, relatively low coupon mortgages remain on the books. As previously issued-debt matures, the GSE is forced to fund the low-coupon mortgage assets with higher-rate, more costly debt. All things equal, such a condition eventually would result in the GSE’s obtaining insufficient cash flow from the mortgage assets to pay these debt obligations. The same potential for a portfolio mismatch exists in a declining rate environment, when borrowers tend to prepay rapidly to obtain lower-rate loans. If the GSE had issued long-term debt to fund the original mortgages, the new, lower-rate mortgages put on the books may provide insufficient funds to pay off the pre-existing, higher cost debt. Thus, to manage the interest-rate risk associated with a mortgage portfolio and minimize losses, a rational funding strategy is needed.

In summary, U.S. mortgage borrowers receive an extraordinary benefit: the complete freedom to “put” back their mortgage at any time. No other set of borrowers participating in world capital markets enjoys such a benefit. This extraordinary feature of the U.S. mortgage finance system requires an extremely sophisticated financing mechanism. To avoid creating distortions and raising mortgage costs, OFHEO’s assumptions governing how the GSEs would finance their portfolios under the hypothetical stress test must be closely aligned with

real-world debt management practices. In my expert opinion, the new assumptions put forth by OFHEO fail in this regard.

## **B. OFHEO's Unjustifiable Debt Issuance Rules**

The risk-based capital statute establishes the interest-rate changes that would apply during the stress period in both the up- and down-rate scenarios. However, the specific rules for the types of debt the GSEs would issue during the stress period are left to up to OFHEO.<sup>4</sup> Unfortunately, the rules proposed by OFHEO are overly simplistic and mechanistic, threatening the viability of the GSEs' prudent funding strategy. These proposed rules are as follows.

- *Static debt mix.* First, OFHEO proposes to assume that each GSE would issue debt in a manner that would retain for the entire stress period the precise mix of long-term and short-term debt obligations (as adjusted by interest-rate swaps) that exist at the start of a stress test period. In other words, if a GSE currently were maintaining, for example, an 80 percent to 20 percent mix of long-term to short-term debt, the stress test would assume that, as debt matured, the GSE would issue a debt instrument with a term designed solely in order to maintain that specific mix, regardless of how high or low interest rates are assumed to have moved in the stress test.<sup>5</sup>
- *Irrational requirement that all long-term debt have call feature.* Long-term debt is assumed to be 5-year debt that can be "called at par," or retired by payment of principal to investors, after its first year (5 no-call 1). Such a mechanistic requirement is inconsistent with prudent risk management. Callability is clearly a rational economic choice that is made by a debt issuer on a case-by-case basis, and should not be a binding requirement.
- *Unjustified 50 basis point premium for long-term debt.* Inexplicably, the assumed yield on the callable 5-year debt includes a 50-basis-point add-on to the assumed interest rate on the long-term instrument. OFHEO's sole explanation for attaching the call feature and its assumed 50-basis point cost to each and every long-term debt instrument issued by the GSEs during the stress period is that the GSEs "increasingly have come to rely upon callable debt to balance the prepayment optionality in their loan portfolios."
- *Unjustified additional 10 basis points premium on all debt.* OFHEO proposes to add an extra cost assumption to every GSE debt obligation issued during the stress period – long-term or short-term – by assuming that the GSEs'

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<sup>4</sup> The statute generally requires assumptions to be "those determined by the Director on the basis of available information, to be most consistent with the stress period."

<sup>5</sup> OFHEO's logic in adopting this assumption was that it did not want to attempt "explicitly to predict or simulate Enterprise responses to the interest rate shocks in the stress test," but that using the GSEs' starting long term/short term debt ratios would result in a "realistic" debt structure.

borrowing costs would increase by an amount 10 basis points greater than the borrowing costs of any other debt issuer in the market. OFHEO's explanation for adding this extra cost assumption has varied during the regulatory process. In its initial proposed rule on the subject, OFHEO proposed to add a 50-basis point premium to debt issuances. However, in the final rule issued in September 2001, OFHEO added back a ten basis point premium add-on to all new debt issuances.

Taken together, OFHEO's four assumptions dictating how the GSEs are to issue debt under the hypothetical stress test are unsubstantiated and mechanistic. As will be shown below, these assumptions contrast greatly with prudent risk management.

### **C. Prudent Management of Interest-Rate Risk When Issuing New Debt**

Now let us consider first principles of debt issuance. I have no doubt that, given the stressful conditions of the test, rational managers of interest-rate risk, including the GSEs, would adhere to the following two basic objectives. First, the issuer would seek to issue debt in a manner that accounts for changes in interest rates that *already had occurred* during the stress period. Second, the issuer would seek some mechanism to manage the *potential for future changes in interest rates, or volatility*. It is essential to distinguish between these two objectives in considering OFHEO's proposals, which are premised on the logic that a GSE, when issuing debt during the stress period, always will seek to manage the optionality of its mortgage portfolio, *i.e.*, always will seek to rebalance the duration and convexity properties of assets and liabilities.

One way to think about these two objectives is to divide a debt funding transaction into two parts: The first is the *term of the bond instrument* itself, which, as it is issued, is a reflection of past changes in interest rates. The second is an *option instrument*, which the issuer purchases along with the bond instrument to manage the volatile interest-rate changes. Options appear in a variety of forms. They can be embedded in a debt instrument in the form of a call feature requiring the payment by the issuer of a premium. Options also include interest-rate swap option contracts and other derivative instruments that provide the same protection as the call.

In a simple example, let's assume there is a portfolio of mortgages with a weighted average coupon (a "WAC") of 8 percent. In the event interest rates rise by 600 basis points (6 percent) – the up-rate scenario – what would the risk manager do when some of this debt matures? First, the risk manager would seek to account for the rise in rates that already has occurred by issuing long-term debt. This is because few of the mortgage borrowers with 8 percent mortgages would elect to prepay their mortgages in a 14 percent interest-rate environment. Issuing long-term debt is, thus, entirely rational; it allows the manager to match the expected, lengthened duration of the mortgage assets with

a concomitant lengthening of the expected duration of the debt funding instruments.<sup>6</sup>

The same rationale holds in the down-rate scenario. Were rates to fall to 4 percent, the risk manager would anticipate many borrowers' prepaying their mortgages, dramatically shortening the duration, or expected life, of the existing mortgage portfolio. To match the duration of the debt to that of the assets, the manager would issue short-term debt. The important point is that *the term of the debt instrument is not a bet on future interest rates, but a prudent response to changes in rates that already have occurred to match asset and liability duration and manage interest-rate risk.*

But what about future interest rates? To manage interest rate volatility when issuing long-term debt in the up-rate environment, the risk manager simultaneously would obtain an option that enables the issuer to call the debt in the event interest rates drop. A rational manager would elect to use the form of option – either callable debt or a swaption that creates “synthetic long-term debt” – that is most efficiently priced while meeting the objective of hedging future interest-rate volatilities. In the down-rate environment, the opposite would occur. The manager would issue short-term debt and simultaneously obtain a “put option” that would enable the issuer to extend the life of the short-term debt in the event interest rates were to rise in the future.

Thus, prudent risk management involves the making of rational choices that simultaneously respond to interest-rate changes that have already occurred and that seek to proactively manage future interest-rate volatility.

#### **D. Comparing OFHEO's Assumptions to Prudent Risk Management**

In the proposed rule, OFHEO deliberately chose *not* to attempt “explicitly to predict or simulate Enterprise responses to the interest rate shocks in the stress test” when creating new debt issuance assumptions. While it is understandable that OFHEO would choose to simplify real world assumptions in the stress test, this does not give OFHEO license to make assumptions that assume irrational decision-making in both the up-rate and down-rate interest-rate scenarios. By setting the OFHEO rule side-by-side with basic risk management principles, we can immediately draw several conclusions.

##### **i. OFHEO's assumption of a static debt mix is wrong.**

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<sup>6</sup> Such a funding strategy, while rational, nonetheless would result in significant losses: It is impossible to fund an existing mortgage portfolio with much higher cost debt and not incur losses. This merely underscores the fact that the basic interest-rate risk stress in the rule is quite severe and would impose stringent penalties on a GSE that had not carefully managed the funding of its portfolio prior to application of the rule's stress test.

OFHEO's assumption regarding the term of the debt that the GSEs will issue requires identical GSE behavior in both the up-rate and down-rate scenario. Under the proposed rules, each GSE will be obliged to issue debt in such terms as to maintain the precise "mix" of long-term and short-term debt that existed at the start of the stress period. OFHEO, to my knowledge, has provided no explanation for this "simplifying" assumption, and I can conceive of no reason why such an assumption makes any sense from a risk management perspective.<sup>7</sup> In fact, no prudent manager would ever issue the debt on identical terms in up-rate and down-rate scenarios with a previous debt mix in mind. Remember, the portfolio risk manager's objective, as OFHEO itself has stated, is to issue debt to rebalance the duration gap between mortgage assets and debt funding, created by the assumed movement in interest rates. Thus, a rational risk manager *always* would issue significantly more long-term debt in the up-rate scenario and significantly more short-term debt in the down-rate scenario. This would not represent a "bet" on future interest rates, as OFHEO has characterized it, but would merely account for the changes in rates that already have occurred.

OFHEO's static debt mix assumption turns prudent risk management on its head. It implies that in a sharply up-rate scenario the GSE would ignore the impact of higher rates on the duration gap of its assets and liabilities and blindly issue whatever percentage of short-term debt it happened to have at the start of a given stress period. Similarly, in the down rate scenario, the rule assumes that the GSEs would issue long-term debt with no attempt to balance duration. In fact, the effect of the OFHEO rule in many cases will be to *increase the duration gap mismatch between assets and liabilities, increasing the interest-rate risk of the GSEs during the stress period*. This is not a result that a safety-and-soundness regulator should actively promote through its regulation, because it could create an incentive in some environments for a GSE to behave in the same way.

Thus, in my expert opinion, the assumptions regarding debt term should mirror the practices of prudent portfolio risk managers. This will align capital with risk and create an incentive for the GSEs to manage their portfolios to reduce interest-rate risk.

## **ii. OFHEO's assumption of a 50 basis points call premium is wrong**

The second major flaw in OFHEO's assumptions about the type of debt that would be issued in the stress test relates to the call option on long-term debt issues. As I discussed above, it is reasonable to include in the stress test an

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<sup>7</sup> It is possible, I suppose, that OFHEO has some reason unrelated to aligning capital to risk, *e.g.*, that adopting a single debt term assumption for both scenarios makes it easier for OFHEO to program its computers to calculate the capital requirement. If so, I would argue that, given the risk-management illogic of the assumption, making OFHEO's job easier should not constitute an adequate reason to adopt such a patently silly rule.

assumption that attempts to mimic a GSE's need to hedge future interest rate volatility through the purchase of an option simultaneous with debt issuance. However, OFHEO's assumption that such a call option uniformly would be attached to 5 year debt at a cost of 50 basis points is absurd and does not reasonably reflect actual costs.

Recall that the purpose of purchasing an option when issuing debt is to hedge future interest rate changes that adversely affect the duration match between mortgage assets and debt liabilities. The OFHEO rule does not contemplate any other purpose for obtaining such an option. Thus, the GSE would seek only to obtain an option that enables it to react to a change in interest rates that changes the effective duration of its mortgage portfolio. The average cost of such an option is much lower than 50 basis points.

Let's return to our earlier mortgage portfolio example, beginning with the up-rate scenario. If interest rates rise from 8 percent to 14 percent, mortgage borrowers are very unlikely to prepay their mortgages until rates again drop below 8 percent. Should interest-rates fluctuate above 8 percent, the GSE is indifferent: It has no need to rebalance its portfolio, because mortgage asset duration will not be significantly changed by such fluctuations. In this case, the GSE would issue new debt (long-term debt to rebalance the interest-rate increase that already has occurred) and then would purchase an option permitting it to call the long-term debt *only in the event rates drop below 8 percent*.

The value of this option obviously would relate to the likelihood that it would be exercised, which, in turn, relates directly to the gap between the assumed prevailing interest rates and the "strike" interest rate of 8 percent. The option cost, which could be easily calculated and programmed by OFHEO, would be higher in the initial period of rising interest rates, when investors would believe that a return to the 8 percent threshold is more likely, and would diminish as interest rates rise. Because the stress test assumes that rates are roughly 6 percent higher than starting rates for the last nine years of the stress test, the average cost of this option over the entire stress period would be very cheap indeed.

This point can be demonstrated with direct, empirical market-based option prices. At my request, Freddie Mac calculated today's market prices for options that would re-balance the optionality of a mortgage portfolio over a four-year period, exercisable after a one-year holding period (closely simulating the features of the 5-year, no-call 1 bond that would be needed to hedge optionality). Based on these market prices, which I believe are quite reasonable, the true cost of the call option that OFHEO's rule contemplates would start at 39 basis points at the outset of the stress period, declining steeply in the first year and remaining

at just 6 basis points for the last nine years of the test.<sup>8</sup> The sharp price reductions reflect the fact that investors would demand much lower prices as the call option became further “out of the money.” Thus, for the final nine years of the stress period, the 50 basis point call premium imposes a cost nearly ten times more than that needed to achieve the purported risk management objective OFHEO sets out.

By requiring the GSE to issue long-term debt with a one-year call option exercisable after one year, and at a cost of 50 basis points, OFHEO is imposing significant and unnecessary costs on the debt structure. Issuance of callable debt that is callable “at the money” obviously can be a useful device for funding newly purchased mortgages. However, it is totally excessive in the scenario envisioned in the stress test. For example, if rates have risen to 14 percent from 8 percent, the GSE only needs to purchase an option that allows it to call the long-term debt if rates drop to 8 percent, but OFHEO’s proposal would require the GSE to purchase an option to call the long-term debt at any time, regardless of changes in interest rates. This is nothing more than a gross surcharge on any reasonable risk-based capital requirement.

In the down-rate scenario, OFHEO’s debt issuance assumption is even more perverse. This is because OFHEO assumes that a GSE would issue primarily long-term debt, but also would pay a 50-basis point premium for callability. In reality, as I discussed earlier, the GSE would issue short-term debt in order to rebalance the duration gap caused by the drop in interest rates that already had occurred. Moreover, the option that the GSE would purchase to hedge the risk of

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<sup>8</sup> Here are the details of the pricing exercise: The option priced is a four-year “swaption” exercisable one year after purchase, which permits the purchaser to pay floating rates of interest upon exercise and receive fixed rate payments equivalent to the bond coupon payment obligation. This option provides appropriate protection to the GSE in the event of a sudden drop in interest rates. Option prices were derived from the Yield Book™, a well-known industry index used for these purposes by market professionals (and, I understand, also used by OFHEO for its calculations). The option model used to calculate the figures was the Yield Book’s proprietary two-factor interest rate model, described in Y.K. Chan, “A Term Structure Model and the Pricing of Fixed-Income Securities,” (Salomon Brothers Fixed Income Research). This is a variant of the Black-Karasinski option model. F. Black and P. Karasinski, “Bond and Option Pricing Theory when Short-Term Rates Are Lognormal,” *Financial Analysts Journal* (July-August 1991), pp. 52-59. The methodology assumes the option is only exercisable at a strike price equivalent to current interest rates (a reasonable assumed proxy for the WAC of a mortgage portfolio). Using this methodology and assuming rates rose in accordance with the assumptions in the up-rate stress test scenario, the bond-equivalent values of the call options were as follows: 39 basis points at outset; 18 basis points at month 3; 13 basis points at month 6; 8 basis points at month 9; and 6 basis points at month 12 and for the remainder of the stress period. These represent a reasonable estimate of what the true price of the call premium should be in any OFHEO rule. At my request, Freddie Mac also developed pricing figures for a 5-year bond that had the identical call features embedded in the instrument itself (this is not a typical instrument in today’s market, but it could be issued and it can be priced). The results of this alternative exercise strongly corroborate the results of the swaption pricing exercise. In the event OFHEO determines to retain an assumption that all long-term new debt will be issued with a call feature, either of these sets of figures would represent a reasonable replacement for the unjustifiable 50 basis point premium assumption.

future interest rate changes in this instance would not be a call option at all. Rather, the GSE would purchase an option that would permit it to *lengthen* the term of its debt should interest rates rise significantly, again for the purpose of rebalancing its asset/liability mix and closing any duration gap.

The purpose of this “put” option in the down-rate scenario – and, therefore, its cost – would be solely to permit a lengthening of debt to hedge the slowing of mortgage prepayments that would accompany a rise in interest rates, incrementally approaching the original interest-rate threshold of 8 percent. This is in essence a mirror image of the up-rate call option. Its cost would be higher in the first months of the stress test, when rates are closer to the starting point, and would diminish considerably within a year, remaining quite low for the remaining nine years of the stress period.

The cost of the down-rate’s short-term debt and put option is likely to vary from the up-rate’s 5 year debt and call option, but again is readily calculable. The reasonable market prices furnished to me by Freddie Mac indicate that the put option would cost 48 basis points at the outset of the stress period and drop to 5 basis points at the end of the first year for the remaining nine years of the period.<sup>9</sup> Once again, empirical data demonstrate an actual cost dramatically lower than the assumptions that OFHEO proposes to adopt.

In sum, OFHEO appears to be requiring the GSEs to purchase call protection in a form and amount that is not reasonably related to the risks OFHEO states are being managed. Only in the initial month of the stress period would OFHEO’s proposed 50 basis point premium bear any reasonable relationship to an empirically derived option cost. For the remaining 119 months of the stress period, particularly the last nine years, a 50 basis point premium is essentially a tax added to the capital requirement: Put another way, the 50 basis point premium represents unnecessary insurance that no reasonable risk manager would ever buy.

To further illustrate this point, consider how much protection against anticipated interest-rate swings one would purchase for a 50 basis point charge under the hypothetical facts of the stress test. Market professionals assess the likelihood of upward or downward swings in interest rates using a figure called “implied volatility.” If an option is expensive relative to current interest rates, the market is implying that rates are very uncertain and likely to be volatile, and the implied volatility percentage is relatively high. If an option is relatively cheap, this

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<sup>9</sup> The pricing figures calculated by Freddie Mac (using the same sources and methodology described for the up-rate scenario) are 48 basis points at the outset of the stress period; 42 basis points at month 3; 28 basis points at month 6; 11 basis points at month 9; and 5 basis points at month 12 and thereafter through the remainder of the stress period. Remember, that these are put swaption prices that would be effectively combined with 1 year bullet debt, not 5 year bullet debt.

reflects an implied market judgment that rates are stable, and the implied volatility percentage is thus lower.<sup>10</sup>

The implied volatility embedded in OFHEO's 50 basis point charge in the up-rate scenario – that is, the implied prediction of interest-rate swings that the market would be protecting against if it charged a 50 basis point premium for a 5 year no call 1 bond – is *double* any implied volatility percentage ever observed in the market, even for short periods of time. In my opinion, it is ludicrous to assume that such unprecedented, high volatilities would persist for a ten year period. The implied volatility of OFHEO's rule in the down-rate scenario is *four times* the market's highest implied volatility.<sup>11</sup> In other words, the market would never charge the GSEs 50 basis points to protect against reasonably anticipated interest-rate volatility once rates had risen or fallen to the levels assumed in the stress test. This again demonstrates that the 50 basis point call charge is simply not reasonable.

### **iii. OFHEO's 10 basis point add-on is unjustifiable**

Finally, I am perplexed by OFHEO's arbitrary decision to add a 10 basis point premium to the GSEs' cost of both long-term and short-term debt as compared to the borrowing costs of other institutions. The explanations that OFHEO advances provide no basis for assuming that GSE debt costs will rise out of proportion to other issuers. Moreover, even were we to infer a rationale for the add-on based on the potential for the GSEs to experience a sectoral or idiosyncratic management and operations problem, those types of risks are already amply covered in other parts of the risk-based capital stress test. In short, this is an unjustified capital charge that duplicates other capital requirements that already are quite severe.

OFHEO itself has admitted that it has no basis to support a 10 basis point surcharge. In an earlier proposed version of the stress test, OFHEO had proposed to add a 50 basis point surcharge to new debt issuance. (Is it merely a coincidence that by adding a 50-basis point "call premium" to long-term debt OFHEO is able to recapture much of this earlier, and groundless, capital charge?) I understand that numerous commenters responded to this proposal, filing critical comments, including comments from the GSEs, accompanied by

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<sup>10</sup> For example, suppose that an investor buys a one-year interest-rate call option when interest rates are 5 percent exercisable only if interest rates fall below 4 percent. For the option to have any value, interest rates must fall more than 100 basis points within the next year. If the implied volatility level quoted in the market is 25 percent for such an option, it is equivalent to saying that market participants expect that interest rates could go up or down by 125 basis points (5 percent beginning interest rate multiplied by 25 percent volatility measure equals 125 basis points).

<sup>11</sup> Historically high implied volatility percentages are around 25 percent. Based on the swaption pricing methodology described above, the implied volatility of a 50 basis point call option that 600 basis points "out-of-the-money" in the up-rate scenario is 50 percent. The implied volatility percentage for the down-rate after one year is 94 percent, roughly four times the historical market percentage.

compelling empirical evidence refuting the likelihood that the GSEs' borrowing costs (debt spreads) would increase (or "widen") in a manner significantly greater than the borrowing costs of other issuers in the market. In response, OFHEO withdrew the debt issuance "add-on" in the September 2001 final rule, stating:

[T]here is too little historical experience on which to determine definitively whether other spreads to Treasuries would widen as much as the Enterprises' spreads or to base an estimate of how much the Enterprises' spreads would widen. Consequently, OFHEO has decided not to include a premium on new debt in the final rule.

This concession by OFHEO notwithstanding, the recent proposed rule reintroduces a GSE debt add-on, this time in an amount of 10 basis points. Although a 10 basis point surcharge is modest compared to the previously proposed 50 basis points, it would, nevertheless, materially impact on the GSEs' capital requirements. OFHEO's stated justification for reintroducing the add-on is as follows:

Although the spreads to Treasury rates of other interests [sic] rates may also widen in a stressful economic environment, the stress test is designed to be especially stressful to the Enterprises. The stress test involves factors, such as a decline in housing prices, that might not affect debt costs in other sectors of the economy as much.

I find neither of these undeveloped justifications compelling. First, OFHEO identifies a sole plausible "factor" that might exclusively affect the housing sector, to wit, a decline in housing prices. However, OFHEO makes no effort whatsoever to assert – much less demonstrate – that house price declines would have the effect of causing spreads on GSE debt to widen relative to other corporate issuers. Moreover, the risk-based capital stress test already accounts for house-price declines in a stringent manner, applying a credit risk stress scenario involving a national 10-year default pattern as severe as that obtaining over a two-year period in the Southwest region during the 1980's recession. If OFHEO is overseeing the stress test properly and ensuring that the GSEs have enough capital to pass the test, including the credit risk standard, there is no reason to suppose that debt investors would become concerned that house price declines would destabilize the financial soundness of a GSE.

As to the contention that the "stress test is designed to be especially stressful to the Enterprises," that may be OFHEO's purpose, but it does not appear to be a purpose consistent with the overall structure of the risk-based capital requirement. The credit-risk and interest-rate stresses are *macroeconomic* stresses, not designed to focus particularly on the GSEs to the detriment of all other market participants. Congress more than adequately addressed management and operations risk by adding an additional capital surcharge of 30 percent to the results of the stress test. This is an extraordinarily large surcharge

that exceeds the standards applicable to any other well-managed financial institution of which I am aware and goes significantly beyond the 20-percent surcharge proposed by the Basel Committee on Banking Supervision – a proposal withdrawn when financial institutions raised a hue and cry that such a charge was unreasonably high.<sup>12</sup>

Finally, the assumption that the GSEs alone would suffer in a stressful economic environment is totally at odds with OFHEO's other assumption (discussed below) that highly rated counterparties would default at historically unprecedented levels (e.g., AA-rated default rates of approximately 12 percent) during the very same stress period. For these reasons, adding a 10 basis point premium to debt surely is an unwarranted surcharge heaped on top of this already severe test.

The fact that OFHEO advances no empirical justification in support of a 10 basis point debt add-on is not surprising. In fact, all recent evidence regarding the capital market's response to stressful conditions suggests that, if anything, OFHEO should add a *discount* to the GSEs' cost of borrowing. Empirical research that Freddie Mac previously furnished to OFHEO in its comments on the original, 50 basis point add-on proposal unassailably demonstrates that, during times of interest-rate volatility and market stress, investors have exhibited a significant preference for GSE securities over those of other capital market participants (excluding, of course, Treasury securities). Recent evidence from the market's response to the bond defaults in the fall of 1998 and the September 11 attack entirely confirm the empirical case and conclusively demonstrate that OFHEO's surcharge is groundless.<sup>13</sup>

In my expert judgment, OFHEO should modify its proposed rule to correct the flaws in the new debt funding assumptions. This will create a risk-based capital rule that more accurately aligns capital requirements with the risks the GSEs must manage and create a safer, sounder and more efficient mortgage finance system.

## **II. OFHEO's Revised Haircuts Continue to Overstate Defaults and Losses**

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<sup>12</sup> Recent Basel Committee pronouncements suggest that its next proposed management and operations risk capital charge will be more in the neighborhood of 12 percent, and there is no assurance that it will not meet the same resistance from governed financial institutions.

<sup>13</sup> For example, market price figures on 3 month GSE debt and 3 month LIBOR debt furnished by Freddie Mac show that, in October 1998, in the days following the world-wide market instability triggered by the Russian bond default, the spread between these market prices widened dramatically, from 0.177 percent on October 5, 1998 to 0.391 percent on October 16, 1998. Similarly, following the events of September 11, these GSE/LIBOR spreads again widened dramatically, from 0.134 percent on September 11 to 0.229 percent on September 13 (when markets re-opened) and widening still more in the aftermath to 0.410 percent on September 20, 2001. These figures demonstrate the fact that GSE debt is highly valued during periods of instability.

In this final section, I would like to provide some brief comments on the proposed changes to the final rule's derivative and non-derivative counterparty haircuts. My comments here supplement a letter I furnished to Freddie Mac on September 19, 2001 addressing haircuts.<sup>14</sup> In sum, while the proposed rule makes progress in correcting the serious flaws in the final rule that resulted in severely excessive haircuts, the haircuts contained in the proposed rule nonetheless remain needlessly more severe than is reasonable and higher than the haircuts I recommended, which more closely tie capital requirements to actual risks.

Let me make two brief comments in regard to OFHEO's proposed changes. First, OFHEO continues to base its estimates of bond default rates on the average performance of railroad bonds dating from the early 1900s. Through a torturous methodology, which I attempted to describe in my earlier letter, OFHEO created a fictitious "stress multiple" which it applied to all rating categories. This resulted not only in unreasonably high haircuts, but in an extremely severe 3:1 differential between haircuts on AAA-rated and AA-rated non-derivative counterparties. While I am pleased that OFHEO has since reduced this differential to 2.5:1, this steep difference is unwarranted and unjustifiable. It completely overstates the credit risk differences between these two high-quality instruments. In my opinion, a ratio of 1.5:1 is more than prudent. Any higher ratio surely will have negative market repercussions.

The second point I would highlight has to do with loss severities. In my September 19 letter, I strongly objected to OFHEO's assumption of zero bond recoveries upon default. Even in a stress scenario, the assumption was completely implausible. As I mentioned then, Moody's data comparable with the 1980s stress period chosen by OFHEO indicate average severities of 56 percent across all credit grades, with lower losses on investment grade securities. OFHEO now proposes to assume default severities of 70 percent. While this is a step in the right direction, the assumption is definitely on the high side, particularly for highly rated securities.

Nothing in OFHEO's proposed rule or its explanation changes the original recommendations that I made in my September 19 letter. While the OFHEO proposal represents some progress in recognizing elemental principles of counterparty risk management, the proposed haircuts remain entirely too severe and will create incentives to concentrate risk and avoid the use of beneficial risk management arrangements with third parties. In my expert opinion, OFHEO should adopt the haircuts I recommended earlier.

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<sup>14</sup> A copy of this letter is provided at Appendix I.

## Conclusion

Thank you for the opportunity to comment on OFHEO's proposed changes to the final risk-based capital rule. I commend OFHEO for putting forth changes that signal that the agency is serious in its commitment to align capital to risk. However, as I have attempted to demonstrate in this comment letter, serious issues remain with regard to the issuance of debt, particularly the requirement of a static debt mix and the completely unjustifiable 50 basis point add-on for long-term callable debt and the 10 basis point add-on for all debt. These seemingly "small" issues have big repercussions. In a stress test of this magnitude, every basis point of unnecessary capital carries enormous weight. The use of rough estimates and unsubstantiated assumptions is simply inappropriate and adds unnecessary burdens to the mortgage finance system and the families that it serves.

Yours/Very Truly,

A handwritten signature in black ink, appearing to read 'Frank J. Fabozzi', written over the closing text.

Frank J. Fabozzi, Ph.D., CFA