MORTGAGE INSURANCE COMPANIES OF AMERICA

OFHEO'S RISK-BASED CAPITAL REGULATION:

Consideration of Mortgage Credit Enhancement Treatment and Other Issues Related to the GSEs' Risk-Based Capital

Response of the Mortgage Insurance Companies of America (MICA) to the Office of Federal Housing Enterprise Oversight (OFHEO) Second Notice of Proposed Rulemaking (NPR2) on Risk-Based Capital Regulation

March 10, 2000

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I.   Executive Summary

The Mortgage Insurance Companies of America (MICA) is the trade association representing the entire private mortgage insurance (MI) industry. Mortgage insurance is purchased by lenders on loans where the borrowers' down payment is less than 20 percent. This insurance permits borrowers to purchase a home more quickly than would be the case if the borrowers had to accumulate a large cash down-payment. As a result, mortgage insurance is an essential component in improving home affordability and promoting the home ownership that is such an essential part of the American dream. Congress has recognized the importance of housing in many areas of social and tax policy, and mortgage insurance plays a major role in achieving this national goal.

In addition to its role in expanding the mortgage market to those who are younger or have more modest means, mortgage insurance provides real protection against mortgage credit losses to lenders and ultimately to investors, chief among whom are Fannie Mae and Freddie Mac.

As the provider of first-loss mortgage credit protection on the riskiest loans, mortgage insurance companies paid out $15 billion from 1980 to 2000. The protection the industry provides is very significant and has been tested. In its 43-year history, the private mortgage insurance industry has experienced severe regional recessions in the Oil Patch, New England and California. Our experience in understanding the dynamics of mortgage credit risk down to the loan level and through different economic cycles is second to none.

Congress has explicitly recognized the important role of mortgage insurance in the Fannie Mae and Freddie Mac charters. Both Government Sponsored Enterprises (GSEs) are barred from purchasing mortgages with loan-to-value ratios (LTVs) above 80 percent without obtaining

mortgage insurance or another bona fide form of third-party credit enhancement. Mortgage insurance is currently the predominant form of credit enhancement used by the GSEs to meet this charter requirement.

Mortgage insurance has several characteristics that make it the most reliable form of credit enhancement, and thus the most stable way the GSEs protect taxpayers when engaging in the high-risk business of purchasing high-LTV mortgages. As shall be demonstrated in more detail in the body of this white paper, mortgage insurance satisfies the criteria for reliable guarantees recently enunciated by the Basle Committee for Bank Supervision at the Bank for International Settlements. As a regulated industry, mortgage insurance companies must be monoline and are thus insulated from other risks. They must meet strict capital and prudential standards. All active mortgage insurance companies are 'AA' rated or better, reflecting their strong financial condition and their specific ability to manage and bear mortgage credit risk in a stress scenario.

MICA Methodology

MICA has gone to great lengths to ensure that its comments on the Office of Federal Housing Enterprise Oversight (OFHEO) Second Notice of Proposed Rulemaking (NPR2) are both authoritative and complete. Almost a year ago, we established a working group comprised of risk management experts from MICA's member companies to understand NPR2 and assess how its capital treatment of various credit enhancements, including mortgage insurance, would impact the GSEs' risk-based capital (RBC). MICA brings a unique perspective because our members are expert in evaluating and taking mortgage credit risk and because we believe we have successfully replicated the mortgage credit risk portions of the OFHEO model (the Model) set forth in NPR2. We have subsequently compared the Model results to the benchmark loss experience (BLE) established in the First Notice of Proposed Rulemaking (NPR1), MICA industry loss experience, other approaches to risk-based capital, and many other critical factors.

Overall Conclusions

MICA believes that while the OFHEO Risk-Based Capital Model is comprehensive and basically sound, a number of revisions and enhancements are required to match the BLE, neutralize the impact of interest-rate movement on predicted credit losses, and enhance its overall effectiveness. In our view, it meets the statutory criteria for transparency, although we have some concerns that aspects of the Model tend to undermine Congressional mandates regarding the role the GSEs should play in the national housing market. Model revisions to address these points are, in our opinion, essential to ensure that GSE capital standards do not create perverse incentives and undermine the critical role the GSEs play in promoting home ownership. Other aspects of the proposed rule create opportunities for regulatory arbitrage which, if taken advantage of by the GSEs, have significant safety and soundness implications. MICA strongly recommends that the proposed rule be modified not only to eliminate any regulatory arbitrage potential but also to reflect the true ability of various mortgage credit enhancement counterparties to manage and absorb mortgage credit risk in a stress scenario.

MICA believes that it is essential for OFHEO to move ahead as quickly as possible to issue a final risk-based capital rule on the GSEs, so that all the participants in the mortgage industry know the rules. We also suggest that OFHEO revise the way it plans to consider new GSE programs. As proposed, OFHEO will review new programs and revise risk-based capital accordingly, without public review or comment. MICA recommends that OFHEO, like the bank regulators, propose any revised capital rules applicable to new programs for public comment to ensure that it has the views of all interested parties.

Highlights of our key findings and recommendations follow.

High-LTV Lending Is Disadvantaged

Although the Model produces a cumulative loan default rate which matches the BLE in the aggregate prior to the interest rate stress test, the Model does not match BLE default rates by LTV group under any interest-rate scenario but, in effect, takes more of an averaging approach. It significantly overstates high LTV loan defaults and severely understates low LTV loan defaults. As a result, the Model requires too much capital for high LTV loans and not enough capital for low LTV loans.

This point may seem technical, but it has significant market implications. If the capital rule creates an artificial incentive for the GSEs to invest in low-, over high-, LTV loans, then the GSEs will focus their activities at that segment of the market that least needs their assistance. The private market for portfolio lending and securitization in low-LTV, low-risk mortgages is very well established. GSE participation, however, remains important at the higher LTV end of the market and is a large part of the public policy justification for their charters. The OFHEO rule should not use averages where they are neither useful in achieving safety and soundness objectives nor in providing incentives which reinforce the GSEs' core mission.

Cross-Subsidization Distorts Capital Requirements

Further, the Model allows for cross-subsidization between credit and interest-rate risk. No other risk-based capital system of which we are aware treats risk in this fashion. The bank rules, for example, separately calculate credit, interest and market risk, applying capital separately in each instance. The bank rules correctly assume that these different risks can be positively correlated. If these risks are cross-subsidized in the capital calculation, then a financial institution can be dramatically under capitalized if credit and interest-rate risks, for example, move in the same direction. Had the bank rules permitted cross-subsidization of credit and interest-rate risk during the S&L crisis, for example, even more institutions would have failed because these risks

were strongly and positively correlated. MICA believes OFHEO should follow the example of the bank regulators and calculate capital separately for each risk category. For example, interest rate risk-based capital should never go below zero thereby offsetting required credit risk capital.

The Risk-Based Capital Model As Currently Proposed Could Exacerbate Housing Downturns

The OFHEO Model relies in part on house-price appreciation (expressed through the house-price index or HPI) and mortgage prepayment variables. As shall be demonstrated in detail in our comment, we believe that aspects of the development of these variables and their use in the Model are flawed. Left uncorrected, these flaws will set the amount of required capital for a GSE in a way that exacerbates regional shifts in home prices, undermining the GSE mission of supporting home ownership throughout housing price cycles.

These flaws result in the GSEs holding the least amount of capital under the Model during periods of rapid home-price appreciation, periods which often precede sharp declines in home prices. As currently proposed, the OFHEO Model creates an incentive for the GSEs to, in essence, load up on mortgages from regions experiencing the boom portion of a housing cycle, and thus fuel more home price appreciation. However, these same flaws increase required capital as a regional housing market turns down. This means that the GSEs are encouraged to reduce their purchase of new loans and thus exacerbate the downturn in house prices in a region experiencing a recession. This limits their ability to contribute to a housing-sector recovery.

Congress intended that the GSEs provide for the liquidity of the residential mortgage market. It is important that the risk-based capital Model not disincent them from performing this role just when private providers of mortgage credit are most in need of the vital secondary-market function for which the GSEs were established. As currently constructed, the risk-based capital

Model encourages the GSEs to behave in a way that tends to exacerbate regional housing market cycles.

The Federal Housing Enterprises Financial Safety and Soundness Act of 1992 ("the Act") mandates that the risk-based capital Model not include capital needed to continue doing new business during the stress period. MICA encourages the Director to work with the GSEs to ensure active purchases by the GSEs throughout any stress period. While this may not be strictly necessary to meet safety and soundness concerns, it is crucial to the public purpose embodied in their charters.

Credit Derivatives Should Not Be Included

The proposal includes giving credit for risk-mitigation hedge benefits based on the rating of the counterparty. Since the GSEs very rarely use mortgage credit risk derivatives, we presume OFHEO intends NPR2 to cover only interest-rate risk mitigation. We urge clarification of the rule to stipulate that only interest-rate risk transfers are covered. Credit risk derivatives remain a very small fraction of the total risk hedge marketplace and in fact are miniscule for the mortgage credit risk market. As yet, they are untested in a market downturn. They are also subject to considerable legal uncertainty. MICA recommends that OFHEO defer consideration of mortgage credit risk derivatives until such time as they are widely accepted in the private market. At that time, a separate rule making can establish the appropriate haircuts for tested, highly-rated mortgage credit risk derivative structures.

The hazards of giving credit for mortgage credit risk derivatives are evident when Freddie Mac's recent effort to transfer credit risk through the so-called MODERNs (Mortgage Default Recourse Notes) structure is evaluated. In this one-time capital markets transaction, Freddie Mac structured a very complex derivative designed to transfer mortgage credit risk on a reference pool

of mortgages. The MODERNs transaction has many structural weaknesses and is not a sustainable approach to mortgage credit risk transfer.

Regulatory Arbitrage Could Occur

The current effort to rewrite the bank risk-based capital rules is in large part an attempt to reduce the amount of regulatory arbitrage — that is, gaming — of the risk-based capital system. When this occurs, banks or, in this instance the GSEs, take advantage of loopholes or exemptions in the capital rules to take on higher risks that are not fully captured in the capital rules. This creates a perverse incentive for risk-taking that sabotages the purpose of the risk-based capital regulations.

Two aspects of the OFHEO proposal create the potential for GSE regulatory arbitrage of the risk-based capital regulations. The first deals with structured mortgage loans, (e.g., 80/10s). In an 80/10 structure, a 90 percent LTV loan is broken into its component parts. In doing so the GSEs can purchase a first mortgage that falls at the 80 percent LTV threshold at which the GSEs believe no third-party credit enhancement is required by their charter. The 10 percent top part of the loan is originated as a second mortgage, sometimes held by the lender or separately securitized. Needless to say, the "80 percent" LTV first loan will exhibit delinquency rates that look like 90 percent LTV loans. Bank regulators have recently recognized that two loans originated at the same time for the same purpose should be treated as the same loan for purposes of determining the LTV and, therefore, the capital that must be assessed. MICA urges OFHEO to follow this example. Failing to do so will encourage the GSEs to create structured mortgage loans to circumvent the higher capital standards required for higher LTV loans.

The second problem in the proposal with regard to regulatory arbitrage arises because the proposal determines the haircut for supplemental credit enhancements based on the credit rating

of the provider of the primary credit enhancement layer, without regard to the rating of the secondary credit enhancement counterparty. This creates the potential — indeed, almost ensures — that the GSEs will structure secondary credit enhancements to take advantage of the high rating of a thin layer of primary coverage, supplementing this with extensive, and lower-cost, credit enhancements from lower-rated counterparties. The proposal should be revised so that the haircut for supplemental credit enhancement is based on the credit rating of such provider. Each provider should stand on its own merits.

Low-Quality Counterparties Are Treated Too Well

Another area of potential regulatory arbitrage created by the proposal relates to the haircut established for unrated and noninvestment grade counterparties. The proposal would treat such entities the same as those rated 'BBB.' However, the risk profile of noninvestment-grade counterparties is far higher. Moody's and S&P both have found that default rates in below-investment-grade rating categories are exponentially higher than investment-grade rating category default rates.

The proposal rationalizes this treatment because it focuses on seller/servicer recourse arrangements and expects that the GSEs could claim servicing rights and associated revenue from these below-investment-grade and non-rated counterparties that would support any such seller/servicer recourse obligation defaults. MICA believes this is a very questionable assumption. One of the GSEs has a program under which a seller/servicer's future servicing fee revenue is pledged to the GSEs MBS. As a result, no servicing fee revenue may be there to claim by the GSE when a below-investment-grade or nonrated seller/servicer counterparty defaults. Further, as bank regulators have recently recognized following several bank failures, residual interest in loan assets are likely to have minimum value in stressed markets. These instruments lack the

liquidity and objective valuations required to give their holders a high rating. If the bank regulators do not recognize the value of such servicing rights, OFHEO similarly should not do so.

OFHEO Should Institute An Open Risk-Based Capital Process

NPR2 contemplates revisions to address new products offered by the GSEs, but restricts this process to one between the GSEs and the agency. The GSEs would be required to submit a new product to OFHEO and OFHEO would then inform the GSEs as quickly as possible of the product's required risk-based capital treatment. As proposed, the public would have no opportunity to comment on the product and the appropriate capital treatment for it. This is in stark contrast to the banking regulators, which follow a public notice process for new products that require revised capital treatment. MICA urges OFHEO to revise the process so that any new programs, products or credit enhancements that do not fit into the current scheme are reviewed by all affected interests, not just the GSEs and OFHEO. Two examples follow of new products and the difficulty in setting appropriate risk-based capital within the proposed rule.

Loans Have Risk Factors Other Than LTV

MICA recommends that OFHEO further refine its Model to take account not only of LTV ratios, but also of other indicators of default risk. These include the general underwriting criteria that determine whether a mortgage is classified as 'A' quality, the traditional realm of the GSEs, or as subprime ('A-'or below). Private mortgage industry data show a significant increase in default rates when mortgage loans move from 'A' to the subprime 'A-' rating or below. While MICA does not propose that mortgage credit scores should be included in the Model, some adjustment for non-LTV risk factors should be incorporated. Without it, the GSEs will have an incentive to book the highest risk, lowest quality loans.

The LTV Buckets Need Refinement

The Model currently aggregates all loans over 90 percent LTV into the same risk category. MICA believes that a distinction should be made among 95 percent LTVs, 97 percent LTVs and LTVs over 97 percent. FHA data indicate that 97 percent LTV loans have about a 34 percent higher default risk than 95 percent LTV loans and that 100 percent LTV loans have a 75 percent higher default risk than 95 percent LTV loans.[1]

Failure to differentiate among LTV buckets creates a perverse incentive for the GSEs to purchase higher risk high-LTV loans. As a result, the Model undermines its goal of ensuring that higher risks carry a tougher capital requirement. MICA urges OFHEO to revise the Model to reflect the widely recognized differential risks associated with loans over 90 percent LTV.

Credit For Mortgage Insurance Is Understated

NPR2 proposes that the value of mortgage credit risk enhancements provided by third parties should generally be based on the public ratings of the credit risk enhancement provider. While MICA believes that it is appropriate to assign differential value to credit risk counterparties according to the counterparties' ability to meet obligations and absorb mortgage credit risk, we also believe it is imperative that OFHEO distinguish between the ability of a monoline mortgage insurance company and a nonmortgage insurance corporate or institutional counterparty to absorb mortgage credit risk. Mortgage insurance companies have a singular mission and are highly regulated businesses. State insurance statutes set forth requirements for capital dedicated to mortgage credit risk, catastrophic loss reserves, regulated investment portfolios, and strong

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[1] These calculations are based on 30-year, fixed-rate mortgages with ten years of cumulative default rates for 1975-1989 origination years as reported in Price Waterhouse Actuarial Review for Fiscal Year 1998 of the Federal Housing Administration's Mutual Mortgage Insurance Fund.

insurance beneficiary (policyholder) preferences in the event of liquidation. Non-mortgage insurance counterparties do not have all of these critical elements.

MICA believes private mortgage insurers with at least a 'AA' (meaning at least 'AA–' by Standard and Poor's or 'Aa3' by Moody's) financial strength rating should receive lesser haircuts than any nonmortgage insurance, corporate, or institutional credit risk counterparty.

MICA believes that the haircut differential OFHEO is proposing between 'AAA' and 'AA' mortgage insurance companies is unwarranted. We believe there should be no haircut differential between 'AAA' and 'AA' mortgage insurance companies for reasons which are outlined in the body of this comment letter.

Other Technical Points

The expense formula used in the Model has expenses falling as loans in force fall during the stress period. In fact, during periods of high defaults the level of expenses remain flat even though the total number of loans considered declines. The cost of foreclosure and other aspects of defaulted loans are significant and, of course, more loans fall into this category during the stress period. As a result, MICA recommends a revision to the expense formula in the Model that holds the level of expenses constant throughout the stress period even though the total number of mortgages guaranteed or held by the GSEs declines during this period.

Additionally, the Model now focuses on adequate capital to take the GSEs through the 10-year stress period. However, even if no new mortgages are added during the stress period, loans will continue to require attention after the 10-year period has expired. Consequently, we believe adequate capital should include capital to handle the remaining loans beyond the 10-year period through the end of their expected duration.

II.   Multiple Credit Enhancement And Structured Loan Transactions

In NPR2, OFHEO tries to simplify the treatment of loans which have multiple credit enhancements or are part of a structured, combination loan transaction. Unfortunately, these simplifications are likely to result in inadequate GSE risk-based capital and may encourage the GSEs to increase their mix of certain higher-risk products and credit structures.

MICA is concerned about how NPR2 will be applied in two situations. The first occurs in Section 3.6 of NPR2 where OFHEO determines the amount of a haircut to apply to credit enhancements on loans with more than one layer of mortgage credit enhancement coverage.[2] OFHEO proposes determining the haircut on supplemental credit enhancements by exclusively using the rating of the counterparty providing the primary layer of coverage. This rule would allow the GSEs to easily veil unrated, untested, and risky credit enhancements (including derivatives) behind a thin layer of highly rated credit enhancements.

The second situation arises out of a lack of any reference in either of OFHEO's two public notices to a common mortgage structure, the "80/10" or "piggyback" mortgage. This is a transaction where the borrower has combined debt equal to 90 percent (combined loan-to-value ratio or CLTV) of the property value, but the debt is divided into an 80 percent first mortgage and a 10 percent second mortgage (or other combinations of a first and second mortgage). Given that the default risk on each loan in this 90 percent CLTV structure should be virtually identical to the risk of a single 90 percent LTV loan, NPR2's silence on this very common structure is problematic. The silence results in the 80 percent first mortgage in the double-lien structure being classified for risk-based capital purposes with 80 percent LTV single-lien loans, which experience

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[2]   NPR2 Section 3.6.3.2 (b) — For loans with more than one layer of mortgage credit enhancement coverage, only the ratings of the counterparty providing the *primary layer of coverage* are used. . . .

significantly lower default rates. This misclassification significantly understates the amount of capital which would be held against 80/10s versus 80 percent LTV single-lien loans. 80/10s are growing in popularity today because they allow the GSEs to participate in mortgage transactions where the combined loan amount exceeds the Congressionally mandated conforming loan limit, which is currently $252,700.

It appears the OFHEO rationale is to save time and effort by evaluating only the first or largest loss position in a complex structure. As we can demonstrate, the potential negative consequences of this approach far outweigh the extra time and effort required to treat multiple credit enhancement and structured loan transactions more appropriately, according to the risk they pose.

OFHEO makes the case that the GSEs have relatively little exposure in a particular instrument, hence some simplification can be made when determining capital requirements. This is a dangerous argument because both Fannie Mae and Freddie Mac have made very significant changes in their investment and operating strategies over the past several years that reveal they are willing to increase their exposure to loss in order to maximize earnings to shareholders. One example would be the 1990s' change in GSE strategy to buy and hold their own securities. Another example is the surge in popularity of the 80/10 and 80/15 structured mortgages and GSEs' purchases of these mortgage loans. Also, the GSEs' attempt to implement minimal primary mortgage insurance coverage in conjunction with the consumers' payment of a nonrefundable delivery fee is more evidence of their growing trend to take more risk. These actions leave the GSEs with risks that likely would be simultaneously exposed in the event of a real estate recession. OFHEO must guard against creating any regulatory arbitrage opportunities in the final rule which, if taken advantage of by the GSEs, would have safety and soundness implications.

Multiple Credit Enhancements: Primary Mortgage Insurance Coverage

Section 3.6 of NPR2 deals with the treatment of credit enhancement counterparty risk. In this section, OFHEO proposes that the rating of the primary credit enhancement counterparty be used to determine the amount of the haircut the supplemental credit enhancements receive. OFHEO apparently would like to simplify the treatment of loans with multiple credit enhancements. It may have taken this approach based on the belief that a mortgage insurer is the usual counterparty for both primary and supplemental coverages, that the mortgage insurance counterparty providing the primary layer has the majority of the risk, or that primary mortgage insurance always stands in front of the remaining counterparties and thus reduces the GSEs' final exposure.

The fact is that a mortgage insurer may not be the provider of both primary and supplemental credit enhancements. If a nonmortgage insurer supplemental credit enhancement provider does not pay, the mortgage insurer primary credit enhancement provider has no obligation to pay on the supplemental coverage provider's behalf. Also, traditional primary mortgage insurance does not always stand in front of the supplemental coverage counterparties and it may not assume the lion's share of the risk when it does. As a result, this rule provides an incentive for the GSEs to obtain very limited primary layers of coverage provided by highly rated entities and rely to a much greater extent on supplemental coverage providers that may be inadequately capitalized and unrated. To the extent the GSEs move toward this type of credit enhancement structure, they would reduce their overall cost of credit enhancement. The true cost of such a structure, however, would be greater exposure to losses as the GSEs find it financially advantageous in the short term to lay off more risk to lower-rated or unrated secondary credit enhancement providers.

For above 80 percent LTV loans with traditional primary insurance, the "primary layer" referred to in NPR2 is not necessarily the largest layer of coverage, nor does primary mortgage

insurance normally stand in front of other counterparties providing enhancements on below 80 percent LTV loans. The GSE's have interpreted their charters to require only that they obtain primary mortgage insurance protection down to 80 percent LTV. As shown in Figure 1 on page 17, this level of coverage (charter-level coverage) can be very small relative to the risk of loss. This means the GSE can lay off a large majority of the risk (and the capital charge that goes with it) to a poorly capitalized secondary party and have the entire credit enhancement assume the 'AA' or higher rating and associated haircut of the primary mortgage insurance provider. The GSE can make this deal even more attractive for itself by requiring just the minimal amount of primary mortgage insurance which it believes to be required by its charter.

This is happening today. Both GSEs have introduced charter-level primary mortgage insurance initiatives — Fannie Mae's Flex 97 and Freddie Mac's Alt 97. Offsetting the lower primary mortgage insurance premiums on these loans, the GSEs charge the lenders (which is passed on to the consumer) a "delivery fee" which the GSEs retain to pay losses, to augment their profits, or to use to buy supplemental coverage. Because the fee is not regulated by the recently passed Homeowner Protection Act of 1999, it is not subject to the consumer protection provisions that apply to private mortgage insurance. As a result, the delivery fee, which is charged in lieu of deeper private mortgage insurance coverage, does not have to be disclosed to borrowers or refunded once the primary mortgage insurance is cancelled. In the end, consumers pay higher mortgage costs under these programs. Though disadvantageous to consumers and taxpayers, these delivery fee programs could become preferable to the GSEs under the proposed OFHEO rule, because a portion of the fee could be arbitraged to buy lower-cost secondary coverage from unrated or lower-rated providers. This would significantly reduce GSE capital requirements and expose the GSEs to higher catastrophic losses.

			Stress Scenario	
LTV Band[3]	**Percent of New Loans**[4]	**Charter Level Primary Cover**	**Est. Gross Average Loss Severity**[5]	**Primary Cover Percent of Severity**[6]
97% LTV	5%	18%	69.0%	26%
95% LTV	10%	16%	69.0%	23%
90% LTV	13%	12%	60.2%	20%
85% LTV	2%	6%	55.0%	11%
Weighted Average				21%

Figure 1: Percentage of Losses Covered by Minimum (Charter Level) Primary Cover for High LTV Loans

Figure 1 shows that the GSE interpretation of their charters permit them to obtain minimum primary coverage on loans above 80 percent LTV which may cover as little as 11 percent of the per loan stress test loss severity to the GSE. This permits as much as 89 percent of the benchmark risk embedded in high LTV loans to be laid off to counterparties providing secondary layers of coverage. These providers could be unrated, unregulated, and undercapitalized shell corporations, and yet under the OFHEO proposal their haircut would be the same as for the primary mortgage insurance carrier, even though the primary carrier does not guarantee the performance of the secondary credit enhancement provider.

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[3] Bands reflect general mortgage industry definitions, for example, the 85 percent LTV band means loans in excess of 80 percent LTV up to and including 85 percent LTV.

[4] Estimated by MICA from various sources - the exact distribution varies by year. Loans at 80 percent and below LTV are estimated to represent about 70 percent of loans purchased by the GSEs.

[5] Estimated gross loss severity before recoveries from mortgage insurance, from NPR1. Because NPR1 lumped all LTVs greater than 90 percent together, we used the 69.0 percent severity for both the 95 percent and 97 percent LTV bands.

[6] This is simply the ratio of the primary coverage percentage to the gross average loss severity.

The total exposure to secondary coverage counterparties could be very large under a stress scenario. We will use as an example, a $1 billion portfolio of 90 percent LTV loans with charter-level primary cover and a 'BBB' secondary cover insuring 100 percent of the benchmark loss experience of $106.6[7] million. As shown in Figure 1 above, the charter-level primary mortgage insurance covers about 20 percent of the risk, leaving 80 percent or $85.3 million of the original loan amount in risk exposure to the secondary coverage provider. If the primary insurer is rated 'AA,' Section 3.6 allows the secondary cover provider to have a 20 percent 'AA' haircut instead of a 'BBB' haircut. The average 'AA' counterparty haircut across the 10-year stress test is 11 percent and the average 'BBB' counterparty haircut is 44 percent over the 10-year stress test. Applying this 33 percentage point differential to the $85.3 million secondary coverage results in $28.1 million of "excess value" being assigned to the secondary coverage, an overstatement of GSE stress test cash flows by the same amount, and a significant understatement of required risk-based capital.

Multiple Credit Enhancements: Other Third-Party Credit Enhancements

The term "primary layer of coverage" is not explicitly defined in the regulation. If there is *no* primary mortgage insurance coverage on a loan, such as loans that are 80 percent LTV or below, traditional usage would suggest that the term "primary layer" would mean the *first* coverage layer or credit enhancement that is triggered to pay default losses. This could be a recourse position, a mortgage guaranty pool policy, a spread account or some other enhancement. Primary means that it is called upon first. It does not mean that the primary layer in any way guarantees the performance of secondary layers.

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[7] The 10.66 percent benchmark gross credit losses from Figure 4 times $1 billion.

Both Fannie Mae and Freddie Mac have already made extensive use of secondary credit enhancement coverage in the form of GSE pool insurance. This is a secondary layer of coverage provided by private mortgage insurers. As shown in Figure 2, MICA estimates that as of December 31, 1999, the two GSEs had insured as much as $ 3.9 billion in risk through pool insurance policies with private mortgage insurers. This represents about $340 billion in insured mortgages. While this credit enhancement today is provided by 'AA' or 'AAA' rated providers, nothing in the proposed regulation prevents a GSE from obtaining this coverage or protection from unrated entities or through unrated derivative transactions.

Figure 2: New GSE Pool Insurance Risk by Year[8]

Year	New Pool Insurance Risk Written
1996	$0.1 billion
1997	$0.7 billion
1998	$1.7 billion
1999	$1.4 billion
Total	$3.9 billion

The likelihood of the proposed regulation encouraging the GSEs to substitute unrated counterparties for 'AA' or 'AAA' rated counterparties is significant. Pressure from customers and shareholders could provide an incentive for the GSEs to seek cheaper, unrated credit enhancements for the secondary layer. A GSE could easily purchase a very thin "primary layer of coverage" on below 80 percent LTV loans, perhaps less than 0.25 percent of its loan exposure and which is at least 'AA' credit quality. It then merely has to supplement the primary layer with a much larger secondary layer of coverage that could be unrated. The second layer could easily be constructed to cover several times the losses of the primary layer.

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[8] Source: Mortgage Insurance Companies of America. $3.9 billion of pool risk represents approximately $340 billion in mortgages insured using an average estimated GSE pool stop loss of 1.15 percent.

Figure 3 examines a situation where the GSE obtains a 'AAA' rated primary layer credit enhancement of 0.25 percent and a 'BBB' secondary credit enhancement of 3.0 percent for a $1 billion pool of loans:

Figure 3: Proposed Rule in Action

A.   Individually Measured Credit Enhancement (CE)

	Percent of Pool	Pre-Haircut $ Value	Average OFHEO Haircut Percent	Remaining Value Percent	Post-Haircut Undiscounted Value[9]
'AAA' CE	0.25%	$2.5 million	5.5%	94.5%	$2.36 million
'BBB' CE	3.00%	$30.0 million	44.0%	56.0%	$16.80 million
Total	3.25%	$32.5 million			*$19.16 million*

B.   OFHEO Rule in Action — 'BBB' Enhancement assumes the 'AAA' haircut

	Percent of Pool	Pre-Haircut $ Value	Average OFHEO Haircut Percent	Remaining Value Percent	Post-Haircut Undiscounted Value
'AAA' CE	0.25%	$2.5 million	5.5%	94.5%	$2.36 million
'BBB' CE	3.00%	$30.0 million	5.5%	94.5%	$28.35 million
Total	3.25%	$32.5 million			*$30.71 million*

Figure 3 shows the OFHEO proposed rule allows the GSE to receive as much as $30.71 million in post-haircut undiscounted credit enhancement value for a structure that NPR2 would otherwise suggest should have a maximum credit enhancement value of $19.16 million. Therefore, about $12 million of poor quality credit enhancement has been cloaked by the thin 'AAA' credit enhancement veil.

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[9]   Assumes that the stress test would produce enough losses to require the full 3.25 percent credit enhancement be called upon. The amount shown is prior to consideration of the projected cash flows and time value discounts that would be applied. It is reasonable to assume that the discounts would apply more or less proportionally to all the numbers in the column and the relationships shown would hold true for the discounted values.

If the stress test showed that the full 3.25 percent of credit enhancement shown in this example was consumed in the stress test, this rule would overstate GSE cash flow by about $12 million and understate GSE required risk-based capital by a proportionate amount, prior to applying the discounts for the timing of the projected cash flows.

Structured Loan Transactions

The lack of any contemplation in NPR2 of structured loan transactions in which a first mortgage loan is originated with a "piggyback" second mortgage is a weakness of the proposal. As a result, NPR2 does not set forth differential credit loss treatment between the first mortgage in an 80/10 mortgage loan combination and a single-lien 80 percent LTV mortgage.

The first mortgage in an 80/10 transaction intuitively has the same default frequency as a single-lien 90 percent LTV mortgage in a stress scenario.[10] Similarly an 80/15 transaction intuitively has the same default frequency as a single-lien 95 percent LTV mortgage in a stress scenario. However, by not considering CLTV, the first mortgage in 80/10 and 80/15 loan transactions would both be classified under NPR2 as having the default frequency of the much lower risk, single-lien 80 percent LTV mortgage. We believe this is an oversight in NPR2 which could lead to a significant understatement of projected GSE credit losses in the OFHEO stress test, and therefore a significant understatement of required GSE risk-based capital.

Figure 4 (on page 24) demonstrates the difference in expected GSE credit losses between a true 80 percent LTV mortgage and the first mortgage position of an 80/10 or an 80/15 transaction. Figure 4 uses the original OFHEO benchmark loss experience default frequency and

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[10] It is possible that an 80 percent LTV first mortgage in an 80/10 loan transaction may have a lower default risk than a single-lien 90 percent LTV first mortgage in good economic times with appreciating home values. This is because a default on the 10 percent LTV second mortgage may result in the second mortgage holder paying off the first mortgage to protect its position, gain control of the property, and mitigate the loss on the second mortgage. However, in a stress scenario with falling home values, it is likely the second mortgage position will be wiped out and therefore the second mortgage holder will have no incentive to pay off the first mortgage, gain control of the property through foreclosure, and thereby protect the first mortgage from default.

gross credit loss severity assumptions for newly originated loans by LTV category. It is fair to assume that a borrower with total debt equal to 90 percent of the property value, controlling all other factors, will experience the same default frequency regardless of whether the debt is structured into two liens or one. Therefore the default *incidence* of both loans in an 80/10 loan structure with a 90 percent CLTV should be the same as that of the NPR2 benchmark single-lien 90 percent LTV loan. It is also reasonable to assume that the severity on the first mortgage in an 80/10 will resemble that of an 80 percent LTV single-lien, since the second mortgage is in a first loss position ahead of it.[11]

Figure 4 indicates that in a benchmark loss experience scenario, actual first mortgage 80/10 credit losses may exceed the NPR2 result by 88 percent (the difference between the intuitive 10.43 percent and OFHEO's 5.54 percent of the original first mortgage amount). Even worse, actual first mortgage 80/15 credit losses may exceed the NPR2 result by 180 percent (intuitive 15.55 percent versus OFHEO 5.54 percent). For each $1 billion of first mortgages in 80/10 loan combinations guaranteed by a GSE, OFHEO may be underestimating the capital needed to survive a benchmark stress test scenario by $48.9 million in undiscounted dollars. For $1 billion in 80/15 first mortgages, this number doubles to $100.1 million.

Piggyback or structured mortgage transactions where the CLTV exceeds 80 percent LTV have been encouraged by the GSEs and account for a material and growing portion of their business. As a result, NPR2 would allow the GSEs to continue to be undercapitalized for a material, growing, and higher-risk portion of their business. For instance, 80/10 and 80/15 mortgages allow the GSEs to extend their mortgage purchases to cases where the combined loan amount exceeds conforming limits, but the first mortgage does not (i.e., the "jumbo" market). Jumbo loans, as they are called, are known to be higher risk, characterized by both higher

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[11] Because the second mortgage in a combination loan structure is in a first loss position, the loss severity on GSE-held or guaranteed second mortgages should generally be the lesser of the second mortgage UPB or the gross loss severity amount predicted by the OFHEO model, based on the loan's CLTV.

incidence and greater loss severity than conforming loans. 80/10s also allow mortgage lenders to bypass the traditional and prudent underwriting restrictions imposed by mortgage insurance, and in some cases allow the GSEs to collect higher fees in the absence of traditional mortgage insurance.

Additionally, 80/20 transactions (100 percent CLTV) are now being offered in the marketplace. If the GSEs choose to purchase either the first or second mortgages produced by these transactions, they will subject themselves to 100 percent LTV default risk, which is significantly higher than 95 percent LTV default risk. FHA data indicates that the default risk on 100 percent LTV loans is about 75 percent greater than the default risk on 95 percent LTV loans.[12]

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[12] Based on a 30-year, fixed-rate loan ten-year cumulative default rates for 1975–1989 origination years from An Actuarial Review for Fiscal Year 1998 of the Federal Housing Administration's Mutual Mortgage Insurance Fund.

	Default Frequency[13]	First Mortgage Gross Loss Severity[14]	First Mortgage Gross Credit Losses[15]
Figure 4: OFHEO Benchmark Loss Experience Assumptions			
A. Single-Lien Mortgage Originations — OFHEO Benchmark			
95% LTV	26.4%	69.0%	18.22%
90% LTV	17.7%	60.2%	10.66%
80% LTV	9.4%	58.9%	5.54%
B. Two-Lien or Piggyback Mortgage Originations — NPR2 Rules			
80% first / 95% CLTV	9.4%	58.9%	5.54%
80% first / 90% CLTV	9.4%	58.9%	5.54%
C. Two-Lien — Intuitive Approach[16]			
80% first / 95% CLTV	26.4%	58.9%	15.55%
80% first / 90% CLTV	17.7%	58.9%	10.43%

Recommendations

MICA strongly recommends that secondary or supplementary credit enhancements not be arbitrarily assigned the same counterparty risk haircut as the primary credit enhancement. Instead each credit enhancement layer should be evaluated and valued separately based on the public

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[13] Based on the NPR1 Benchmark Loss Experience — percentage of original loans defaulting.

[14] The expected average foreclosure write-off expressed as a percentage of the original loan amount. The gross loss severity is taken from the Benchmark Loss Experience severity of NPR1 and is prior to any recoverables from mortgage insurers.

[15] The total expected foreclosure write-offs in the Benchmark scenario expressed as a percentage of the total original loan amount in the GSE portfolio. It is calculated as the frequency times the severity.

[16] A person with total debt equal to 90 percent of the property value should have the same default frequency (probability) regardless of whether that debt is structured into two loans or just one in this intuitive approach. However, the severity of the loss on the first mortgage is assumed to be the same as for an 80 percent LTV loan, since the second mortgage has an inferior claim on the property disposition proceeds and any recoveries.

issuer credit rating of each provider. The GSEs should be required to maintain systems and records to do this effectively. There is no reason not to require the GSEs to provide enough information for OFHEO to evaluate each credit enhancement of any material size separately.

For any mortgage transaction where there are multiple loans closed simultaneously, the GSEs are capable of tracking the existence of these liens and capturing, reporting and classifying them according to CLTV. MICA strongly recommends that the stress test default frequency estimate for mortgage loans in a structured, combination loan transaction (80/10, 80/15, or any other first and second lien combination) be based on the CLTV of the combined loans. Such treatment would be consistent with the risk-based capital treatment of structured, combined loan transactions by financial institution regulators; who recently ruled that two loans originated at the same time for the same purpose to the same borrower are the same loan. In addition, financial institution regulators have recently proposed that second mortgages in combination structured loan transactions receive low-level recourse capital treatment. Such treatment requires the first and second mortgage together to be viewed as one asset for risk-based capital determination purposes.

III. Mortgage Credit Enhancement Counterparty Risk Treatment

NPR2 proposes that the value of mortgage credit risk enhancements provided by third parties should generally be based on the public ratings of the credit risk enhancement provider. While MICA believes that it is appropriate to assign differential value to credit risk counterparties according to the counterparties' ability to meet obligations and absorb risk, we also believe it is imperative that OFHEO distinguish between the ability of a monoline mortgage insurance company, versus a nonmortgage insurance corporate or institutional counterparty to absorb mortgage credit risk. Mortgage insurance companies have a singular mission and are highly regulated businesses. State insurance statutes set forth requirements for capital dedicated to mortgage credit risk, catastrophic loss reserves, regulated investment portfolios, and strong insurance beneficiary (policyholder) preferences in the event of liquidation. Nonmortgage insurance counterparties do not have all of these critical elements.

NPR2 discusses derivative contracts only in the context of interest rate risk derivatives. Presumably, NPR2 does not address mortgage credit risk derivatives because such mortgage credit risk transfer instruments are neither fully developed or broadly used in the marketplace. Freddie Mac's MODERNs (Mortgage Default Recourse Notes) transaction is the only GSE mortgage credit risk derivative transaction of which we are aware, and it has a variety of structural and market weaknesses which make it an inferior mortgage credit enhancement compared to traditional mortgage insurance. The market for mortgage credit risk derivatives remains small, uncertain, and most important, untested in an economic downturn. MICA believes that NPR2 is only intended to address interest rate risk derivatives and that no credit should be given for mortgage credit risk derivatives until OFHEO has fully evaluated such products under a separate rule making process.

MICA believes private mortgage insurers with at least a 'AA' (meaning at least 'AA–' by Standard and Poor's or 'Aa3' by Moody's) financial strength rating should receive lesser haircuts

than any nonmortgage insurance, corporate, or institutional credit risk counterparty. In addition, MICA believes that mortgage credit enhancement counterparties which are unrated or have a credit rating below 'BBB' should receive a 100 percent counterparty risk haircut, because the large majority of default risk occurs at rating levels below 'BBB.'

Mortgage Insurance vs. Nonmortgage Insurance Credit Risk Enhancement Counterparties

The OFHEO proposal, like several recent regulatory initiatives, depends heavily on the objective risk determinations provided by national ratings agencies. In general, MICA agrees this approach is preferable to the arbitrary risk weightings in the current risk-based capital regulations promulgated by bank regulatory agencies. However, in using external ratings, a further distinction needs to be made between ratings which are most applicable to the risk being assumed and ratings which are not related to the risk being assumed.

For example, in its proposed regulation, OFHEO is assigning credit enhancement counterparty haircuts based on public issuer credit ratings or insurer financial strength ratings. These ratings reflect the relative risk that an obligor will default on its obligations. The types of risks rated by the rating agencies are as varied as the businesses of the many companies worldwide which have public ratings. It is common for companies in different businesses to have identical public ratings although the underlying types of risk being rated differ greatly from one company to the next. That's because the ratings are based on the rating agency's determination that both companies have an equal chance of defaulting on their respective obligations. It does not follow, however, that the two companies can assume one another's risks without changing the probability of default, and therefore the rating.

Residential mortgage credit risk is a unique type of risk. There is only one type of company whose rating is based solely on its ability to manage and absorb mortgage credit losses in a stress scenario — a private mortgage insurer. By comparison, a nonmortgage insurance

company having the same rating, but without any mortgage credit expertise cannot be counted on to underwrite, manage and ultimately absorb the same level of *mortgage* credit risk as the mortgage insurance company because its rating and core business competencies most likely had little to do with its ability to absorb mortgage credit risk (and certainly not in a stress scenario). Therefore, the credit enhancement provided by a 'AA' mortgage insurance company should be considered more valuable than a credit enhancement provided by any nonmortgage insurance entity.

In addition, mortgage credit enhancement providers who have debt-issue-specific credit ratings (e.g., bond rating or commercial paper rating), and do *not* have a general "issuer credit rating" should be considered an unrated counterparty for the purpose of credit enhancement counterparty risk haircuts. This is because debt-issue-specific ratings, by definition, do not extend to any other business of the rated entity and should not be substituted in the absence of a general issuer credit rating.

Since OFHEO's proposed regulation seeks to assign credit risk counterparty haircuts based on the ability to absorb mortgage credit losses in a stress scenario, mortgage insurance companies should be treated more favorably than comparably rated nonmortgage insurance companies. Listed below are some of the safety and soundness characteristics of insurance companies in general — and mortgage insurance companies in particular — which result in mortgage insurance being a higher quality credit enhancement than credit enhancements provided by nonmortgage insurance entities.

General Insurance Characteristics:

- Pooling of Risks ("cross-subsidization") — The business of insurance is very different from any noninsurance businesses. It involves the combination of large numbers of transactions from policyholders, written over many years, which are then evaluated to project severity and frequency of loss. Those transactions are supported by the pooling of premiums and the capital of the insurer, shared among

policyholders, for the payment of losses arising from a small subset of the pool. In the case of mortgage insurance, transactions with diverse credit risk attributes, originated by many different lenders, over many years, involving different loan types, and representing both healthy and distressed real estate markets are pooled together. This pool creates a cross-subsidization of loans which pose varying levels of default risk. Cross-subsidization is an important element of mortgage insurance for two reasons. On a consumer level, it results in a lower cost of mortgage insurance for higher-risk borrowers and, therefore, increases affordability. From a safety and soundness perspective, it facilitates a "dispersion" of risk on many fronts — geographic, lender, loan type, loan age, and borrower credit risk, to name a few. This dispersion minimizes the loss of capital a mortgage insurer experiences during economic events which impact certain real estate markets, classes of borrowers, types of loans, etc.

- Policyholders' Preference — The entire regulatory structure of insurance is established for the protection of policyholders, from licensing, to supervision and examination, to rehabilitation or liquidation of the insurer. Under liquidation statutes, policyholders' claims are given preference over the claims of other creditors and shareholders. Noninsurance credit enhancements are not subject to state laws which establish preferences for policyholders over creditors or shareholders.

- Licensing and Filing Requirements for Insurers — State laws prohibit an entity from insuring loans until it is licensed and meets minimum financial and operating requirements. These requirements may vary across states and are established by state insurance regulators. Most importantly, these requirements, which include minimum capital requirements and a review of the experience and qualifications of

the principal parties associated with the insurer, are intended to protect policyholders. In addition, during the course of an insurer's operations, its premium rates and terms of coverage offered must be approved by a number of state regulators, thereby introducing a review of and limitation on risky practices. Similar supervision of noninsurer credit enhancers is not available.

- Reporting and Examination Requirements — An insurer is required to report annual and quarterly financial information to state insurance departments, which review the information and are alerted to adverse changes in the financial condition of the insurer. In addition, the state in which the insurer is domiciled as well as states in which it is licensed, examine the insurer on both a regular and special basis to obtain more detailed information on the status of the insurer. Nonregulated entities are not subject to such reporting and examination requirements. As a result, financial problems may not be as easily or quickly discovered and remedied.

- Limitations on an Insurer's Transactions — State laws generally limit an insurer's discretion to enter into extraordinary transactions with affiliates or to pay extraordinary dividends and to enter into other unusual transactions without approval from its primary regulator. The regulator would consider those transactions with a view towards the protection of policyholders and take into account the insurer's financial condition and other circumstances in deciding whether to permit them. No such regulator oversees a noninsurer's transactions, and only negotiated contractual terms can be used to limit a noninsurer's transactions.

Special Mortgage Insurance Characteristics:

- Monoline Business — Mortgage insurance is a monoline business, which means that a mortgage insurer cannot engage in any business other than mortgage insurance. That restriction recognizes the unique nature of mortgage insurance and the requirement to dedicate substantially all of its capital to the payment of mortgage credit losses. This singular focus also assures that management is dedicated to managing mortgage default risk.

- Capital and Reserves — Mortgage insurance companies are not only required to establish a minimum amount of capital before being licensed, but their ongoing capital is dictated by several requirements designed to protect policyholders and which recognize the long-term, unique risk associated with mortgage defaults:

    – Risk-To-Capital Ratio — Generally, in order to write new business an insurer must maintain a ratio of its outstanding policy liabilities to policyholders' surplus, which cannot exceed 25 to 1.

    – Contingency Reserve — Generally, 50 percent of each year's earned premiums is set aside as a contingency reserve, which is included within the policyholders' surplus of the insurer. Each addition to the reserve is maintained for a period of ten years (accumulating to about 4 percent to 5 percent of in force risk), except for payment of extraordinary levels of policy claims or as permitted by the insurer's domiciliary regulator. The contingency reserve reflects the possible need for substantial, extraordinary loss protection which might arise due to adverse economic cycles over the long-term coverage provided by mortgage insurance. This catastrophic loss reserve is not required for nonmortgage insurance credit enhancements. Contingency reserve contributions may be used to reduce

federal taxable income. Any resulting tax benefit requires the mortgage insurer to purchase, at par, a special US Treasury obligation (a Mortgage Guaranty Tax and Loss Bond) with a zero coupon, a stated maturity of 10 years but due on demand. This "tax deferral" is unique to the mortgage insurance industry and is designed to make such deferrals available to help to pay catastrophic losses, if and when such losses develop.

−   Loss and Unearned Premium Reserves — Mortgage insurance loss reserves are established for losses anticipated on reported defaults and unearned premium reserves are established to match premiums with ongoing coverage. These reserves are intended to preserve capital for policyholders and provide a restriction on payment of dividends and extraordinary transactions which could harm policyholders.

•   Investments — A mortgage insurer generally cannot invest directly in mortgages. Also, its investments are subject to limitations established for all insurers by most state regulations. With investment practices dictated by strong statutory regulations and prudent investment policies, private mortgage insurers maintain investment portfolios that emphasize the preservation of capital. These portfolios are of exceptionally high credit quality and consist primarily of publicly traded fixed-income securities. Diversification by issuer is required by statutory regulations, and prudent investment policies limit concentrations of exposure. Compliance is recorded and open to inspection in quarterly filings made with the National Association of Insurance Commissioners ("NAIC") on Schedule D which lists investment transactions and specific holdings. Mortgage insurers must file this schedule in every state in which they conduct business. A security held by a mortgage insurer must also be rated by the NAIC's Security Valuation Office

(SVO). The SVO is chartered with reviewing and rating securities with the interests of the Insurance Commissioners in mind, not underwriters or issuers. This additional outside review fortifies credit quality and the suitability of investment. Nonmortgage insurance credit enhancers may not be subject to the same strict investment guidelines, if any.

Mortgage Insurance vs. Noninsurance Mortgage Credit Risk Transfer Contracts

NPR2 proposes a treatment of derivative contract benefits that is generally based on the external credit rating of the contract counterparty and the presence or absence of a collateral pledge agreement. The proposed rule discusses derivative contracts only in the context of interest rate risk derivatives and MICA is aware of only one transaction in which a GSE used a mortgage credit risk derivative to transfer risk (the Freddie Mac MODERNs transaction — discussed in detail elsewhere in this white paper). As a result, we presume that OFHEO intends now to issue a general rule that covers only those interest rate risk derivatives in widespread use by the GSEs. We recommend a clarification to the proposal that makes it clear that NPR2 is applicable only to interest-rate risk transfer contracts.

We recommend this cautious policy because residential mortgage credit risk derivatives remain an untested product with limited use in the financial system. We note, for example, that there is currently no generally accepted way to mark credit derivatives to market. Further, considerable legal ambiguities surround these instruments. The $1 billion estimate of total credit derivatives booked in the United States. is in stark contrast to the $80 trillion (notional value) worldwide market for more established derivative products. As a result, we suggest that OFHEO defer any recognition of credit derivative benefits in this proposal. To the degree that the GSEs may be interested in using credit derivatives, this should be examined in a separate rule making

that will permit OFHEO to consider this important issue on its own merits, not in conjunction with the current lengthy and complex risk-based capital rule.

We suggest caution and a separate rule making even for mortgage credit risk derivatives collateralized by cash or government securities. In January, the Basle Committee on Bank Supervision outlined the criteria by which risk mitigation devices should be evaluated for capital reduction purposes. Issues such as legal certainty and a demonstrated historical ability to absorb risk are among the factors used to compare derivatives, guarantees and insurance. Credit risk derivatives were found by the bank regulators to lack the characteristics necessary for favorable capital treatment under the Basle scheme. They thus should not be granted favorable treatment by OFHEO under NPR2.

Mortgage Insurance vs. MODERNs Type Transaction

In 1998 Freddie Mac entered into a reinsurance transaction with an offshore reinsurance entity, G3 Mortgage Reinsurance Limited (G3), whereby G3 agreed to make a claim payment to Freddie Mac in the event of default by any individual mortgage loan in a defined reference pool of mortgage loans owned by Freddie Mac. The claim payment on a defaulted loan was set at 27 percent of the loan's unpaid principal balance regardless of Freddie Mac's actual loss incurred on the defaulted loan. G3, a special purpose vehicle formed solely for this transaction, obtained funds to make claim payments by selling bonds (Mortgage Default Recourse Notes, or MODERNs) through a private placement into the capital markets. Interest payable on the bonds comes from two sources — interest income on bond sale proceeds, and Freddie Mac premium payments.

OFHEO has not addressed in NPR2 how the MODERNs benefits to Freddie Mac will be treated from a credit enhancement counterparty risk haircut perspective. Although MODERNs is technically an insurance transaction between Freddie Mac and G3, practically speaking, Freddie Mac structured and sold mortgage credit risk into the capital markets. Therefore, MODERNs should be viewed not as an insurance transaction but more as a complex, highly structured mortgage credit risk transfer with more similarities to a derivative than to true mortgage insurance. As such, MICA believes that MODERNs has a number of conceptual and structural weaknesses which should result in MODERNs benefits receiving a significantly higher mortgage credit enhancement counterparty risk haircut than mortgage insurance from a mortgage insurer. The weaknesses of the MODERNs transaction are as follows:

- Like other derivative products, MODERNs is an opportunistic product. Its availability is subject to the capital markets' appetite for and pricing of mortgage credit risk. MODERNs was a "one off" transaction done as a private placement. Industry sources have indicated that not all of the MODERNs' bonds were able to

be sold into the market. Therefore, the depth of the capital markets for this sort of security has proven to be very limited in the best of economic times. In distressed economic periods, it is unlikely that the capital markets will be willing to buy mortgage credit risk at all or at an economic price. In contrast, mortgage insurance from a mortgage insurer is available in good times and bad times and the private mortgage insurance industry has demonstrated both its ability to pay claims and capacity to satisfy the primary credit enhancement need of the entire mortgage market.

- G3 can redeem all the bonds and leave Freddie Mac with no credit enhancement if Freddie Mac fails to pay premiums or extraordinary expenses. Therefore, in a stress scenario, if Freddie Mac cannot pay these amounts, it loses the credit enhancement benefits just at the time it needs them most. In contrast, borrower-paid mortgage insurance stays in place as long as the insured passes through the premium to the mortgage insurer. If a borrower fails to make mortgage payments, the mortgage loan is in default and the loan retains insurance coverage through default resolution.

- Freddie Mac went to great lengths in setting up G3 as an offshore entity to avoid meaningful insurance regulation and licensing, investment company registration, and US taxation. By so doing, Freddie Mac exposed itself to regulatory risk because G3 has the right to redeem all bonds and leave Freddie Mac with no credit enhancement if the bondholders are classified as insurers or if G3 is required to register as an investment company. This is a real risk which monoline mortgage insurers do not have due to the highly regulated nature of the private mortgage insurance industry.

- MODERNs' credit enhancement benefits to Freddie Mac are subject to the risk of bondholder lawsuit which could interrupt or stop benefit payments altogether. Bondholder lawsuits are most likely to arise in the event of an adverse tax ruling or severe underperformance of bonds due to more and faster credit losses than expected. Even though the MODERNs bonds were sold to "sophisticated" investors, one should keep in mind the number of lawsuits brought by "sophisticated" real estate limited partnership investors against general partners/syndicators when the commercial real estate market collapsed in the late 1980s. In contrast, this risk is absent on mortgage insurance from MIs. Mortgage insurers price for and expect to pay claims across the entire economic cycle. Although mortgage insurers cannot predict when and where heavy losses will occur, they know extraordinary losses will occur and are prepared for them.

- The MODERNs' bonds may be redeemed and Freddie Mac will therefore lose all credit enhancement benefits if interest on the bonds is not paid timely. First, permitted investments for bond sale proceeds are not limited to US Treasury securities and are therefore subject to some default risk. Second, G3 entered into a swap agreement with Morgan Stanley to manage interest rate risk. Therefore, there is swap counterparty risk associated with Morgan Stanley failure to perform or general Morgan Stanley business failure.

In summary, MODERNs is an experimental structured mortgage credit risk transfer transaction which is more similar to a derivative than to true mortgage insurance. As a mortgage credit risk derivative, no credit should be given to MODERNs benefits under NPR2. However, MICA believes that credit enhancement benefits payable from a MODERNs-like transaction should receive a significantly higher mortgage credit enhancement counterparty haircut than

traditional mortgage insurance, under a future and separate OFHEO credit risk derivative rule, due to MODERNs wide range of structural risks.

Below-Investment-Grade and Unrated Mortgage Credit Risk Counterparty Treatment

NPR2 proposes four rating categories for mortgage credit enhancement counterparty credit risk classification: 'AAA,' 'AA,' 'A' and 'BBB.' NPR2 further proposes that mortgage credit enhancement counterparties which are rated below investment grade or unrated be placed in the 'BBB' category for counterparty haircut purposes.

OFHEO's rationale for treating unrated or below investment grade counterparties the same as 'BBB' counterparties focuses on GSE seller/servicer obligations under a recourse agreement. OFHEO apparently believes that unrated seller/servicers should be placed in the 'BBB' counterparty risk category for these reasons:

- A seller/servicer's obligations under a recourse agreement are partially secured by the servicing rights on all of the GSEs' loans then serviced by the seller/servicer, and the servicing rights have economic value.

- Because seller/servicer recourse represents a small percentage of credit enhancements used by the GSEs, "imprecision resulting from assigning unrated seller/servicers to the 'BBB' or lower rating group would have a small impact on the resulting capital requirement."[17]

MICA disagrees with OFHEO's rationale and believes that mortgage credit enhancement counterparties which are unrated or have issuer credit ratings below 'BBB' should be assigned greater counterparty haircuts than those rated 'BBB,' for the following reasons:

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[17] Page 253 of NPR2

- OFHEO should not consider the value of servicing rights in determining the level of counterparty haircuts for below investment grade or unrated seller/servicers because:

  – The value of servicing rights is uncertain, particularly in a stress scenario.

  – Because a seller/servicer has the option under a GSE alternative servicing compensation arrangement of receiving the present value of substantially all expected future servicing income at the time it sells loans to a GSE or could sell its servicing rights at any time, it is questionable whether a seller/servicer would have any servicing rights at all or servicing rights with any economic value at the point in a stress scenario when a GSE would attempt to realize upon those rights.

- The fact that seller/servicer recourse currently represents a small percentage of the credit enhancements used by the GSEs may not be true in the future. The usage of this type of credit enhancement could grow significantly in the future for unforeseen reasons.

- By focusing on seller/servicer recourse arrangements and value of servicing rights as a rationale for lumping below investment grade and unrated counterparties into the 'BBB' counterparty risk category, OFHEO is ignoring the fact that the GSEs may obtain other forms of mortgage credit enhancements from below investment grade or unrated counterparties. In particular, a GSE may enter into a mortgage credit risk transfer or derivative contract (such as default swaps, total rate of return swaps, etc.) with a below investment grade or unrated counterparty. An unrated derivative contract counterparty should not receive the same haircut as a 'BBB' derivative contract counterparty because the unrated counterparty has a

much higher probability of default on its obligations than a counterparty with a 'BBB' credit rating.

- Studies by both S&P and Moody's of historic default rates show that default rates in below investment grade rating categories are exponentially higher than investment grade rating category default rates. The increase is particularly severe between the 'BBB' and 'BB' categories. The S&P study of historic default rate is shown in Figure 5:

Figure 5: Average Cumulative 15-Year Default Rates[18]

'AAA'...	1.06 percent
'AA'	1.11 percent
'A'..	2.30 percent
'BBB'..	4.21 percent
'BB'	16.75 percent
'B'..	28.43 percent
'CCC'	42.72 percent

The Moody's study of historic default rates is shown in Figure 6.

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[18] Standard & Poor's (1999) Property/Casualty Insurance Rating Criteria, page 9.

Figure 6: Average Cumulative 15-Year Default Rates[19]

Investment Grade ('Aaa,' 'Aa,' 'A,' 'Baa')............................ 4.10%
Speculative Grade (Below 'Baa').. 36.74%

'AAA' vs. 'AA' Mortgage Insurance Company Haircuts

In NPR2, OFHEO is proposing to assign a significant counterparty credit haircut differential to mortgage insurance companies with a 'AAA' versus 'AA' insurer financial strength rating. As indicated earlier in this section of the MICA comment letter, MICA believes that all mortgage insurance companies should be treated more favorably and receive a lower counterparty credit risk haircut than nonmortgage insurance entities. MICA also believes the haircut differential OFHEO is proposing between 'AAA' and 'AA' mortgage insurance companies is unwarranted for reasons which include the following:

- In rating mortgage securities, S&P does not discount "normal" primary mortgage insurance benefits unless the mortgage insurance provider is rated below 'AA.' This is true even if the highest rated bonds in the mortgage securitization transaction are 'AAA.' Normal primary mortgage insurance is the predominant first loss credit enhancement product provided by the mortgage insurance industry. The normal coverage levels provided by mortgage insurance are defined by S&P to be 30 percent cover for 95 LTV loans, 25 percent cover for 90 LTV loans and 12 percent cover for 85 LTV loans. S&P only recognizes differences in ratings of mortgage insurers rated 'AA' or better on that portion of the mortgage insurance coverage which is either greater than "normal" primary coverage or which

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[19] Moody's Investors Service (January, 1999) <u>Historical Default Rates of Corporate Bond Issues 1920–1998</u>, Exhibit 31, page 26.

represents pool insurance coverage. This distinction is only relevant if the highest rated bonds in the transaction are to be 'AAA.'

- A mortgage insurance company may be rated less than 'AAA' for reasons unrelated to its ability to pay its obligations in a stress scenario. In fact, some mortgage insurance companies with 'AA' ratings are able to meet more than 100 percent of their obligations (Capital Adequacy Ratio) in S&P's 10-year "South Central Stress Scenario." S&P acknowledges this in its discussion of the evaluation of mortgage insurers' capital adequacy under its 10-year "South Central Stress Scenario" — "A company with a rating of 'AA' will develop at least seven-eighths of the funds required for solvency and, even if rendered insolvent before the end of the period, may have funds available to discharge its obligations to insureds throughout the period"[20] (emphasis added). Therefore, there is very little or no real difference between the ability and actual capital sufficiency of 'AA' versus 'AAA' mortgage insurance companies to withstand S&P's very severe stress test.

- The rating agency stress tests that mortgage insurance companies are subjected to are more severe than the OFHEO stress test outlined in NPR2. Mortgage insurers rated 'AA' or better would meet their obligations under OFHEO's stress scenario. For example, subjecting a hypothetical mortgage insurance company insurance in-force portfolio (with mix by LTV, seasoning, primary coverage levels and premium similar to the private mortgage insurance industry current in-force mix) to the S&P stress test versus the OFHEO stress tests yields the ten-year cumulative results for default rate and the two critical cash flow components

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[20] Standard & Poor's (1999) Property/Casualty Insurance Rating Criteria, page 74 of article; "Evaluating Mortgage Insurers Capital Adequacy"

shown in Figure 7 (see page 46). These results indicate that private mortgage insurers are held to a higher standard in the S&P stress test and that a 'AA' mortgage insurance company has capital generally adequate to meet its obligations under the OFHEO stress test and should receive as much credit as a 'AAA' mortgage insurance company in any haircut calculation. A mortgage insurance haircut should only relate to mortgage insurers rated less than 'AA.' There is no need for a differential between 'AA' and 'AAA.'

- The GSEs for many years have only required a 'AA–' financial strength rating or better for a mortgage insurer to be deemed a "qualified" mortgage insurer. The GSEs have been working with both 'AAA' and 'AA' mortgage insurance companies for many years and have never made a distinction in their preference for or acceptability of 'AAA' vs. 'AA' mortgage insurers. This practice resulted in the growth and development of a financially strong mortgage insurance industry. OFHEO has shown no good reason to change this structure, but it would be changed if a 'AA' rated mortgage insurer received a haircut greater than a 'AAA' rated mortgage insurer. Any such change would be unfair to the industry and may jeopardize the financial strength of the industry and the security provided to its policyholders, of which the GSEs are the two largest. In addition, such a change may disadvantage borrowers who obtain low down payment loans in the future because either the cost of mortgage insurance would have to increase or the GSEs would have to charge more for loans insured by mortgage insurers without a 'AAA' rating.

- According to a study done for OFHEO by S&P in February 1997, the GSE "standalone" financial strength ratings at that time were no more than 'AA.' It is general rating agency practice to only discount financial guarantor benefits if the

financial guarantor rating is below the targeted rating level. For example, in a mortgage securitization structure, S&P will assign no discount to any mortgage insurance benefits from a 'AA' mortgage insurance company if the highest rated bonds in the transaction are to be 'AA.' Therefore, if the GSEs are essentially 'AA' entities, then standard rating agency practice would result in no discount being assigned to mortgage insurance benefits payable to the GSEs from either a 'AAA' or 'AA' rated mortgage insurer.

Recommendations

Specific MICA recommendations for mortgage credit enhancement counterparty risk haircuts are shown in Figure 8 on page 56. Our general recommendations are described as follows:

- MICA believes that OFHEO should clarify its rule to make it clear that credit for risk-based capital purposes only apply to rated interest-rate risk transfers that meet the other criteria specified in the proposal. No credit for any type of mortgage credit risk derivative should be allowed until OFHEO has fully considered the degree to which mortgage credit risk derivatives are reliable risk mitigation devices in a separate rule-making process.

- Mortgage insurance from a mortgage insurance company rated 'AA–' and above should receive a lower haircut than any nonmortgage insurance, corporate or institutional credit risk counterparty, or structured transaction, due to the highly regulated nature of private mortgage insurance companies whose sole business it is to evaluate and take mortgage credit risk.

- Mortgage credit enhancement counterparties which are unrated or have a credit rating below 'BBB' should receive a 100 percent haircut due to the significantly greater default risk associated with unrated or below-investment-grade counterparties.

- Benefits from complex capital markets credit enhancement derivative transactions such as Freddie Mac's MODERNs should not be given any credit until OFHEO promulgates a final and separate rule on mortgage credit risk derivatives. Even then, benefits from a MODERNs-like transaction should receive a greater haircut than mortgage insurance from a mortgage insurer due to the many conceptual and structural risks embedded in the MODERNs' transaction.

- There should be no haircut differential between 'AAA' and 'AA' mortgage insurance companies because there is relatively little and sometimes no capital adequacy difference between 'AAA' and 'AA' mortgage insurance companies and because mortgage insurance companies are subjected to a more severe stress test to achieve their ratings than the OFHEO stress test.

Figure 7

LTV Category	S&P**				OFHEO Up-Rate Scenario**				OFHEO Down-Rate Scenario**			
	Ten-Year Default Incidence***	Premium Cash Flow	Losses	Net Premium/Loss Cash Flow	Ten-Year Default Incidence***	Premium Cash Flow	Losses	Net Premium/Loss Cash Flow	Ten-Year Default Incidence***	Premium Cash Flow	Losses	Net Premium/Loss Cash Flow
95	19.4%	$210,634	($334,685)	($124,051)	12.2%	$280,189	($190,292)	$89,897	13.7%	$123,776	($213,664)	($89,888)
90	12.1%	$132,526	($161,890)	($29,634)	7.2%	$168,876	($86,515)	$82,261	6.9%	$68,367	($82,800)	($14,433)
85	10.4%	$21,351	($16,408)	$4,943	6.1%	$26,952	($8,680)	$18,272	5.4%	$10,822	($7,774)	$3,048
Total	15.3%	$364,511	($512,983)	($148,472)	9.4%	$476,017	($285,588)	$190,429	9.9%	$202,965	($304,238)	($101,273)

* All dollars are expressed on a nominal, not discounted basis, in thousands (000s)

** These results represent MICA's understanding of the S&P stress test methodology and assumptions and were neither prepared or reviewed by S&P. The OFHEO scenario results were derived by substituting OFHEO model-produced conditional default and prepayment rates and the OFHEO MI primary claim gross-up factor assumption into the S&P model

*** Cumulative ten-year default incidence expressed as a percentage of beginning number of loans

Figure 7 — continued:

Mortgage Insurance Capital Requirement*

	S&P	OFHEO Up-Rate Scenario	OFHEO Down-Rate Scenario
Beginning MI company capital required to achieve 100% Capital Adequacy Ratio (AAA level)	$128,000	$0	$86,000
Beginning MI company capital required to achieve 87.5% Capital Adequacy Ratio (AA level)	$84,000	$0	$61,000

*   All dollars are in thousands (000s)

Figure 7 — continued:

Assumptions

	S&P Stress Test	OFHEO Up-Rate Scenario	OFHEO Down-Rate Scenario
Beginning primary insurance-in-force (aggregate UPB)	$10 billion	$10 billion	$10 billion
Loan type	30 yr./fixed rate	30 yr./fixed rate	30 yr./fixed rate
Loan coupon rate	7.75%	7.75%	7.75%
Stress test start date*	NA	7/1/97	7/1/97
Primary MI claim gross-up factor**	1.25	1.134	1.134
Investment rate of return	5%	5%	5%
Tax rate	35%	35%	35%
Operating expenses	Same for all — 2% of premium		
LTV mix	Same for all — see "IIF Distribution Assumptions" schedule		
Loan age mix	Same for all — see "IIF Distribution Assumptions" schedule		
Primary MI cover % mix	Same for all — see "IIF Distribution Assumptions" schedule		
Primary MI premium rate mix	Same for all — see "IIF Distribution Assumptions" schedule		
MI premium payment plan	Same for all — annually, in advance, on declining UPB		
Conditional claim (default) rates	See detailed schedules		
Conditional prepayment rates	See detailed schedules		

*   OFHEO scenarios use OFHEO-provided HPI and interest rate history leading up to start of stress test. Stress test start date does not influence S&P results.

**   Applied to defaulted UPB to determine primary mortgage insurance claim amount — excess over UPB represents foreclosure expenses and accrued interest.

Figure 7 — Continued

IIF Distribution Assumptions*

Original LTV Category	Loan Age Category	Proportion of Beginning Insurance in Force	Beginning Insurance in Force ($, 000)	Primary MI Coverage %	Annual Premium Rate
> 90%	> 5 yrs. Prior	4.2%	$420,000	25%	0.67%
	5 yrs. Prior	2.3%	$230,000	25%	0.67%
	4 yrs. Prior	3.5%	$350,000	30%	0.78%
	3 yrs. Prior	4.3%	$430,000	30%	0.78%
	2 yrs. Prior	6.0%	$600,000	30%	0.78%
	1 yr. Prior	13.1%	$1,310,000	30%	0.78%
	Target year	12.7%	$1,270,000	30%	0.78%
85–90%	> 5 yrs. Prior	8.3%	$830,000	17%	0.39%
	5 yrs. Prior	2.3%	$230,000	17%	0.39%
	4 yrs. Prior	2.4%	$240,000	25%	0.52%
	3 yrs. Prior	3.1%	$310,000	25%	0.52%
	2 yrs. Prior	4.7%	$470,000	25%	0.52%
	1 yr. Prior	12.4%	$1,240,000	25%	0.52%
	Target year	10.2%	$1,020,000	25%	0.52%
80–85%	> 5 yrs. Prior	0.9%	$90,000	12%	0.32%
	5 yrs. Prior	0.3%	$30,000	12%	0.32%
	4 yrs. Prior	0.4%	$40,000	12%	0.32%
	3 yrs. Prior	0.6%	$60,000	12%	0.32%
	2 yrs. Prior	1.1%	$110,000	12%	0.32%
	1 yr. Prior	4.1%	$410,000	12%	0.32%
	Target year	3.1%	$310,000	12%	0.32%
	Total	100.0%	$10,000,000		

*   Distribution of beginning insurance-in-force (aggregate UPB) is reasonably representative of actual MI industry primary insurance-in-force distribution by original LTV, loan age, coverage percentage and premium rate as of 12/31/99

Figure 7 — continued:

S&P Annual Conditional Default Rates

Original LTV Category	Loan Age Category	Stress Test Year									
		1	2	3	4	5	6	7	8	9	10
> 90%	> 5 yrs. prior	0.01%	0.04%	0.12%	0.24%	0.68%	0.43%	0.33%	0.33%	0.26%	0.34%
	5 yrs. prior	0.10%	0.21%	0.71%	1.04%	1.87%	1.37%	1.41%	0.72%	0.57%	0.58%
	4 yrs. prior	0.19%	0.38%	0.83%	1.36%	2.47%	2.25%	1.75%	1.31%	1.05%	0.97%
	3 yrs. prior	0.56%	0.72%	1.31%	2.24%	3.94%	3.65%	2.73%	2.30%	1.48%	1.58%
	2 yrs. prior	0.89%	1.41%	1.94%	2.87%	5.52%	4.86%	3.44%	2.77%	2.24%	2.04%
	1 yr. prior	1.97%	3.05%	4.89%	5.92%	8.71%	9.57%	6.28%	4.48%	3.21%	3.19%
	Target year	0.03%	0.85%	2.91%	5.62%	10.02%	12.06%	9.51%	5.21%	4.01%	3.39%
85–90%	> 5 yrs. prior	0.05%	0.06%	0.19%	0.35%	0.60%	0.80%	0.52%	0.42%	0.32%	0.31%
	5 yrs. prior	0.13%	0.14%	0.34%	0.53%	1.25%	1.28%	0.88%	0.67%	0.48%	0.47%
	4 yrs. prior	0.27%	0.32%	0.60%	1.04%	2.09%	2.53%	1.74%	1.15%	1.11%	1.18%
	3 yrs. prior	0.54%	0.72%	1.06%	1.87%	4.00%	3.35%	2.67%	2.47%	1.33%	2.26%
	2 yrs. prior	1.15%	1.72%	2.61%	3.36%	6.19%	5.03%	3.95%	2.91%	2.57%	1.89%
	1 yr. prior	0.45%	0.99%	2.06%	3.30%	5.62%	4.38%	4.15%	2.58%	1.51%	1.48%
	Target year	0.01%	0.37%	1.64%	2.63%	6.78%	6.31%	4.87%	3.06%	2.53%	3.10%
80–85%	> 5 yrs. prior	0.12%	0.13%	0.13%	0.74%	0.79%	0.17%	0.18%	0.30%	0.42%	0.79%
	5 yrs. prior	0.09%	0.15%	0.21%	1.74%	1.00%	0.52%	1.25%	1.02%	1.50%	0.19%
	4 yrs. prior	0.77%	0.43%	1.21%	1.41%	1.50%	1.26%	0.50%	1.06%	0.61%	1.73%
	3 yrs. prior	0.74%	1.86%	1.10%	2.50%	2.96%	3.78%	1.73%	0.70%	2.30%	1.83%
	2 yrs. prior	1.05%	1.19%	0.86%	4.03%	2.72%	2.32%	2.16%	0.76%	1.40%	3.07%
	1 yr. prior	0.00%	0.22%	2.35%	2.80%	3.13%	3.63%	3.23%	0.47%	0.90%	1.12%
	Target year	0.00%	0.24%	1.22%	3.40%	3.61%	3.83%	4.41%	2.00%	2.78%	0.60%

Figure 7 — continued:

S&P Annual Conditional Prepayment Rates

Original LTV Category	Loan Age Category	Stress Test Year									
		1	2	3	4	5	6	7	8	9	10
> 90%	> 5 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	5 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	4 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	3 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	2 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	1 yr. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	Target year	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
85–90%	> 5 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	5 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	4 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	3 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	2 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	1 yr. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	Target year	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
80–85%	> 5 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	5 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	4 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	3 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	2 yrs. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	1 yr. prior	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
	Target year	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%

Figure 7 — continued:

OFHEO Up-Rate Scenario Annualized Conditional Default Rates

Original LTV Category	Loan Age Category	Stress Test Year									
		1	2	3	4	5	6	7	8	9	10
> 90%	> 5 yrs. prior	0.50%	0.52%	0.49%	0.78%	0.77%	0.54%	0.22%	0.16%	0.10%	0.06%
	5 yrs. prior	0.46%	0.64%	0.65%	0.96%	1.14%	0.77%	0.54%	0.22%	0.16%	0.10%
	4 yrs. prior	0.40%	0.71%	0.89%	1.22%	1.35%	1.06%	0.77%	0.39%	0.22%	0.16%
	3 yrs. prior	0.66%	0.89%	1.02%	1.47%	1.97%	1.44%	1.21%	0.77%	0.39%	0.22%
	2 yrs. prior	0.55%	0.92%	1.13%	2.10%	3.11%	2.55%	1.53%	1.14%	0.77%	0.39%
	1 yr. prior	0.52%	1.16%	1.37%	2.66%	3.48%	3.58%	2.76%	1.71%	1.14%	0.77%
	Target year	0.56%	1.24%	1.70%	2.46%	3.02%	3.48%	3.58%	3.04%	1.48%	1.06%
85–90%	> 5 yrs. prior	0.42%	0.43%	0.41%	0.37%	0.47%	0.25%	0.19%	0.13%	0.09%	0.05%
	5 yrs. prior	0.38%	0.42%	0.43%	0.62%	0.75%	0.48%	0.25%	0.19%	0.13%	0.09%
	4 yrs. prior	0.33%	0.38%	0.42%	0.76%	0.83%	0.75%	0.48%	0.25%	0.19%	0.13%
	3 yrs. prior	0.27%	0.42%	0.59%	1.00%	1.20%	1.05%	0.75%	0.48%	0.25%	0.19%
	2 yrs. prior	0.26%	0.55%	0.67%	1.06%	1.75%	1.24%	1.12%	0.75%	0.48%	0.25%
	1 yr. prior	0.27%	0.58%	0.76%	1.73%	2.53%	2.30%	1.48%	1.16%	0.75%	0.48%
	Target year	0.18%	0.52%	0.72%	1.80%	2.51%	2.74%	2.47%	1.48%	1.12%	0.75%
80–85%	> 5 yrs. prior	0.42%	0.43%	0.41%	0.37%	0.31%	0.25%	0.19%	0.13%	0.09%	0.05%
	5 yrs. prior	0.38%	0.42%	0.43%	0.41%	0.37%	0.31%	0.25%	0.19%	0.13%	0.09%
	4 yrs. prior	0.33%	0.38%	0.42%	0.54%	0.83%	0.57%	0.31%	0.25%	0.19%	0.13%
	3 yrs. prior	0.27%	0.33%	0.38%	0.74%	0.94%	0.83%	0.57%	0.31%	0.25%	0.19%
	2 yrs. prior	0.21%	0.27%	0.42%	0.92%	1.18%	1.02%	0.83%	0.57%	0.31%	0.25%
	1 yr. prior	0.15%	0.32%	0.55%	1.05%	1.61%	1.44%	1.16%	0.91%	0.57%	0.31%
	Target year	0.10%	0.33%	0.49%	1.39%	2.19%	2.11%	1.44%	1.20%	0.83%	0.57%

Figure 7 — continued:

OFHEO Up-Rate Scenario Annualized Conditional Prepayment Rates

Original LTV Category	Loan Age Category	Stress Test Year									
		1	2	3	4	5	6	7	8	9	10
> 90%	> 5 yrs. prior	3.96%	3.42%	3.10%	2.61%	2.13%	1.68%	1.29%	0.92%	0.62%	0.40%
	5 yrs. prior	3.98%	3.57%	3.39%	3.01%	2.57%	2.13%	1.68%	1.29%	0.92%	0.62%
	4 yrs. prior	3.81%	3.56%	3.51%	3.30%	2.98%	2.58%	2.13%	1.71%	1.29%	0.92%
	3 yrs. prior	3.37%	3.36%	3.50%	3.42%	2.98%	2.94%	2.57%	2.13%	1.71%	1.29%
	2 yrs. prior	2.93%	3.04%	3.32%	2.91%	2.32%	2.61%	2.90%	2.57%	2.13%	1.71%
	1 yr. prior	2.40%	2.21%	2.67%	2.20%	2.01%	2.11%	2.47%	2.79%	2.57%	2.13%
	Target year	1.62%	1.39%	1.69%	1.77%	1.93%	2.01%	2.11%	2.31%	2.92%	2.58%
85–90%	> 5 yrs. prior	4.31%	3.72%	3.37%	2.91%	2.36%	1.88%	1.41%	1.00%	0.68%	0.44%
	5 yrs. prior	4.33%	3.92%	3.72%	3.31%	2.81%	2.35%	1.88%	1.41%	1.00%	0.68%
	4 yrs. prior	4.15%	3.94%	3.92%	3.63%	3.25%	2.81%	2.35%	1.88%	1.41%	1.00%
	3 yrs. prior	3.79%	3.75%	3.88%	3.78%	3.56%	3.25%	2.81%	2.35%	1.88%	1.41%
	2 yrs. prior	3.28%	3.35%	3.66%	3.75%	3.29%	3.53%	3.24%	2.81%	2.35%	1.88%
	1 yr. prior	2.69%	2.89%	3.31%	2.84%	2.47%	2.82%	3.36%	3.22%	2.81%	2.35%
	Target year	2.14%	2.27%	2.73%	2.19%	2.11%	2.32%	2.66%	3.36%	3.24%	2.81%
80–85%	> 5 yrs. prior	4.31%	3.72%	3.37%	2.91%	2.40%	1.88%	1.41%	1.00%	0.68%	0.44%
	5 yrs. prior	4.33%	3.92%	3.72%	3.37%	2.91%	2.40%	1.88%	1.41%	1.00%	0.68%
	4 yrs. prior	4.15%	3.94%	3.92%	3.69%	3.25%	2.86%	2.40%	1.88%	1.41%	1.00%
	3 yrs. prior	3.79%	3.78%	3.94%	3.82%	3.59%	3.25%	2.86%	2.40%	1.88%	1.41%
	2 yrs. prior	3.31%	3.47%	3.75%	3.80%	3.75%	3.59%	3.25%	2.86%	2.40%	1.88%
	1 yr. prior	2.75%	2.97%	3.35%	3.47%	3.30%	3.54%	3.58%	3.25%	2.86%	2.40%
	Target year	2.18%	2.43%	2.92%	2.61%	2.37%	2.84%	3.54%	3.56%	3.25%	2.86%

Figure 7 — continued:

OFHEO Down-Rate Scenario Annualized Conditional Default Rates

Original LTV Category	Loan Age Category	Stress Test Year									
		1	2	3	4	5	6	7	8	9	10
> 90%	> 5 yrs. prior	0.47%	1.61%	1.56%	2.50%	2.47%	1.99%	1.51%	0.53%	0.35%	0.22%
	5 yrs. prior	0.43%	1.98%	2.02%	3.00%	3.60%	2.69%	1.99%	1.51%	0.53%	0.35%
	4 yrs. prior	0.37%	2.20%	2.77%	3.80%	4.21%	3.84%	3.30%	1.99%	1.51%	0.53%
	3 yrs. prior	0.62%	2.76%	3.17%	4.53%	6.10%	5.36%	4.36%	3.30%	2.35%	1.51%
	2 yrs. prior	0.52%	2.89%	3.51%	6.54%	9.64%	8.57%	7.02%	4.90%	3.54%	2.51%
	1 yr. prior	0.49%	3.71%	4.31%	8.34%	10.83%	11.71%	11.01%	9.74%	6.41%	3.65%
	Target year	0.54%	1.19%	5.46%	7.79%	9.46%	10.83%	11.71%	11.65%	9.95%	7.60%
85–90%	> 5 yrs. prior	0.39%	1.33%	1.28%	1.17%	1.50%	1.04%	0.61%	0.44%	0.29%	0.18%
	5 yrs. prior	0.35%	1.29%	1.33%	1.93%	2.37%	2.04%	1.65%	0.61%	0.44%	0.29%
	4 yrs. prior	0.31%	1.19%	1.29%	2.35%	2.60%	2.37%	2.04%	1.46%	0.61%	0.44%
	3 yrs. prior	0.25%	1.31%	1.82%	3.06%	3.71%	3.48%	3.18%	2.23%	1.65%	0.96%
	2 yrs. prior	0.25%	1.71%	2.09%	3.25%	5.41%	4.57%	3.95%	3.18%	2.40%	1.65%
	1 yr. prior	0.25%	1.84%	2.38%	5.43%	7.89%	8.20%	7.13%	5.38%	3.51%	2.73%
	Target year	0.17%	0.48%	2.29%	5.72%	7.88%	9.04%	8.98%	8.40%	5.83%	4.06%
80–85%	> 5 yrs. prior	0.39%	1.33%	1.28%	1.17%	1.01%	0.81%	0.61%	0.44%	0.29%	0.18%
	5 yrs. prior	0.35%	1.29%	1.33%	1.28%	1.17%	1.01%	0.81%	0.61%	0.44%	0.29%
	4 yrs. prior	0.31%	1.19%	1.29%	1.67%	2.60%	2.08%	1.28%	0.81%	0.61%	0.44%
	3 yrs. prior	0.25%	1.03%	1.19%	2.29%	2.91%	2.60%	2.37%	2.04%	0.81%	0.61%
	2 yrs. prior	0.19%	0.84%	1.31%	2.83%	3.62%	3.59%	3.48%	2.58%	2.04%	1.26%
	1 yr. prior	0.14%	1.01%	1.71%	3.25%	4.99%	4.92%	4.08%	3.72%	3.18%	2.04%
	Target year	0.09%	0.30%	1.57%	4.41%	6.88%	7.57%	7.49%	5.54%	3.95%	3.18%

Figure 7 — continued:

OFHEO Down-Rate Scenario Annualized Conditional Prepayment Rates

Original LTV Category	Loan Age Category	Stress Test Years									
		1	2	3	4	5	6	7	8	9	10
> 90%	> 5 yrs. prior	28.63%	32.64%	30.14%	26.10%	21.94%	17.74%	13.65%	10.31%	7.14%	4.69%
	5 yrs. prior	28.89%	33.77%	32.40%	29.42%	25.79%	21.91%	17.74%	13.65%	10.31%	7.14%
	4 yrs. prior	28.06%	33.68%	33.27%	31.58%	29.08%	25.76%	21.84%	17.74%	13.65%	10.31%
	3 yrs. prior	25.46%	32.10%	33.14%	32.49%	28.99%	27.50%	25.15%	21.84%	17.70%	13.65%
	2 yrs. prior	22.78%	29.66%	31.82%	28.43%	23.40%	24.70%	24.91%	24.32%	21.56%	17.69%
	1 yr. prior	19.18%	22.65%	26.53%	22.36%	20.63%	20.48%	21.01%	20.30%	21.99%	21.43%
	Target year	12.68%	18.28%	17.87%	18.52%	19.95%	20.63%	20.48%	20.02%	20.10%	19.95%
85–90%	> 5 yrs. prior	30.65%	34.89%	32.27%	28.67%	24.03%	19.61%	15.26%	11.17%	7.75%	5.09%
	5 yrs. prior	30.93%	36.34%	34.89%	31.81%	27.80%	23.63%	19.15%	15.26%	11.17%	7.75%
	4 yrs. prior	30.06%	36.50%	36.34%	34.14%	31.32%	27.80%	23.63%	19.30%	15.26%	11.17%
	3 yrs. prior	28.11%	35.11%	35.98%	35.23%	33.56%	31.19%	27.69%	23.60%	19.15%	14.99%
	2 yrs. prior	24.96%	32.08%	34.37%	34.98%	31.42%	32.02%	30.48%	27.69%	23.58%	19.15%
	1 yr. prior	21.09%	28.51%	31.79%	27.88%	24.72%	25.02%	26.62%	27.71%	27.20%	23.53%
	Target year	17.42%	27.82%	27.16%	22.39%	21.58%	22.31%	23.79%	23.91%	26.82%	26.18%
80–85%	> 5 yrs. prior	30.65%	34.89%	32.27%	28.67%	24.38%	19.78%	15.26%	11.17%	7.75%	5.09%
	5 yrs. prior	30.93%	36.34%	34.89%	32.27%	28.67%	24.38%	19.78%	15.26%	11.17%	7.75%
	4 yrs. prior	30.06%	36.50%	36.34%	34.65%	31.32%	28.02%	24.18%	19.78%	15.26%	11.17%
	3 yrs. prior	28.11%	35.37%	36.50%	35.56%	33.85%	31.32%	27.80%	23.63%	19.78%	15.26%
	2 yrs. prior	25.24%	33.02%	35.11%	35.40%	34.97%	33.74%	31.19%	27.77%	23.63%	19.45%
	1 yr. prior	21.70%	29.19%	32.08%	32.93%	31.58%	32.41%	33.00%	30.83%	27.69%	23.63%
	Target year	17.81%	29.42%	28.73%	26.09%	23.91%	25.18%	26.56%	30.07%	30.48%	27.69%

Figure 8

Mortgage Credit Enhancement Counterparty Cumulative Haircuts[21]

Month	'AA' and Above MI	'AAA' Non-MI	'AA' Non-MI	'A' Non-MI	'BBB' Non-MI	Noninvestment Grade or Unrated Non-MI
12	0.6%	1%	2%	4%	8%	100%
24	1.2%	2%	4%	8%	16%	100%
36	1.8%	3%	6%	12%	24%	100%
48	2.4%	4%	8%	16%	32%	100%
60	3.0%	5%	10%	20%	40%	100%
72	3.6%	6%	12%	24%	48%	100%
84	4.2%	7%	14%	28%	56%	100%
96	4.8%	8%	16%	32%	64%	100%
108	5.4%	9%	18%	36%	72%	100%
120	6.0%	10%	20%	40%	80%	100%

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[21] Only non-MI entities having Issuer Credit Ratings should be included in the categories "AAA non-MI" through "BBB non-MI" in this table. A mortgage credit enhancement provided by a non-MI entity which has only an Issue-Specific Rating (e.g., relating to specific bond issue or commercial paper program) should be placed in the "Noninvestment Grade or Unrated Non-MI" category because Issue-Specific Ratings do not extend to the entity's other business activities.

IV.   OFHEO Model Performance

In order to assess the quality of the Model which underlies NPR2, MICA replicated the residential mortgage credit risk portions of the Model and compared Model results to the BLE, MI industry experience, and other historical loan performance benchmarks. MICA believes that the Model is essentially sound and that it meets the statutory criteria for transparency. However, we also believe that the Model should be revised and improved in certain ways to better match the BLE and align the proposed risk-based capital rule with public housing policy goals.   With regard to whether the Model reasonably reflects the BLE, MICA found that the Model matches overall BLE mortgage default and credit loss levels when using the BLE interest rate path. However, we also found some problems:

- The Model does not match the BLE by LTV group. The Model overstates high LTV and severely understates low LTV default rates and credit losses.

- The Model produces a significantly lower overall level of credit losses than the BLE in the up and down-interest-rate scenarios.

The default rate and credit loss bias against high LTV loans results in relatively less cash flow and therefore relatively more risk-based capital for high LTV versus low LTV loans, than should be required. If unchanged, the OFHEO stress test will disincent GSE purchase of high LTV loans relative to low LTV loans, which is contrary to the GSEs' public purpose and mission. In addition, MICA doesn't believe that Congress intended the interaction of the interest rate risk and credit risk portions of the stress test to result in such a low level of credit losses, and therefore relatively low level of capital required for mortgage credit risk.

MICA believes these Model deficiencies can be remedied with some straightforward revisions. A later section of this white paper contains two recommended approaches to revising the Model so that it better matches the BLE.

MICA also observed that the Model's approach to the calculation of a loan's current LTV ratio results in a significant degree of required capital volatility. The Model uses a point Home Price Index (HPI) value to estimate current property value and therefore current LTV. Current LTV is a variable that strongly impacts predicted default rates. As estimated property value increases, current LTV, predicted default rate, credit losses and required capital decrease; and visa versa as property values decline. Therefore, for regions with rapid home price appreciation, required capital declines which will incent the GSEs to accelerate their loan purchases from such regions, thus fueling even higher regional home price inflation. In contrast, the Model will incent the GSEs to reduce their purchase of new loans from a region experiencing home price depreciation because such loans will have a relatively higher capital cost. This will tend to prolong and deepen the housing and economic recessions in such regions.

Because of the way the Model uses the OFHEO HPI to estimate current property value and LTV, the proposed risk-based capital rule is clearly pro-cyclical. The GSEs were established to provide liquidity for mortgage markets under all conditions, including stress environments, and to serve a counter-cyclical purpose. A capital requirement that moves with the housing cycle may serve as a de-stabilizing influence on regional housing markets. MICA believes that a less volatile capital rule is safer for the US taxpayer and necessary to avoid prolonged and deeper regional housing cycles, which are clearly not in the public's best interest.

MICA has a detailed recommendation for revising the application of the OFHEO HPI to estimation of current LTV, which will reduce the required capital volatility of the proposed rule.

MICA observed a number of other Model performance results for which OFHEO should consider making adjustments. They are as follows:

- Model produces prepayment rates that are significantly higher than MI industry experience for the BLE region and time period.

- Model appears to be understating default rates on seasoned loans (BLE seasoned loan performance data was not made available to MICA). Any Model deficiency in the prediction of seasoned loan performance is important because at any point in time the large majority of loans which the GSEs have credit risk on will be seasoned.

- Model appears to be understating defaults and therefore credit losses and required capital associated with adjustable-rate mortgages (ARMs).

Model vs. BLE

Observations and Findings

MICA wished to verify that the Model produced results that reasonably reflect the BLE. We assessed Model fit to the BLE for the two important modules in determining single-family mortgage cash flows, the prepayment and default module and the loss severity module. To accomplish this, we ran several types of new 30-year fixed-rate mortgages through the replicated Model for a stress period beginning January 1, 1984 using the actual BLE interest rate path. We then compared predicted cumulative default rate, average severity rate, loss rate, and cumulative prepayment rate, by LTV group, to the BLE. Figure 9 presents our comparison. Figure 10 presents the Model results expressed as a percentage of the appropriate BLE value.

Figure 9

	Cumulative Default Rate			Average Severity Rate			Cumulative Loss Rate			Cumulative Prepayment Rate	
LTV	BLE	Model		BLE	Model		BLE	Model		BLE	Model
60	2.22%	0.27%		43.5%	44.0%		0.97%	0.12%		92.3%	97.5%
70	3.54%	2.10%		46.2%	52.0%		1.64%	1.09%		89.6%	94.9%
75	7.87%	5.84%		50.1%	55.1%		3.94%	3.22%		84.5%	90.5%
80	9.39%	9.10%		58.9%	58.0%		5.53%	5.28%		82.2%	86.5%
85	12.02%	15.98%		55.0%	61.3%		6.61%	9.79%		75.7%	77.5%
90	17.74%	20.64%		60.2%	64.4%		10.68%	13.29%		69.5%	71.7%
95	26.39%	28.42%		69.0%	67.0%		18.21%	19.05%		57.6%	63.2%

Source for BLE data: OFHEO

Figure 10

LTV	Cumulative Default Rate	Average Severity Rate	Cumulative Loss Rate	Prepayment Rate
60	12%	101%	13%	106%
70	59%	113%	67%	106%
75	74%	110%	82%	107%
80	97%	98%	95%	105%
85	133%	111%	148%	102%
90	116%	107%	124%	103%
95	108%	97%	105%	110%

MICA makes the following observations about these results:

- Cumulative default rate is extremely low relative to the BLE for low LTV loans, and is overestimated for high LTV loans. The default rate produced by the Model for LTVs less than 60 percent is 12 percent of the BLE rate, while the rate for LTVs between 80 percent and 85 percent is 33 percent higher than the BLE rate.

- Severity rates produced by the Model are reasonably close to BLE severity rates, with no discernable trend by LTV.

- The resulting cumulative loss rates, due to the bias in default rates, are also significantly understated for low LTV loans. The Model loss rate for under 60 percent LTV loans is only 13 percent of the BLE rate, while the loss rate for 80-85 percent LTV loans is 48 percent higher than the BLE rate.

- Prepayment rates produced by the Model are reasonably close to BLE prepayment rates, with no discernable trend by LTV.

The bias exhibited by the Model in loss rates is a serious problem for two reasons. First, the bias will result in an incorrect forecast of credit loss amounts for any mix of business by LTV that differs from the mix implicit in the BLE data. Second, the bias creates excessive capital requirements for high-LTV loans and insufficient capital requirements for low-LTV loans.

**Figure 11: Federal Housing Finance Board (FHFB Survey) —
Conventional Purchase Loans**
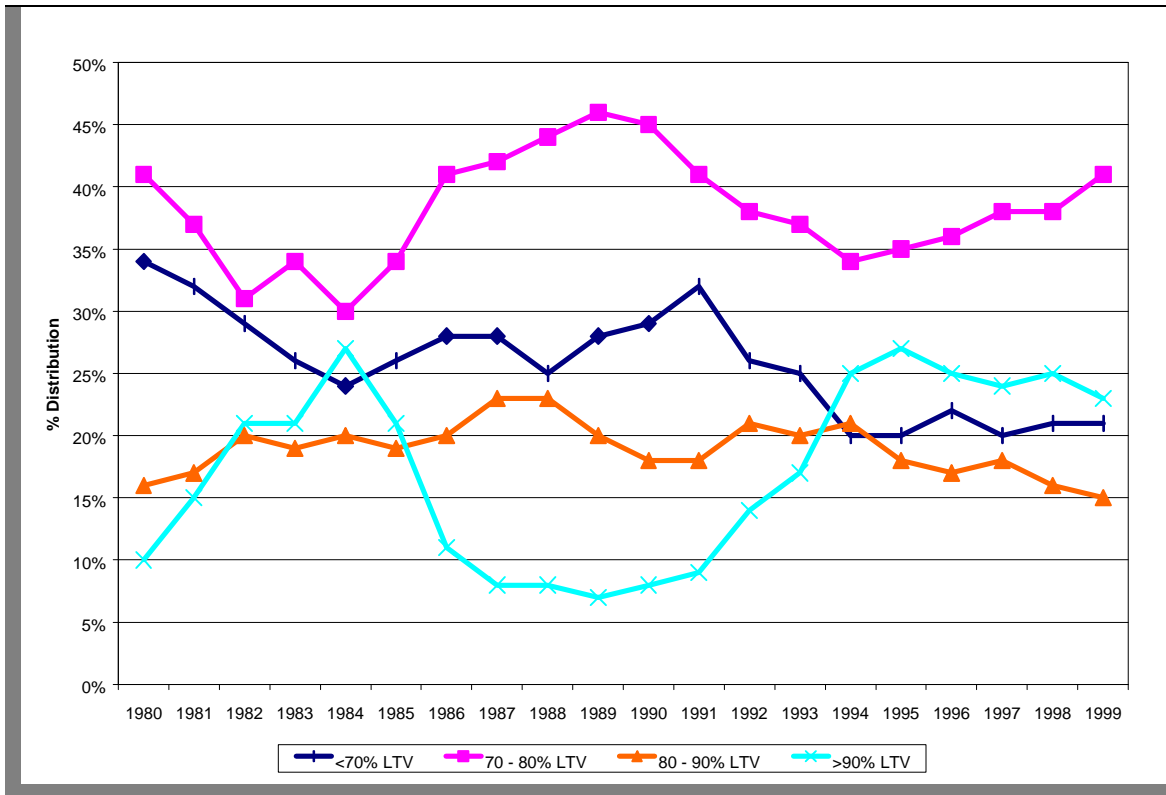
OFHEO calibrated the Model to overall defaults for the BLE. Because of the bias by LTV, the calibration is only accurate for the specific BLE LTV distribution of loans. For any other distribution, the calibration will no longer be valid. This would not be an issue if mix of business by LTV for the GSEs was stable. However, the mix of LTVs varies considerably over time. Figure 11 depicts the changing LTV composition of new, conventional purchase mortgage originations from 1980 through 1999. For example, the share of originations represented by LTVs over 90 percent rose from approximately 7 percent in 1989 to 27 percent in 1995. Given such variance in the distribution of loans by LTV group, the need for more accurate estimates of credit losses by LTV group is essential to the correct calculation of overall required capital.

The other obvious impact of the failure of the Model to match BLE default rates by LTV group is on LTV group marginal capital requirements. The Model-produced credit losses for less than 60 percent LTV loans are only 13 percent of the BLE 60 percent LTV credit losses. Therefore, the capital required for those loans will be severely understated. At the other end, the Model produces significantly higher credit losses for high-LTV loans than it should. The GSEs will therefore be required to hold more capital on high-LTV loans than they should, relative to low LTV loans. As a result, the GSEs will be incented to minimize high-LTV lending or charge higher guarantee fees for high LTV loans. In either case, the end result is that high-LTV loans will be more expensive to the consumer. High-LTV lending is critical for new homebuyers and affordable housing, so this bias is in conflict with the GSEs' mission.

MICA also ran the Model to calculate projected credit losses in the up and down-interest-rate scenarios and compared them to Model credit losses using the actual interest rate path during the BLE period.[22] Figure 12 illustrates cumulative credit loss rates, by LTV, for the BLE and the Model in actual, down, and up-rate scenarios. It is apparent that credit losses are, in general, *reduced* under both the up- and down-rate scenarios for new 30-year fixed-rate mortgages (FRMs). In fact, using the hypothetical LTV distribution from NPR1, total expected credit losses are 4.4 percent in the down-rate scenario and 5.1 percent in the up-rate scenario. These compare to 6.2 percent for the BLE and 6.8 percent for the Model using the actual BLE interest rate path.

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[22] Up- and down-rate scenarios were also run using a January 1, 1984 stress test start date.

**Figure 12: Cumulative Loss Rate Before MI —
Original OFHEO Model**
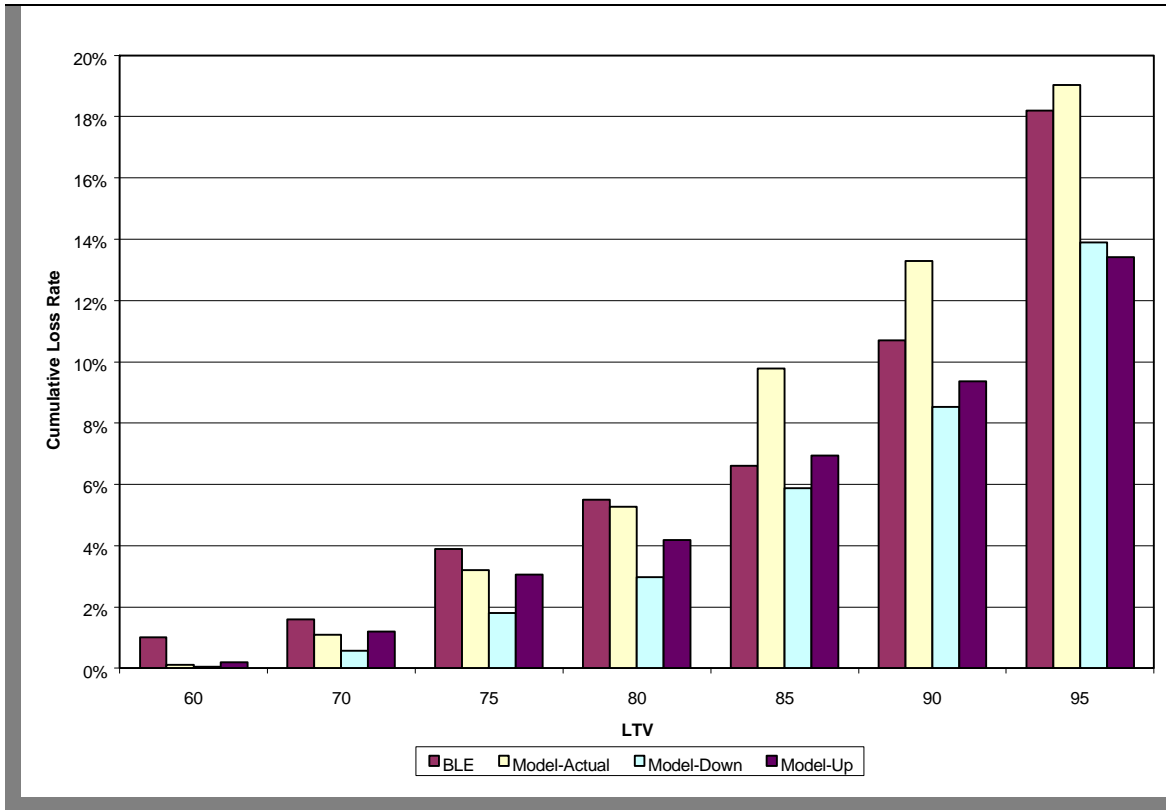
In specifying benchmark loss experience criteria within the Act, Congress clearly intended a conservative level of credit losses for the stress test. However, OFHEO's proposed actual capital-setting stress test, which combines the credit risk stress test with an interest rate stress test of 600 basis points up or 600 basis points down (as required by the 1992 Act), produces a credit loss level that is well below the BLE standard. Therefore, the required capital resulting from the OFHEO stress test will not be sufficient to cover the appropriately high level of credit losses anticipated by Congress in establishing the requirements for the BLE.

Underlying Causes

MICA assessed these findings and the OFHEO Model and determined the following likely causes for the problems noted.

- The HPI used by OFHEO does not adequately reflect the changes in property values that typically occur during a stress period.

- The default and loss severity modules of the Model are calibrated to the BLE in total, rather than by LTV.

- The artificial combination of two distinct economic events in the stress test, a housing market crash and major interest rate movements, created unanticipated results in the application of a joint probability Model.

OFHEO Home Price Index

It is clear that home price appreciation is an important driver of the Model's prepayment, default, and loss severity results. Responses to this driver operate through the probability of negative equity (PNEQ). Errors in the HPI and the degree to which home values fall in the economic stress scenario have a large bearing on both cumulative default and loss severity calculations, and to a lesser degree on prepayments. A small decline in the HPI can push high-LTV loans into a high probability of negative equity (where the value of the property is less than the outstanding loan amount). For low LTV loans, a large decline in the HPI is needed to generate a significant PNEQ.

The OFHEO West South Central (WSC) HPI that is used in the stress test declines by a cumulative 12 percent from the start of the OFHEO stress test. Rating agency "AAA" stress tests assume home price decline levels that are substantially deeper. S&P, for example, assumes a

34.5 percent market value decline. Moody's assumes a 34.4 percent decline in home values while Fitch IBCA's "AAA" market value decline reaches a maximum 38.4 percent. Duff & Phelps assume a range of price declines with a median of 30 percent for all homes and a maximum of 40 percent for defaulted loans. In essence, OFHEO is attempting to achieve a high investment-grade level of credit losses using a stress test home price decline pattern which is significantly milder than rating agency standards.

MICA believes that the reason for the relatively small drop in the OFHEO HPI in the BLE is that the OFHEO HPI series uses only single-family detached sales of homes where the loans were eventually purchased or securitized by the GSEs. The index excludes condos, planned-unit developments (PUDs), 2- to 4-family homes, and most importantly excludes foreclosure sales. In Southern California in the mid-90s, foreclosed properties accounted for over 30 percent of the Multiple Listing Service (MLS) listings during the worst years of the downturn. It is reasonable to assume that a similar relationship held true for the 1980s in the West South Central region. To exclude sales of such properties clearly would bias upward any resulting HPI.

The PNEQ variable combines with this limited HPI decline to underestimate defaults and loss severity on low LTV loans in the Model. First, PNEQ is a cumulative normal distribution function of the natural log of LTV. Second, rather than entering the Model as a continuous number, its PNEQ is categorized into eight levels. The result is that PNEQ is insensitive at very high LTVs, highly sensitive at middle LTVs, and insensitive again at very low LTVs. Because of the limited downward movement of the OFHEO HPI, only loans that start out at relatively high LTVs will have a high enough PNEQ to generate significant defaults. A deeper downward home price movement, similar to that used by the rating agencies, would bring even low LTV loans into the range of PNEQ where it can have its proper effect.

Model Calibration

MICA believes that OFHEO needed to recalibrate the Model to the BLE with single calibration terms in part because of the inadequacy of the OFHEO HPI for expressing typical home price movements in a declining market. Both the default rate and severity rate were adjusted upward by single calibration terms, indicating that the Model originally underestimated losses in the aggregate. A deeper drop in home prices would have produced a higher default rate and average severity, reducing or eliminating the need for calibration. In addition, the single default rate calibration constant failed to correct the bias by LTV in default rates.

Juxtaposition of Risks

MICA believes that the artificial juxtaposition of a housing market crisis and a large movement in interest rates in the OFHEO stress test created a significant unintended consequence. When the Model is applied using the up- and down-interest-rate scenarios, the resulting credit losses are actually lower than they would have been under the actual BLE interest rate path. In the down-rate scenario, loans prepay at an extraordinary rate at the very beginning of the stress period. This significantly reduces the number of loans that default, both through the joint probability specification and especially through the operation of conditional probabilities. The burnout variable turns on earlier in the down-rate scenario than in the actual rate path, but the difference is not enough to bring loss rates back to BLE levels. In the up-rate scenario, prepayment speeds are much lower and default rates are higher. However, no loan groups exhibit burnout in the up-rate scenario, which more than offsets the slower prepayments. In addition, the inflation adjustment to the HPI increases property values, lowering default rates further.

Recommended Solutions

MICA believes it is critical that the risk-based capital Model not discriminate against high-LTV loans (relative to low-LTV loans), and that the Model must produce a credit loss level closer to the BLE regardless of the interest rate environment, which we believe is what Congress originally intended. At the same time, any adjustments to the Model should preserve the relationships between LTV and loss severity, and between LTV and prepayment rate.

In order to correct the problems identified in this section and achieve these goals, MICA created two alternative sets of revisions to the proposed Model. Both approaches have the following revisions in common:

- Removal of the default and loss severity calibration constants;

- Substitution of Moody's "AAA" regional price decline for the BLE — West South Central HPI during the stress period; and

- Addition of new, LTV-based calibration constants.

<u>Approach No. 1</u>

In Approach No. 1, LTV-based calibration constants are added to the default and loss severity equations. The calibration constants are chosen to calibrate the Model in a down-rate scenario to the BLE, rather than calibrating the Model in the actual-rate scenario to the BLE. We chose to recalibrate the Model to the BLE using the down-interest-rate path in this approach because our analysis shows that the down-rate scenario is much more likely to be the actual capital-setting stress test.

The following calibration constants, shown in Figure 13, were used by MICA in Approach No. 1:

LTV	Default Calibration	Severity Calibration
Figure 13		
60	1.250	-0.0417
70	-0.440	-0.0712
75	-0.500	-0.0575
80	-0.210	0.0140
85	-0.240	-0.0439
90	0.180	-0.0067
95	0.390	0.0747

Figure 14 illustrates the effects of Approach No. 1 on loss rates. In this case the loss rates track closely to BLE loss rates by LTV. In the down-rate scenario, loss rates tend to be slightly below BLE rates for each LTV group. In the up-rate scenario, loss rates tend to be slightly above BLE rates for each LTV group. In the actual rate path, loss rates are of course significantly above BLE rates.

**Figure 14: Cumulative Loss Rate Before MI —
OFHEO Model Modified by Approach No. 1**
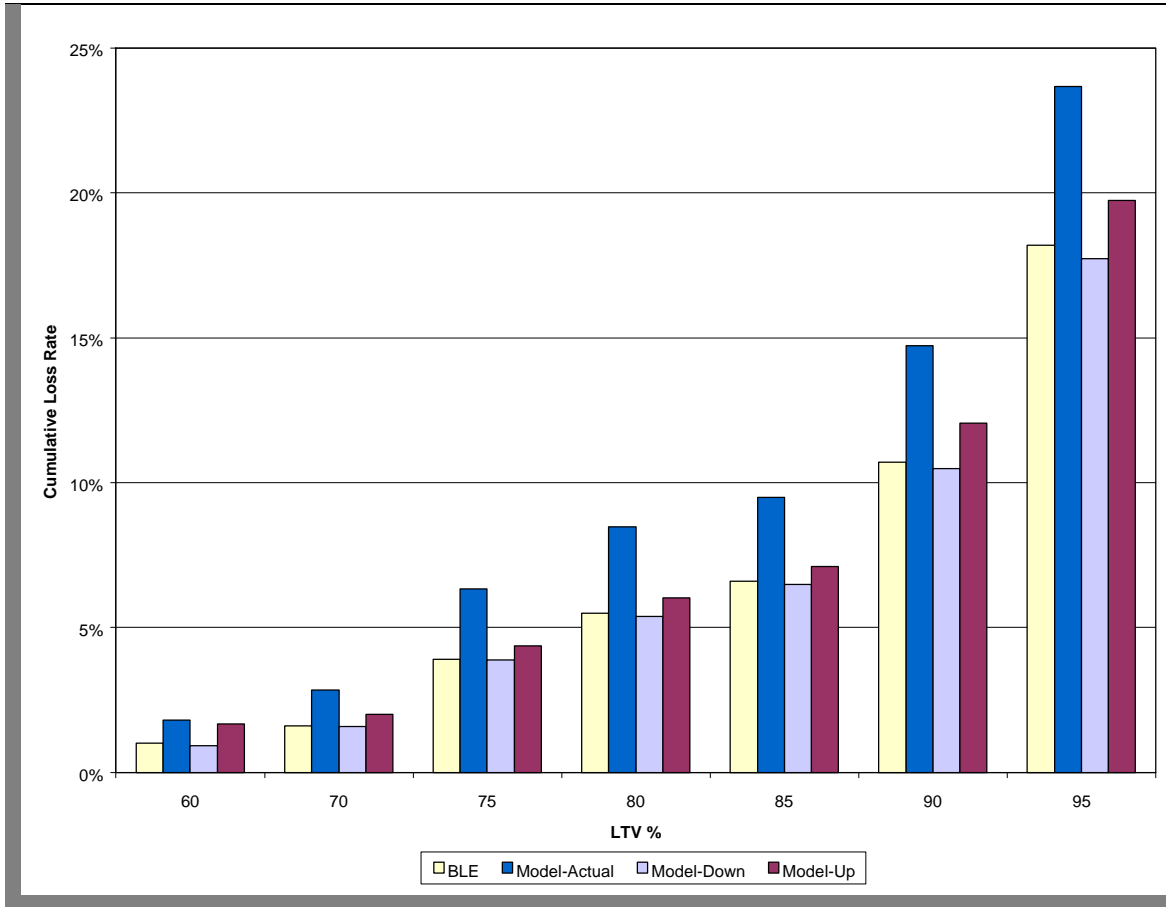
Figure 15 illustrates the effects of Approach No. 1 on prepayment by LTV group. The changes maintain a close correlation between BLE prepayment rates and Model prepayment rates for each LTV.

**Figure 15: Cumulative Prepayment Rates —
OFHEO Model Modified by Approach No. 1**
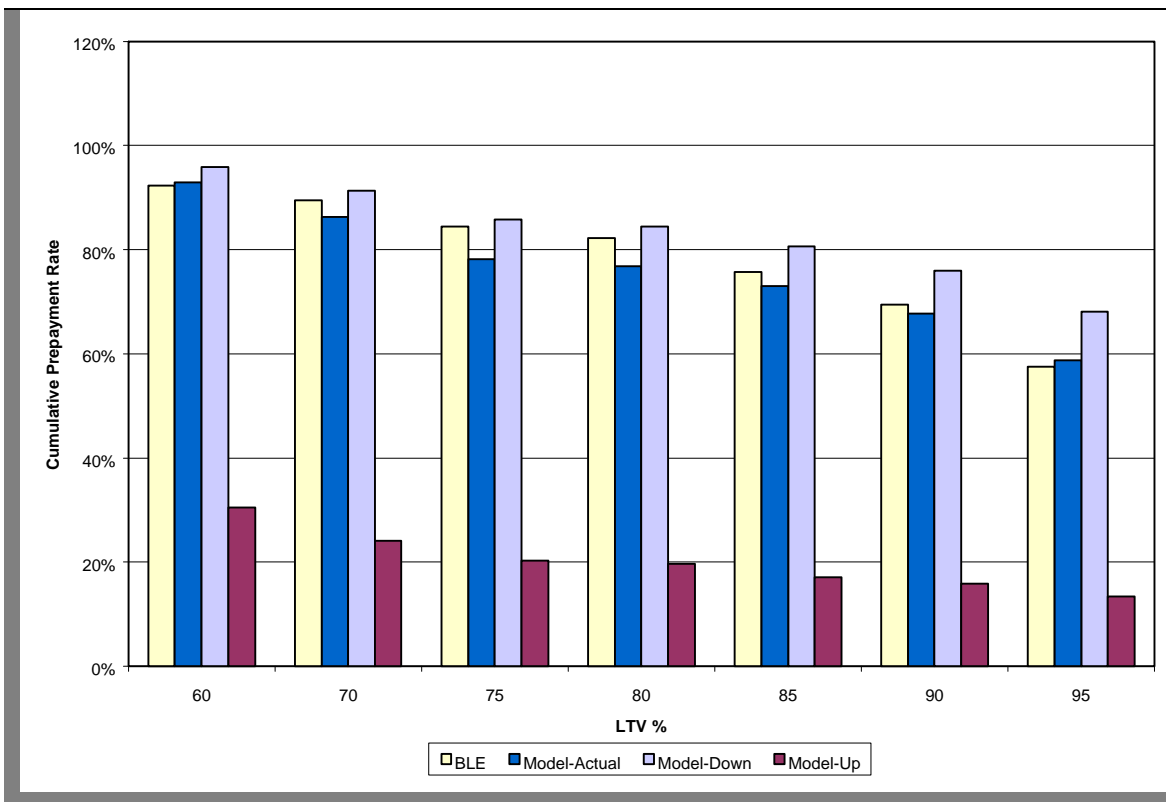
Approach No. 2

In Approach No. 2, MICA estimated calibration constants by LTV group to match the Model results under the actual interest rate environment to the BLE. We also made a small prepayment calibration for high LTV loans. The following calibration constants shown in Figure 16 were used by MICA in Approach No. 2:

Figure 16			
LTV	Default Calibration	Prepay Calibration	Severity Calibration
60	1.250	0.000	-0.0417
70	-0.440	0.000	-0.0712
75	-0.500	0.000	-0.0575
80	-0.210	0.000	0.0140
85	-0.240	0.000	-0.0439
90	0.180	-0.095	-0.0067
95	0.200	-0.285	0.0747

In order to maintain appropriate credit loss levels under the up- and down-rate scenarios, MICA generated monthly cash flows by combining the defaulting UPB amounts from the actual rate environment with the severity and prepayment rates from the up- and down-rate environments. This approach involves a significant change in the Model, but MICA believes it is entirely consistent with the 1992 Act. We believe that Congress intended the stress test mortgage credit loss level be reasonably related to the BLE, regardless of the interest-rate scenario. In addition, rating agency mortgage credit risk stress tests generally specify a level of defaults which is independent of interest rate movement and prepayments. Therefore, in this approach MICA proposes that the level and pattern of credit defaults be the same for both the up- and down-interest-rate stress tests in order to remain reasonably related to the benchmark loss

experience. Loss severity is affected by the level of carrying costs and, therefore, is adjusted to fit the separate interest-rate scenarios.

In order to use this approach, MICA proposes that defaulting UPB amounts be estimated based on a decline in interest rates that is proportional to the pattern of interest rate movement between 1984 and 1993 (the BLE period). The amount of defaulting UPB by month would be used in both the up- and down-scenarios. Prepayments would vary by the appropriate interest-rate scenario. The periodic probability of prepayment would be estimated under the separate up- and down-interest-rate scenarios as in the original Model.

Thus, in Approach No. 2, loans outstanding by period (used in determining revenue flows in each interest-rate scenario) are calculated as follows:

- Subtract the appropriate period defaulting UPB from the beginning of the period loan balance by loan group;

- Apply the probability of prepayments as estimated by the appropriate up- or down-interest-rate scenario to the beginning balance and subtracting that amount;

- Subtract the normal amortization of loans neither defaulting nor prepaying.

At each of these steps, if the principal balance is less than the amount to be subtracted, the principal balance is set to zero and all subsequent prepay, default, and principal payment amounts are set to zero. MICA recognizes that this approach can lead to actuarial inconsistencies. In the down-rate scenario, high prepayment rates coupled with the fixed default amounts can produce balances which decline to zero, preventing the loan group from developing all of the defaults. In practice, however, the prepayment rates in the proportional interest rate path are close enough to those in the down scenario that this effect is insignificant.

In this manner, the MICA proposal links the requirement that credit losses be reasonably related to the BLE, while permitting prepayments to alter both interest income and interest expense to satisfy the interest rate stress requirements. Figure 17 illustrates the cumulative default rates by LTV group for the Model as modified by Approach No. 2. The default rate for each LTV group closely matches the BLE in every interest-rate scenario. Figure 18 on page 76 illustrates the cumulative prepayment rates by LTV group for Approach No. 2. Using the actual rate path, prepayments still closely match the BLE for each LTV group.

**Figure 17: Cumulative Default Rate —
OFHEO Model Modified by Approach No. 2**
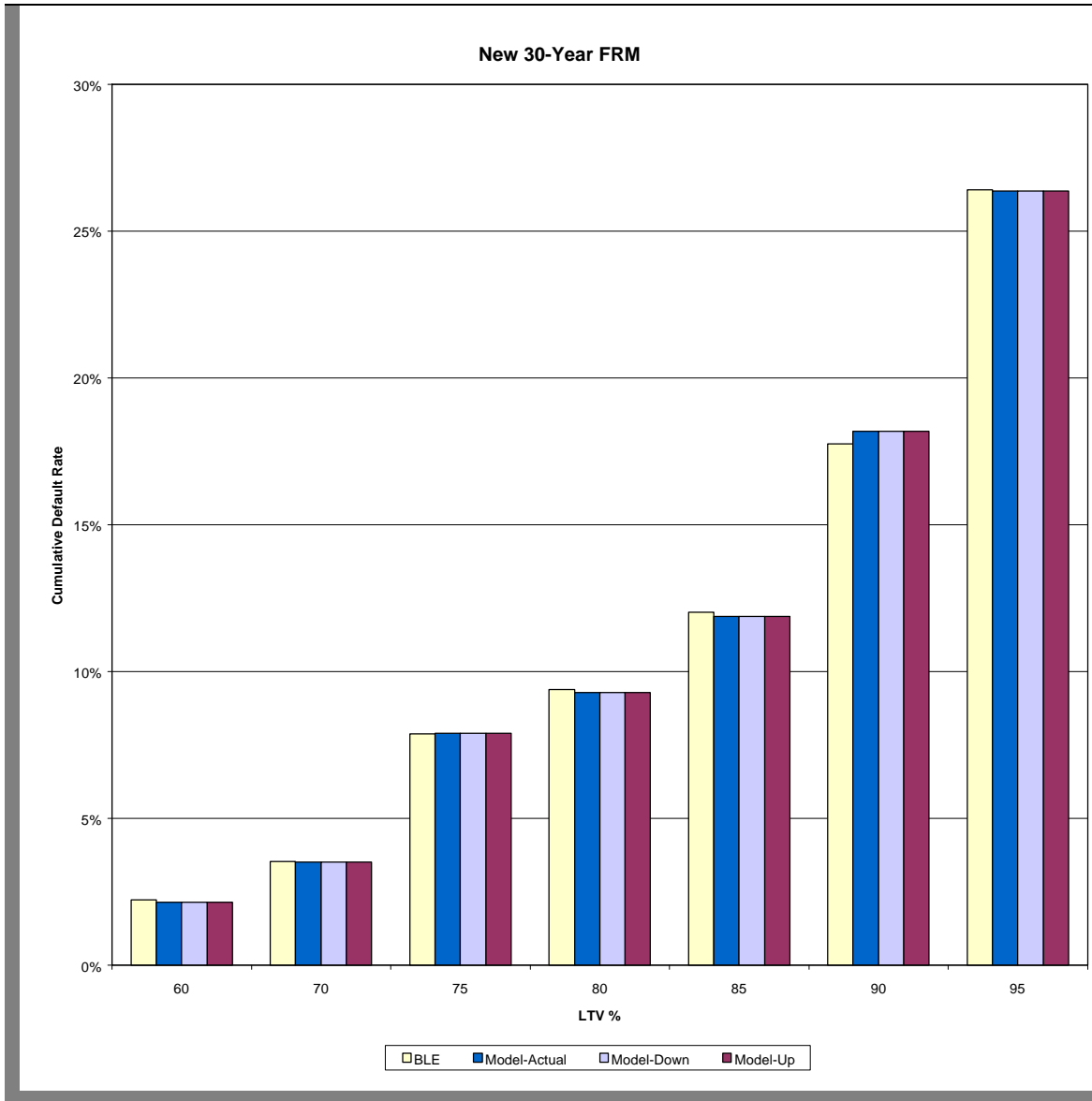
**Figure 18: Cumulative Prepayment Rates —
OFHEO Model Modified by Approach No. 2**
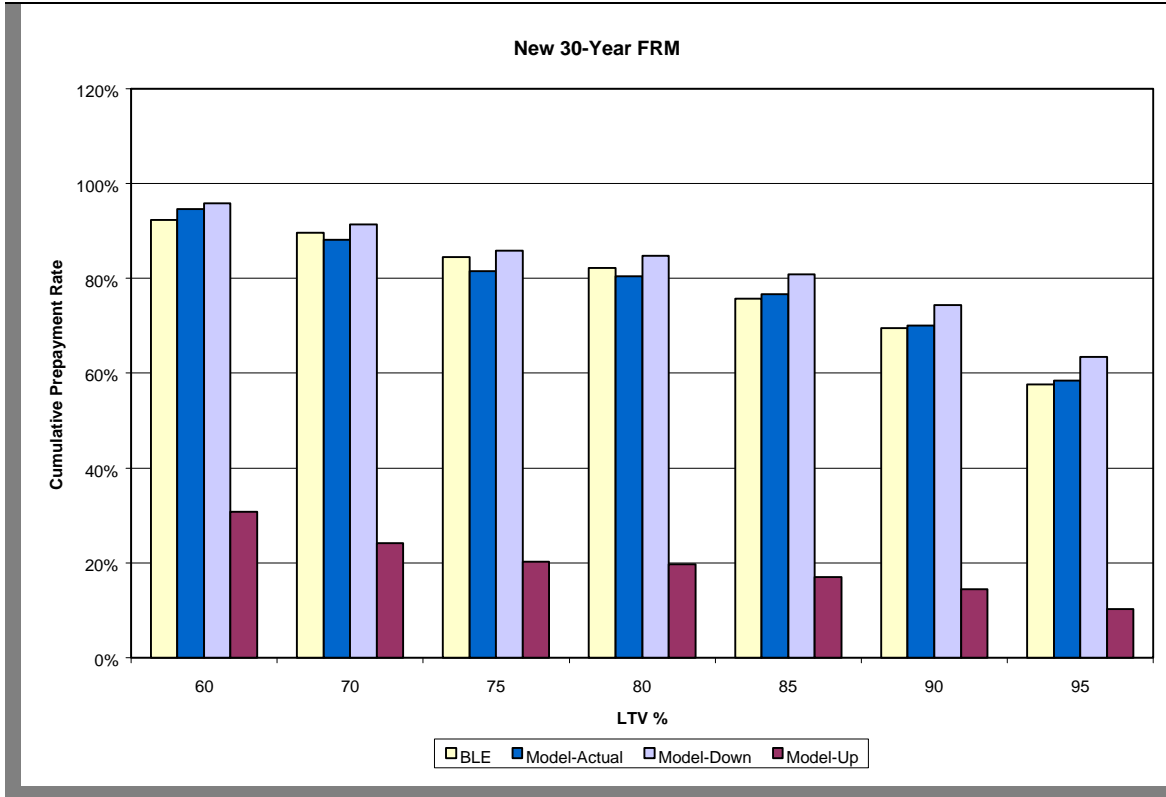
Comparison of Approach No. 1 and Approach No. 2

The two approaches suggested by MICA use the same technique to resolve the issue of biased loss estimates by LTV. In both cases, MICA proposes to eliminate the single calibration constants in the default and loss severity equations, use a 'AAA' home price decline pattern during the stress period, and adopt LTV-specific calibration constants in the default and loss-severity equations. Figure 19 shows the average losses for the BLE, the original Model, and the two approaches proposed by MICA. Both approaches eliminate the biased LTV credit loss results and ensure that the Model will produce accurate capital requirements regardless of the GSEs' mix of business by LTV.

Figure 19: Cumulative Loss Rate Before MI
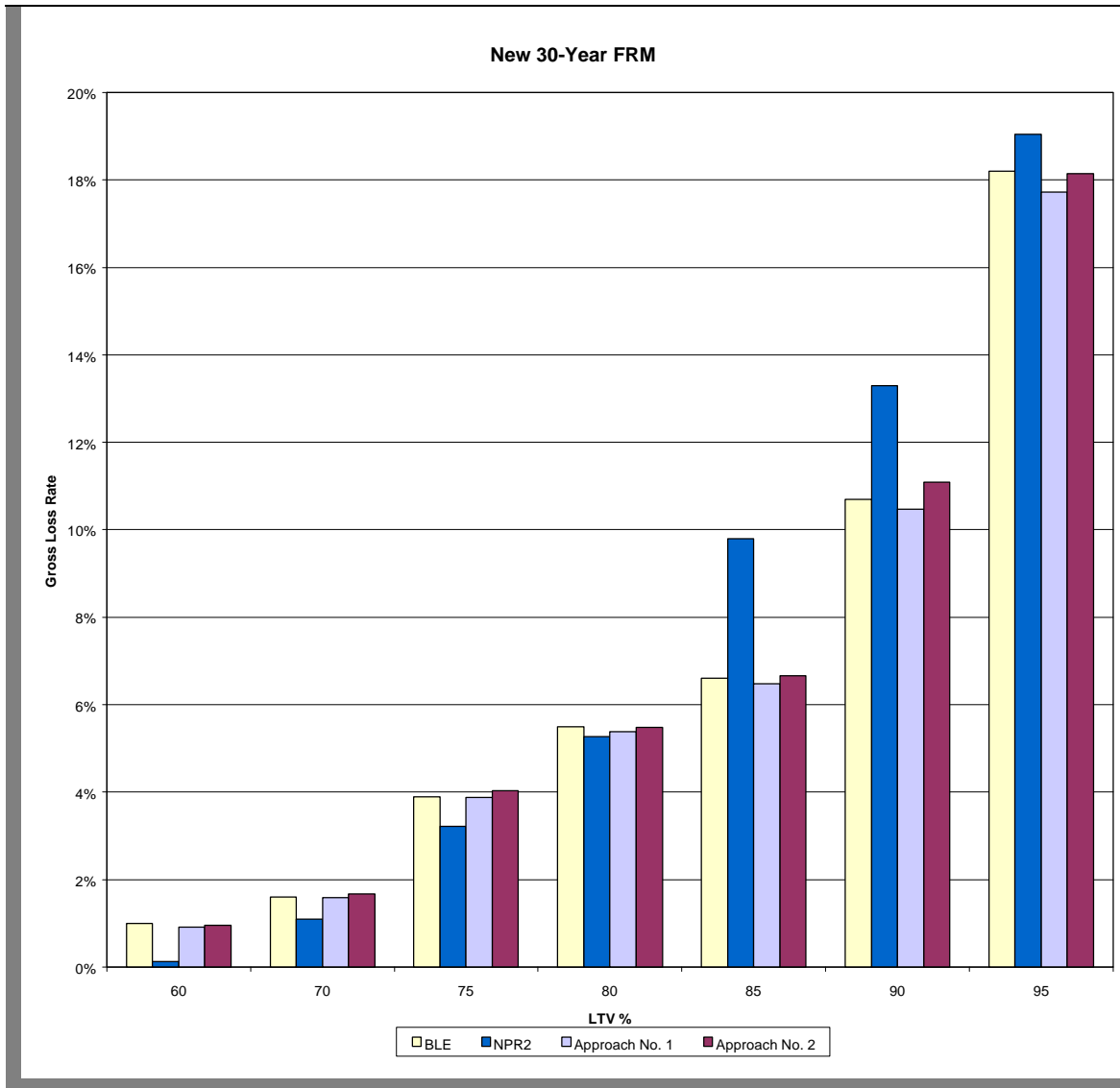
Where the two approaches differ is in the resolution of the low credit losses produced by the up- and down-rate scenarios. In Approach No. 1, the default module is calibrated to produce BLE losses using the down-interest-rate scenario. In Approach No. 2, the default module is calibrated to produce BLE losses using the same interest rate path as the BLE. Then, the defaults

calculated from that same interest rate path are carried over to both the up- and down-rate scenarios. As illustrated in Figure 14 and Figure 17, both approaches generate losses that relate well to the BLE under either the down- or up- scenario. In Approach No. 1, however, the losses exceed the BLE when using the actual interest rate path. Given that the Act calls for the use of the up- and down-interest-rate scenarios as the actual capital-setting stress tests, however, MICA believes that both approaches yield results that are consistent with the statute's requirement that credit losses in the stress test be reasonably related to the BLE.

From an implementation perspective, Approach No. 1 is easier to accomplish. To make the changes needed for Approach No. 1, OFHEO only needs to insert new calibration constants into the Models. MICA has estimated approximate values for these constants; with more time, they could be estimated more accurately. The changes necessary for Approach No. 2 are somewhat more complicated. OFHEO would have to add a third interest-rate scenario to match the proportional interest rate change path of the BLE period. Then, OFHEO would have to revise the cash flow portion of the Model to use the defaulting UPB amounts from the proportional-rate scenario to project up- and down-rate scenario cash flows.

Effect of Model Revisions on Credit Losses Under Average Conditions

Given the unique economic environment of the BLE, MICA also assessed the performance of the Model under long-run average conditions. The purpose of this analysis is to examine the credit losses produced by the Model, as proposed by OFHEO and as modified by MICA, under typical starting conditions. The long-run average conditions are characterized by steady interest rates (8.0 percent for conventional 30-year FRM) and steadily increasing home prices (4.6 percent per year). MICA estimated credit loss rates before MI, by LTV, under such economic assumptions for the OFHEO Model, MICA Approach No. 1, and MICA Approach No. 2. The analysis is for newly originated, 30-year FRMs sold into mortgage-backed securities (MBS).

**Figure 20: Cumulative Loss Rates Under Long-Run Average Conditions —
Down-rate Scenario**
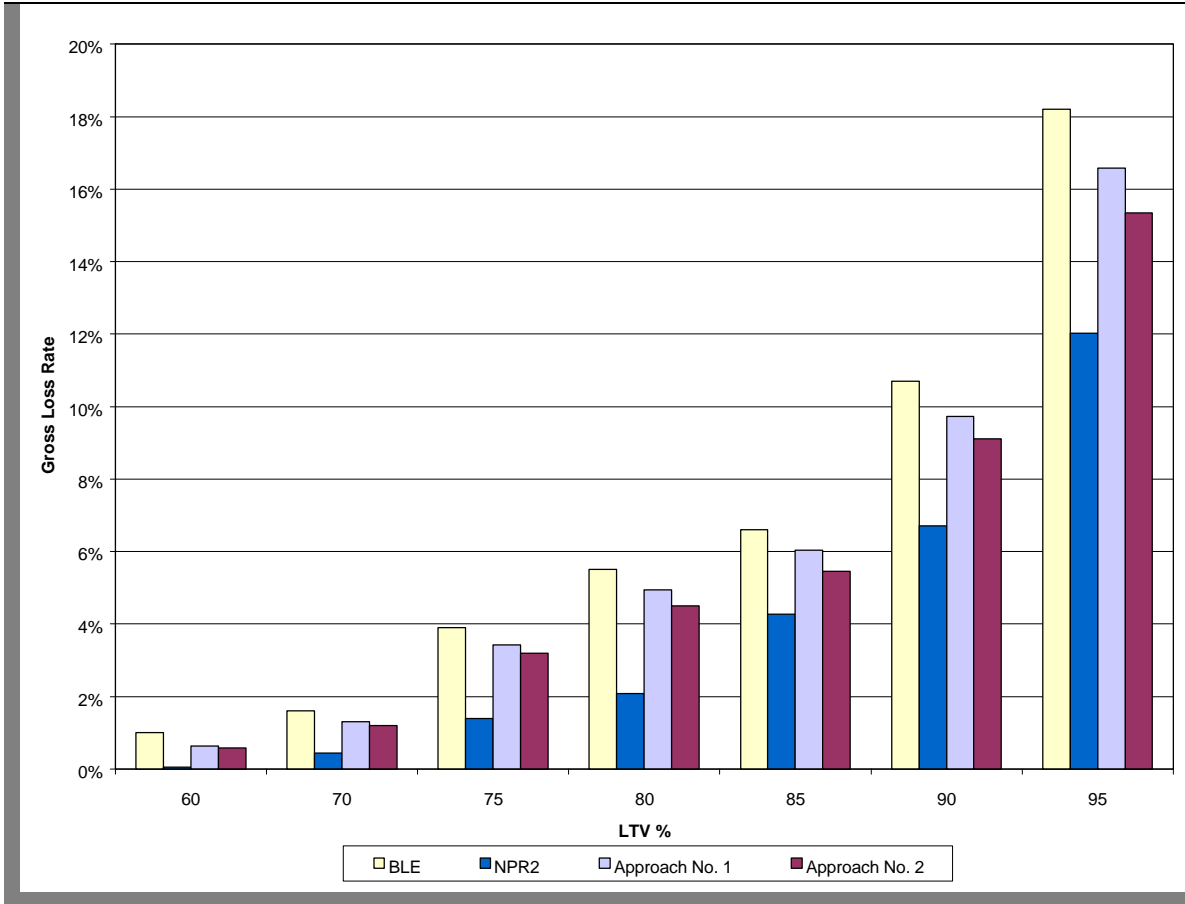
**Figure 21: Cumulative Loss Rates Under Long-Run Average Conditions —
Up-rate Scenario**
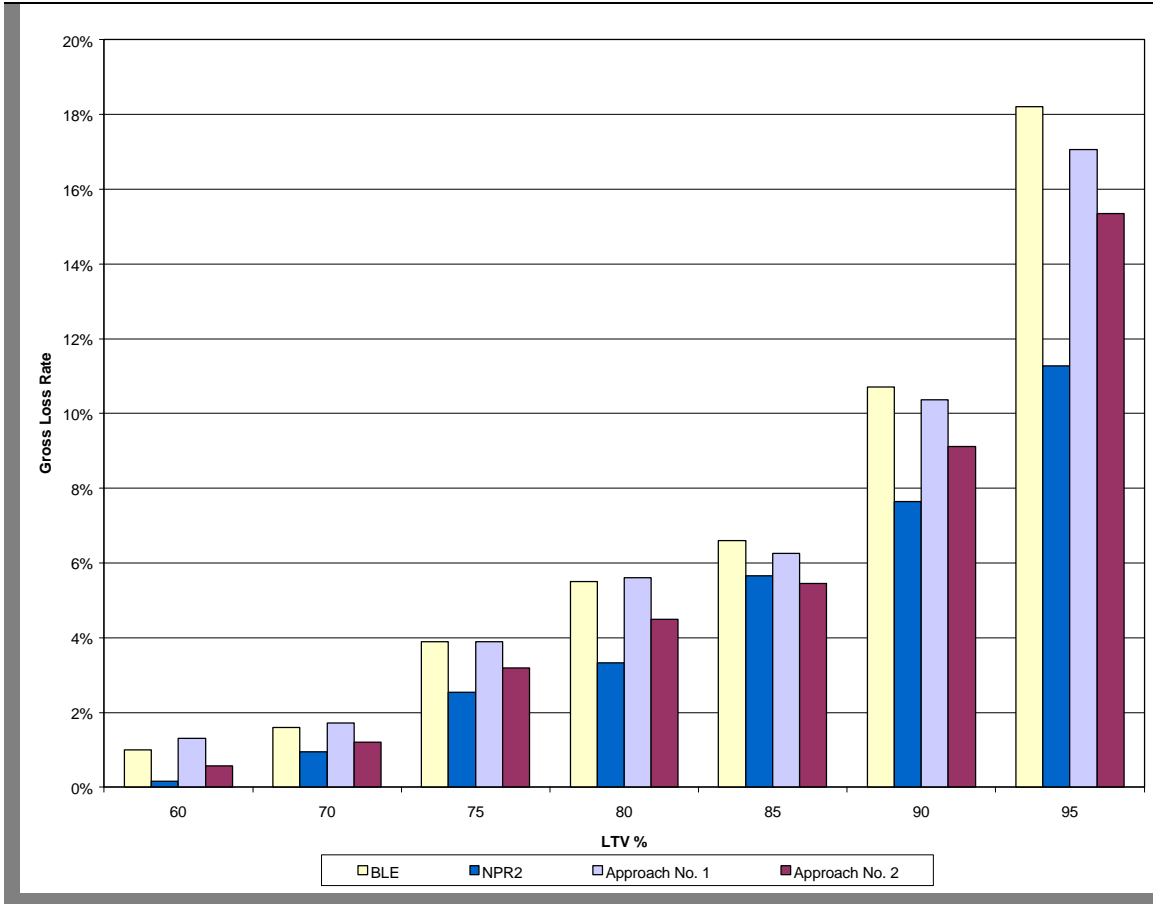
The graphs in Figures 20 and 21 show that, under long-run average home price increase
and interest rate conditions (which are more similar to the current economic and market
environment than the pre-BLE period is), the Model as proposed by OFHEO generates
substantially lower credit losses than the BLE. The MICA-revised Models generate lower than
BLE credit losses under these assumptions, but still significantly higher and closer to the BLE
than the credit losses produced by the original OFHEO Model under the same assumptions. Just

as important, the MICA-revised Models produce projected credit losses across LTV categories which are consistent with the LTV credit loss relationship observed in the BLE.

Procyclicality

Observation and Findings

In our response to NPR1, MICA expressed a concern that the use of a home price index (HPI) point estimate to mark-to-market property values and estimate current LTV at the start of the stress test would introduce undesirable volatility to the capital requirements for the GSEs. To demonstrate this effect, MICA created a portfolio of loans that matched a distribution across seasoning and LTV for conventional, conforming, fixed-rate loans in the Mortgage Information Corporation (MIC) database. MIC collects data from numerous large mortgage originators as well as from Fannie Mae and Freddie Mac, so this distribution should be representative of the actual distribution of GSE loans. We tracked this portfolio from 1983 to 1989, in the West South Central census division, to measure the effect of changes in the HPI on required capital.

In the absence of detailed balance sheet information for the GSEs, MICA calculated the "maximum cash deficit" for cash flows generated by the test portfolio. The maximum cash deficit is the most negative monthly cumulative cash flow during the stress period. Monthly cash flow is defined as guarantee fee income less credit losses less operating expenses (0.6 bps of UPB per month). All loans were assumed to be sold into MBS. The maximum cash deficit represents the amount of starting capital required to maintain liquidity, absent any hedging, return on invested capital, taxes or gross-up for operational risks. Thus it serves as a very good proxy for capital requirements where other balance sheet and tax consequences are unknown.

MICA started with the hypothetical portfolio in January 1983, and estimated unpaid principal balances through 1989 using the original OFHEO Model and the actual interest rate path during that period. These estimated unpaid principal balances were then used as starting points in January of each year through 1989. For each of those years, MICA ran the Model on the

hypothetical portfolio and estimated the maximum cash deficit under the up- and down-rate scenarios. The maximum cash deficit in each year was calculated as a percentage of the beginning, 1983 balances to track changing capital requirements over time.

As the portfolio ages and principal balances fall, one would expect that the level of capital required for the portfolio would fall, as well. In fact, as seen in Figure 22, the OFHEO Model as proposed would significantly increase the dollar amount of capital required despite the declining principal balances. The maximum stress test cash deficit projected for the portfolio at January 1985, for example, is over 50 percent greater than the amount projected at January 1983, despite a drop in UPB to 84 percent of the starting amount. In January 1989, six years after the first measurement, the projected maximum cash deficit is still 17 percent greater than the beginning amount, yet UPB is only 36 percent of its original level. It is clear from these results that the projected stress test mortgage cash flows will be highly sensitive to the way OFHEO proposes to use its HPI to estimate current property value and current LTV. While some may argue that required capital should increase because risk has increased, MICA contends that properly established capital requirements should be adequate to cover the assumed home value decline in the stress test. If the GSEs are required to increase the capital held for a shrinking pool of mortgages over the stress test period, then the initial capital requirements must have been too low.

Figure 22: Maximum Cash Deficit as a Percentage of Beginning (1983) Maximum Cash Deficit OFHEO Model as Published
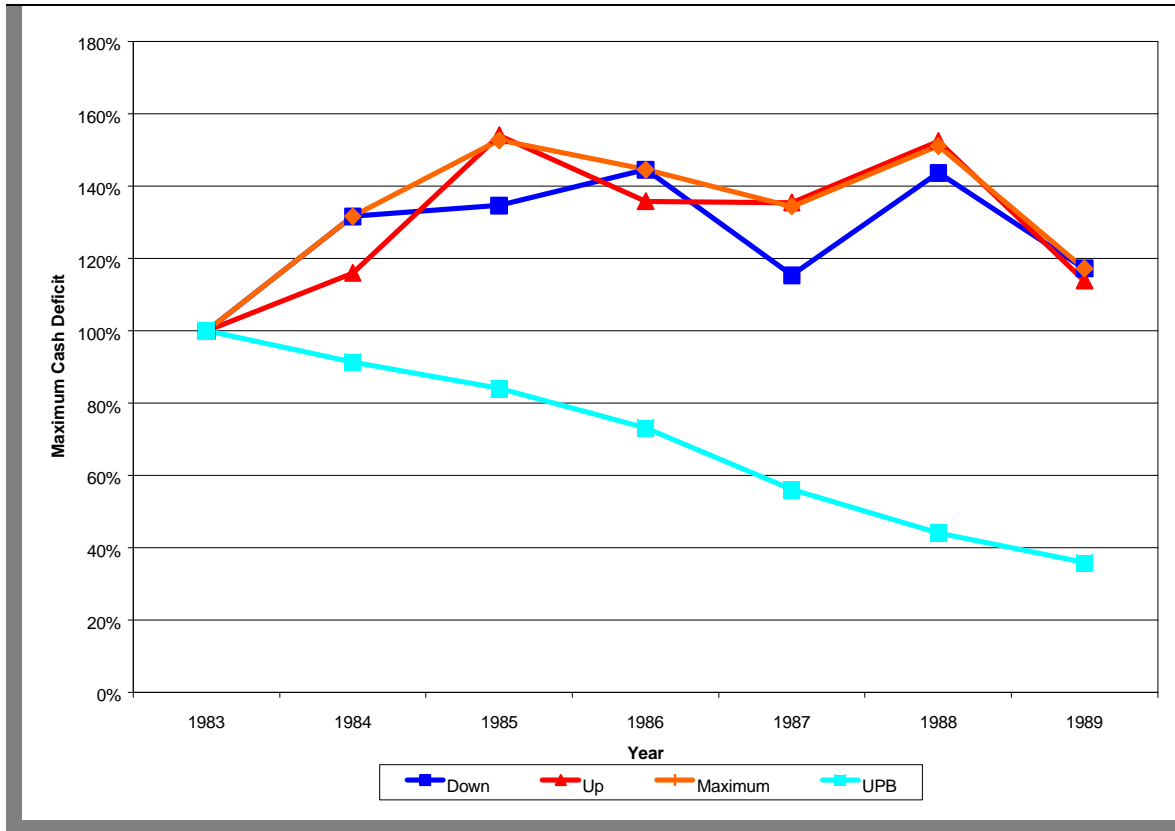
Underlying Causes

The obvious cause of this volatility in required capital is the volatility of current property value and current LTV estimates from application of the underlying HPI. It is well known that housing market declines are generally preceded by sharp increases in home prices. Figure 23 (on page 86) shows the annual changes in the OFHEO HPI for the New England, Pacific, and West South Central census divisions from 1980–1997. Each of these three regions has had a significant housing market decline during the last two decades. As is seen in the graph, each period of decline was preceded by a period of greater-than-average increases in prices. As home prices

increase, the probability of negative equity decreases, which lowers the expected credit losses. When home prices decline, probability of negative equity increases, which raises the expected credit losses. The result is that projected mortgage cash flows are significantly altered as home prices cycle up and down.

In addition to the natural volatility of home prices, there are known flaws in any repeat sales home price index methodology. Specifically, an HPI is subject to revisions, usually downward, as more home sale information is added. The theory behind the repeat-sales approach to home value indexes is that revisions (through the accumulation of additional acquisitions in the GSE series) should lower the standard error of the estimated indexes. It would also imply that large initial samples would make subsequent revisions insignificant in nature. However examinations by John Clapp and Carmelo Giaccotto of several repeat-sales indexes, including the Freddie-Fannie series used by OFHEO, indicate that revisions observed are large, insensitive to sample size, and more likely to be downward than upward.[23] Moreover, such revisions are more likely and indeed larger in regions where there is greater than average home price appreciation.

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[23] "Revisions in Repeat-Sales Price Indexes: Here Today, Gone Tomorrow?" by John M. Clapp and Carmelo Giaccotto, <u>Real Estate Economics</u>, Spring 1999, vol. 27, number 1, pp. 79–104.

**Figure 23: OFHEO Home Price Index
Annual Change**
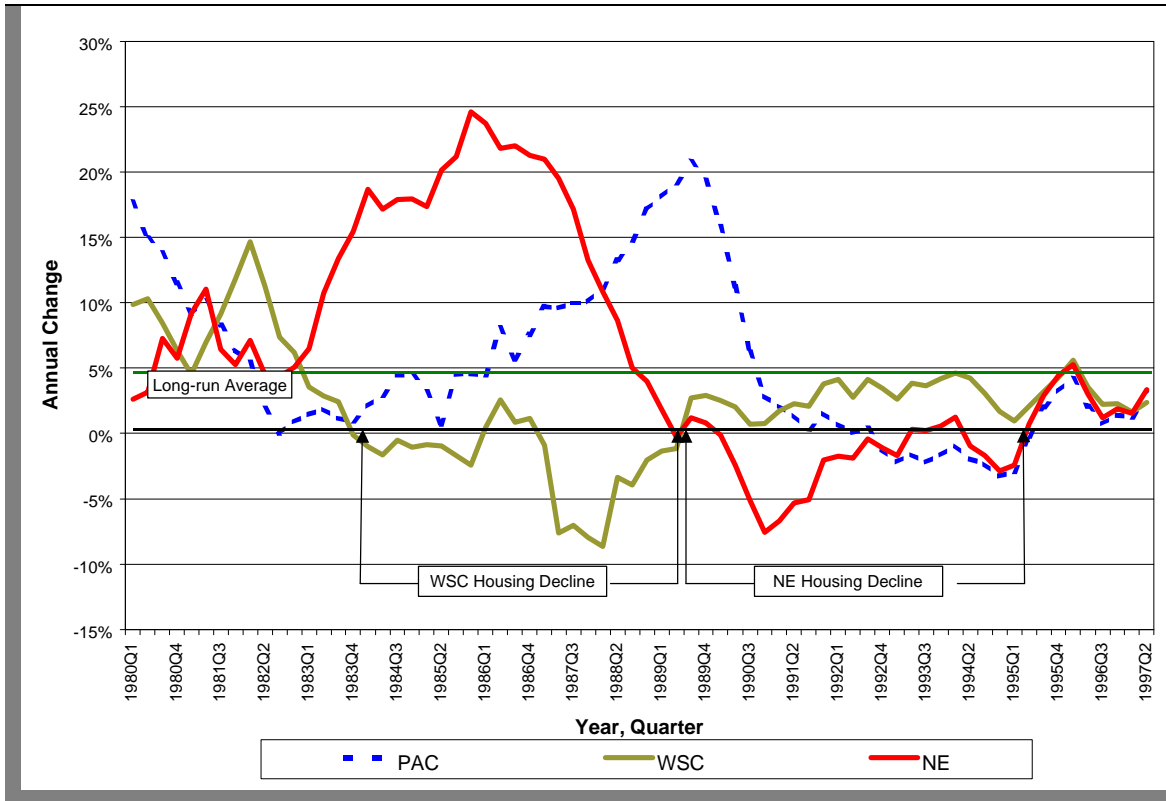
Recommended Solution

MICA recommends that OFHEO use a two-year moving average of the HPI for the purpose of estimating current home values at the start of the stress test. This would dampen both upward and downward short-term trends in home values while allowing longer-run trends to have greater influence. This would also remove most of the revision bias discovered in studies of repeat-sales indexes.

MICA modified their version of the OFHEO Model to use a two-year moving average HPI in the numerator of the ratio that is multiplied against original property value to yield a current property value estimate. We then remeasured changes in capital requirement from 1983-1989. The modification involved generating a two-year moving average HPI series from the OFHEO HPI. The OFHEO HPI begins in 1979Q1. For the first seven quarters, q = 1.7, the moving average is the average of the first q quarters. Thereafter the moving average is the average of the current and seven prior quarters. MICA calculated the relative home value at the start of the stress test by dividing the two-year average HPI value at the beginning of the stress period by the quarterly HPI value at the quarter of origination. While it would seem counterintuitive to use the quarterly HPI value instead of the two-year average value for the origination period in the denominator, MICA believes that this generates more stable capital requirements. During the stress period, property values are calculated relative to the property value at the beginning of the stress period.

The results of this modification are presented in Figure 24, represented by the data for "Two-Year Average." The use of a two-year moving average HPI causes a noticeable smoothing of the capital requirements compared to the Model as proposed by OFHEO. There is a slight increase in capital required between the second and fifth years, but overall the amount decreases as the portfolio ages.

MICA also prepared the same analysis using the Model as modified by MICA Approach No. 1 and Approach No. 2. The results are displayed in Figure 24, represented by the data labeled "MICA Approach No. 1 with 2-Year Average" and "MICA Approach No. 2 with 2-Year Average." The Model, as modified by MICA, produces a more logical, predictable path of projected capital requirements. MICA Approach No. 2 shows a small rise in capital of 7 percent from 1983 to 1984, then another small increase from 1987 to 1988. Other than those two minor increases, capital requirements generally decline as the portfolio ages. MICA Approach No. 1 improves the model further in this respect, providing a path of required capital

that steadily declines as the portfolio ages.

Figure 24: Maximum Cash Deficit as a Percentage of Beginning (1983) Maximum Cash Deficit OFHEO Model as Published Compared to MICA Two-Year Average
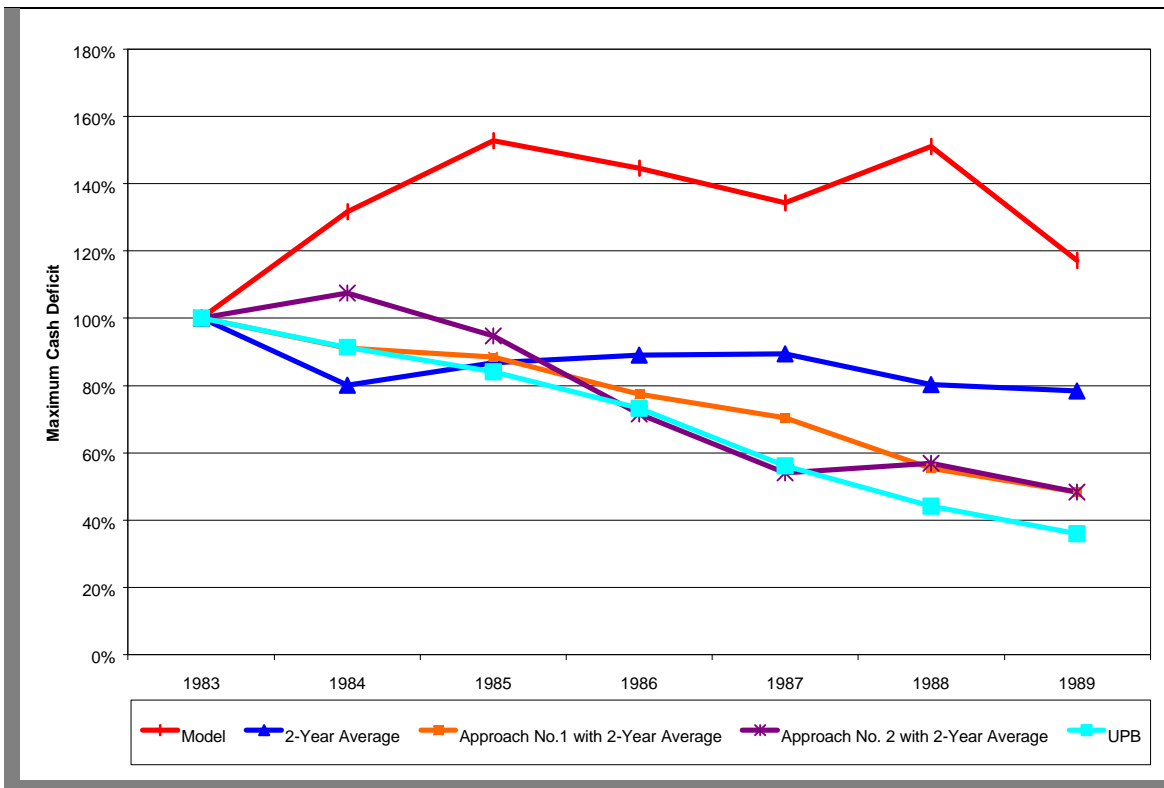
Other Significant Model Findings

MICA found some other Model performance issues which are potentially significant. MICA does not have specific recommendations for resolving these issues, and does not believe that they need to be resolved in order for the Rule to be implemented. Nevertheless, OFHEO should consider addressing these issues in subsequent revisions to the Rule.

Prepay Rates Too High Relative to MI Industry Experience

In the early 1980s the combined market share of Fannie Mae and Freddie Mac was not nearly as high as it is today. Indeed, during the 1983–1984 period, the two GSEs accounted for only 15.4 percent of the non-GNMA program loans outstanding, compared to more than 46 percent by the end of 1999. (See Figure 25.)

Figure 25

	GNMA	FHLMC	FNMA	All Other	GSE Share of	
					Total	Non-GNMA
1980	9.7%	1.7%	5.3%	83.2%	7.1%	7.8%
1983-1984	13.2%	4.9%	8.4%	73.5%	13.3%	15.4%
1999	12.2%	16.6%	24.2%	46.9%	40.8%	46.5%

As the MI industry trade group, MICA keeps historical data that tracks loan performance by location and loan characteristics. This MICA data set is substantially larger than the GSE high-LTV loan sample which comprised a portion of the BLE. Figure 26 compares the four-state BLE mortgage insurance industry prepayment experience for the 1983 and 1984 origination years on a weighted-average basis by LTV group to the OFHEO BLE. BLE loan prepayments are also markedly higher than those experienced by the mortgage insurance industry in the same

geographic region over the same time period. As a result, MICA expects that the OFHEO Model will tend to create prepayments that are too high for high LTV loans.

Figure 26

10 Yr. Cumulative Prepayments	BLE (OK, AR, LA, MS)	MI Industry (OK, AR, LA, MS)
85 LTV	75.7%	51.8%
90 LTV	69.5%	50.2%
95 LTV	57.6%	33.8%

Seasoned Loan Performance

OFHEO did not publish a benchmark default or prepayment experience for seasoned loans. Yet, seasoned loans account for a substantial proportion of GSE MBS guarantees and portfolio exposure, often ranging between 66 percent and 85 percent of total GSE mortgage exposure depending on the degree of refinancing activity in the market. Upon examination of Model estimates versus MI industry experience on seasoned 90 percent LTV and 95 percent LTV loans, it appears that the OFHEO Model may not properly measure default risk for seasoned loans. In Figures 27 and 28, we compare the cumulative default rates generated by the Model to equivalent rates for the BLE for 90 percent and 95 percent LTV loans. We estimated the BLE default rates for seasoned loans by applying the MICA-observed multipliers to the OFHEO BLE default rates for unseasoned loans. For example, in the MICA data for 90 percent LTV loans, loans seasoned one year had a default rate 1 percent higher than unseasoned loans. Therefore, given the BLE default rate of 17.7 percent on unseasoned, 90 percent LTV loans, MICA estimated a default rate of 17.9 percent for the BLE for loans seasoned one year.

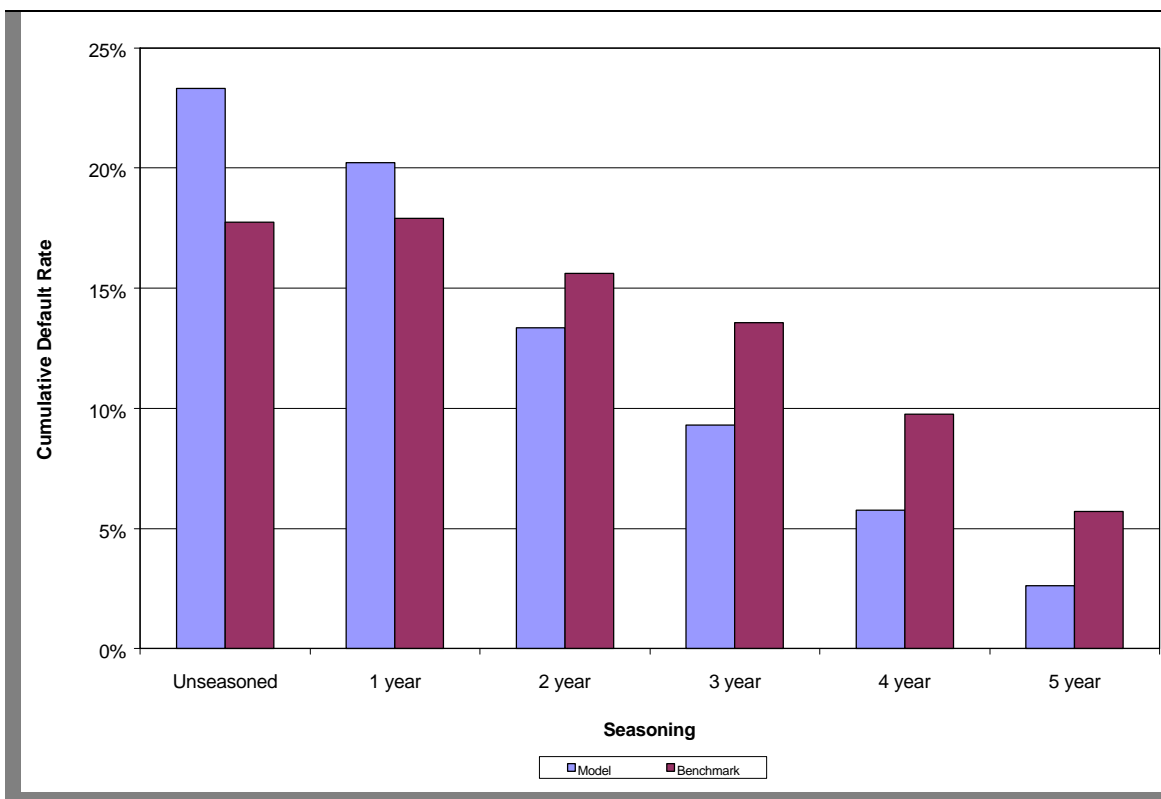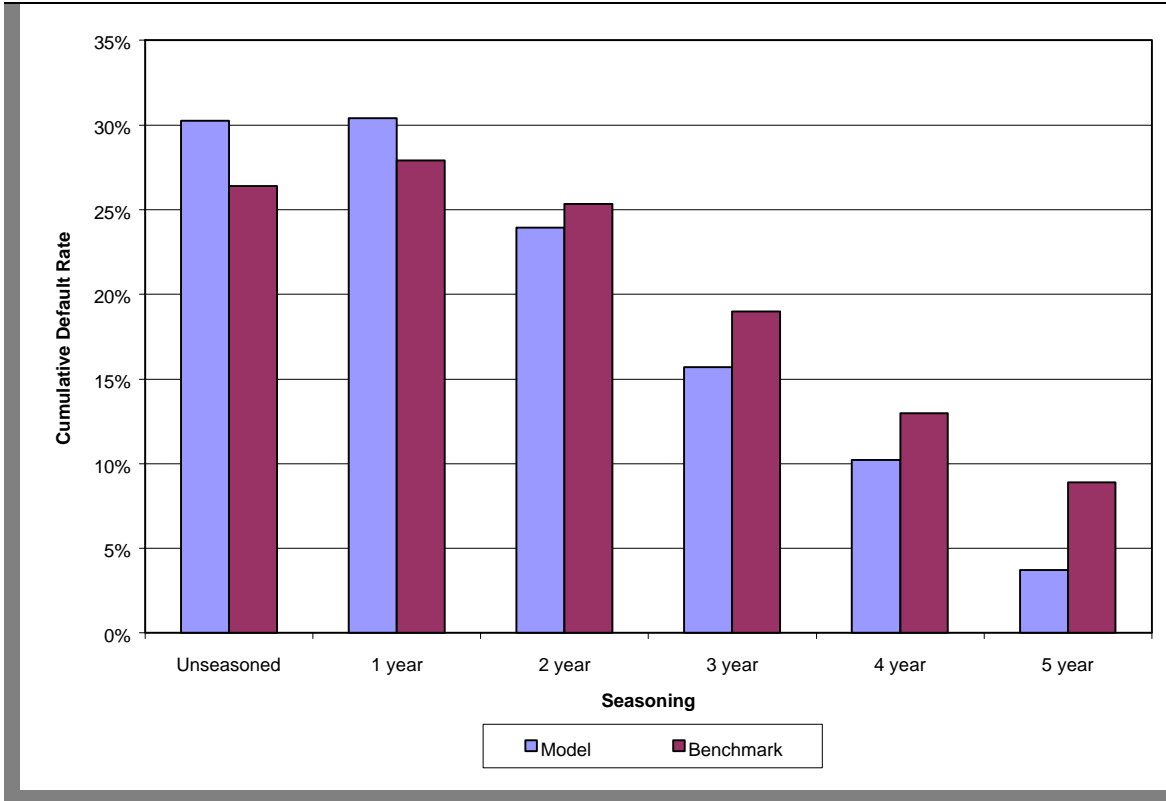**Figure 27: Benchmark 90 Percent LTV Defaults vs. Model Estimates**

Figure 28: Benchmark 95 Percent Defaults vs. Model Estimates

It is apparent from these charts that the Model tends to overestimate defaults on new loans, and progressively underestimate defaults as loans age.

MICA recommends that OFHEO review their specification of the relationship between loan age and probability of default and prepayment. The Model as specified uses a quadratic function of age that declines sharply beyond the fifth year, as illustrated in Figure 29.

Figure 29: OFHEO Model Baseline Conditional Default Rates by Loan Age
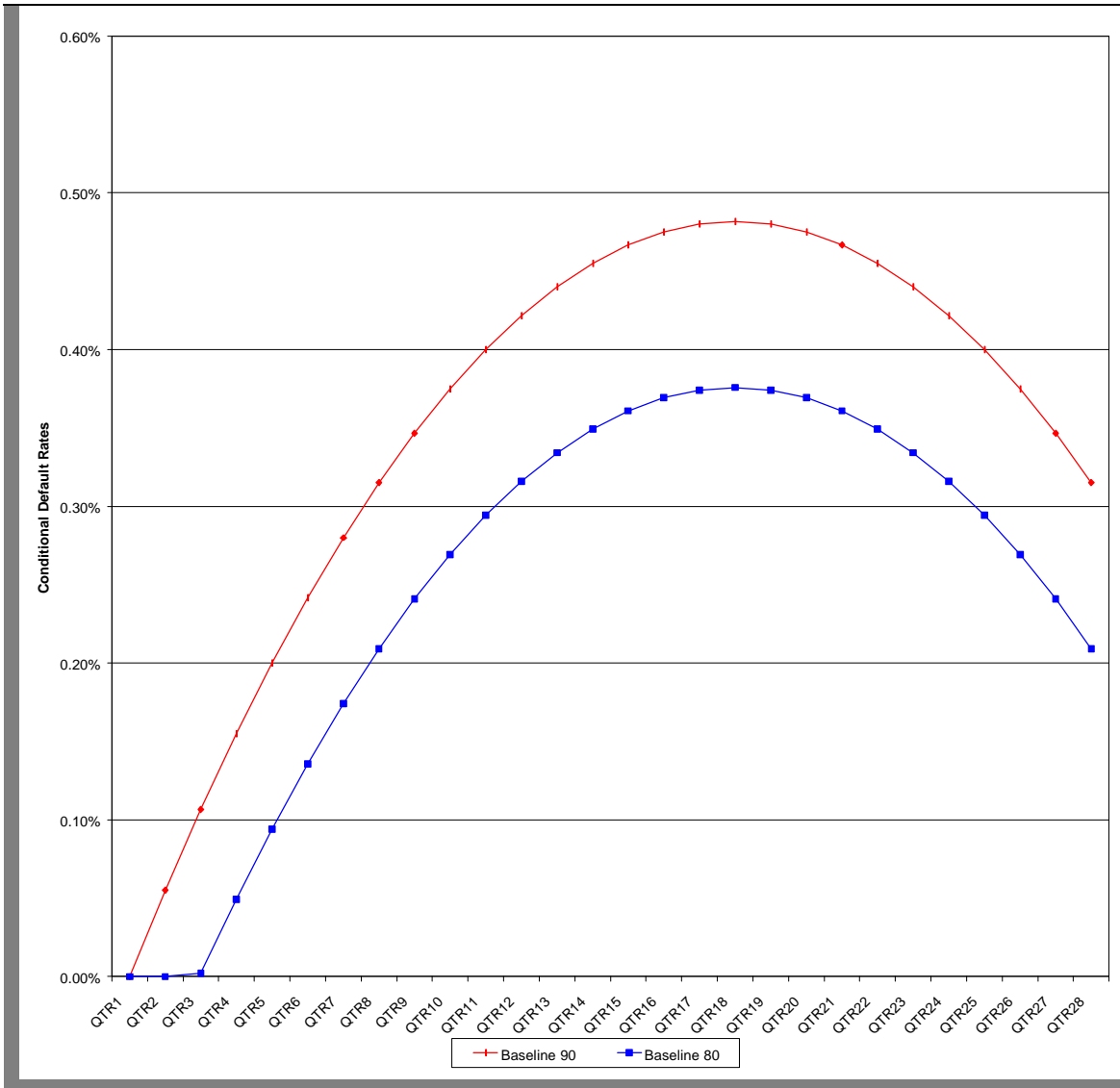

Examination of both MI industry data and data compiled by Mortgage Information Corporation (MIC) on all conventional conforming fixed-rate loans by various LTV groups reveal a different conditional default pattern. The MIC data in Figure 30 depicts quarterly percentages

of loans in foreclosure by LTV for loans originated in 1992. Instead of conditional default rates peaking and then turning lower as suggested by the OFHEO baseline case, conditional default rates for all LTV groups either remained near their 4½-year levels or continued to rise. Analysis of other loan vintages reveals similar results.

Figure 30: Percentage of Loans in Foreclosure by Quarter of Conventional Conforming FRMs Originated in 1992 by LTV
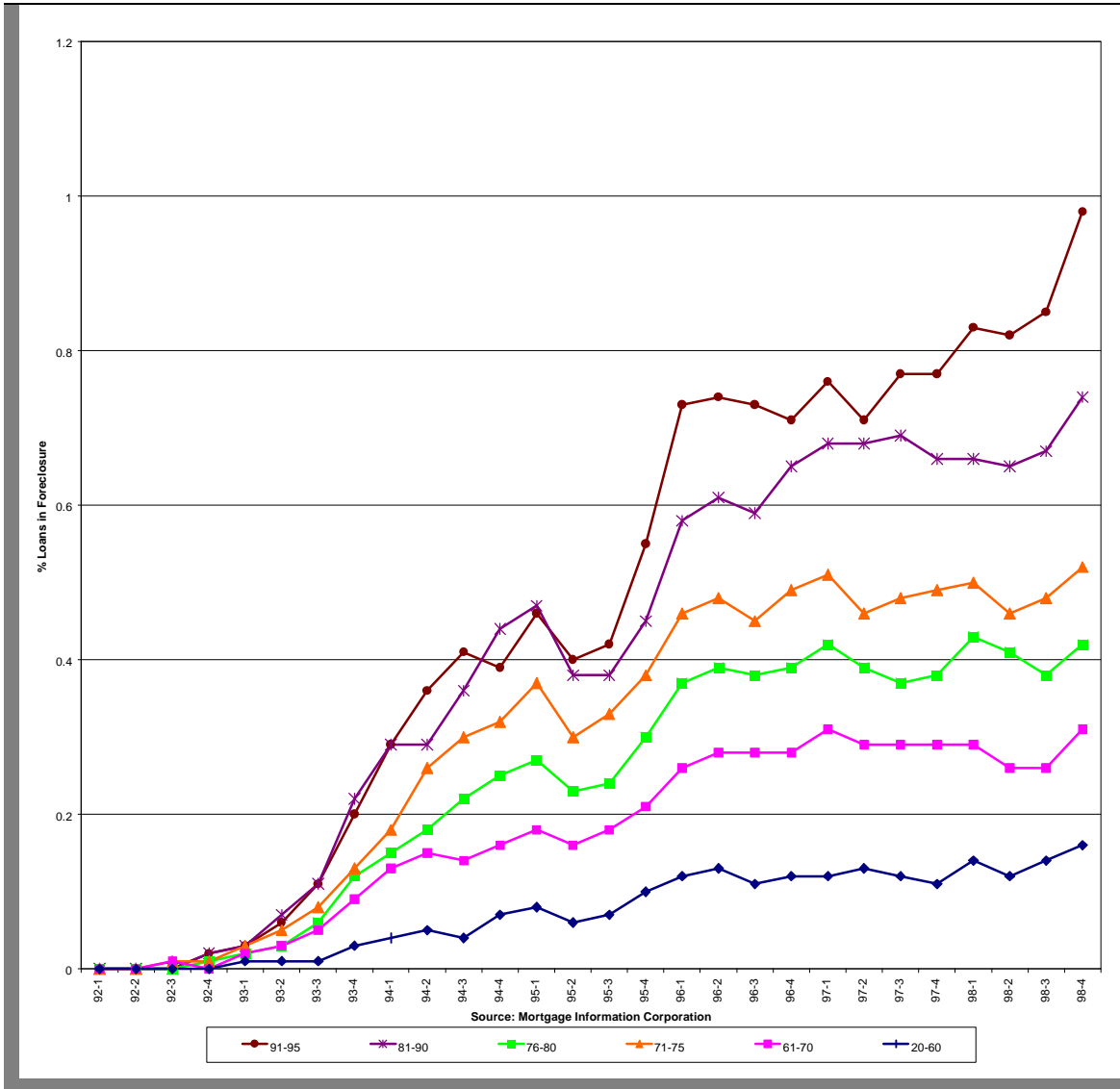
ARM Loans Insensitive to Payment Shock

Examination of ARM performance over time suggests that ARM loan defaults exhibit a 25 percent higher average default risk than fixed-rate loans. However, data also suggest that

when a declining rate environment is combined with falling home prices, high LTV ARM loans may be lower risks than high LTV fixed-rate loans. When home prices are falling, fixed-rate high LTV borrowers cannot refinance their loans to take advantage of lower interest rates. High LTV ARM borrowers, however, get partial relief as payments adjust lower, making it somewhat easier to meet payments. This is sometimes referred to as "payment benefit." "Payment shock" occurs when interest rates rise. Higher rates increase monthly payments relative to income, making it more difficult for ARM borrowers to meet their monthly obligations.

The OFHEO Model features a separate set of coefficients for ARM loans for both the prepayment and default functions. The conditional default function utilizes all of the same variables as the fixed-rate function. For all of the variables the signs and relative sizes of the coefficients tend to move in the same direction and vary only in degree. On the prepayment function we see a similar movement in signs and relative size of coefficients for all variables except the yield curve spread. Here there is a different pattern altogether. The fixed-rate prepayment coefficients have a set pattern for yield curve spread going from a negative effect to a positive one as the yield curve spread gets larger. The ARM coefficients start positive then get negative for spreads between 100 percent and 150 percent, and then go negative once more for spreads over 150 percent.

Based on this modeling structure, the ARM portion of the OFHEO Model allows interest rate changes to affect conditional prepayments, but not conditional defaults except through the joint probability Model. Consequently, there is no measure of payment benefit or payment shock. We suggest that OFHEO consider improving the Model to take these variables into account.

Miscellaneous Model Technical Observations

In addition to the previously noted issues with the Model, MICA makes the following observations. Like the issues in the previous section, they are not, in the opinion of MICA, of sufficient impact to prevent implementation of the Model. Rather, they are items that MICA recommends OFHEO consider for future refinement of the Model.

UPB Amounts to Zero

The Model, as described in NPR2, allows UPB amounts to fall below zero. This results in calculation errors when calculating PNEQ. The validation data provided to MICA by OFHEO indicates that OFHEO dealt with this issue by holding UPB at the last positive quarterly amount through the remainder of the stress test. Ideally, UPB should decline to zero, then stay at zero for the remainder of the stress period.

ARIMA Models

MICA believes that the use of ARIMA Models for forecasting non-Treasury rates adds unnecessary complication to the Model.

Dropped Variables

OFHEO originally included two variables, SEASON(t) and LOANSIZE in the estimation of the prepay and default modules. For application purposes, they then excluded SEASON(t) and grouped all observations into one LOANSIZE bin. MICA suggests that OFHEO remove the SEASON(t) variable and reestimate the Model. MICA also suggests that OFHEO perform further research on the relationship between loan size and probabilities of prepayment and default. There is a considerable amount of research that proves the theoretical importance of UPB,

especially to prepayment likelihood. Empirical results from modeling by MICA members confirm the theoretical importance of this variable.

OFHEO also explained in NPR2 why they did not use any employment data as an input to the Model. Theoretical and empirical research have proven the importance of employment and unemployment data to forecasting both prepayment and default. The data is readily available from many sources and is easily linked by census division to the loan groups in the Model. MICA recommends that OFHEO reconsider their decision not to include employment as a variable.

Burnout

The simple, binary burnout function employed by OFHEO is, in the opinion of MICA, insufficient to capture the complex relationships between current LTV, economic environment, and the burnout phenomenon. In 1993 interest rates fell to long-term lows, prompting large waves of refinancing. In New England, however, prepayment rates were far slower than expected. Then, in 1995, another downswing in interest rates generated another wave of refinancing. This time, prepayments in New England were far greater than expected. The explanation for this lies in the fact that, in 1993, New England was experiencing a housing decline. In 1995, property values had begun to recover. People who had not refinanced in 1993 were not "burned out"; refinancing then was not an option because their current LTVs were too high. When property values recovered in 1995, those people were able to take advantage of lower rates and lower LTVs and refinance their loans. This is just one example of the ways in which burnout is connected to other variables. MICA recommends that OFHEO research ways to make the burnout variable better capture these relationships.

Operating Expenses

The Model assumes that expenses decline proportionally with loan balances. In a truly stressful environment, expenses associated with REO and loss management would prevent expenses from dropping proportionally.

"Tail" Risk

There exists a potential unrealized loss in the assets and liabilities that remain at the end of the stress period or "risk tail." MICA recommends that OFHEO account for that potential in the Model.

OFHEO Model Replication Validation Process

Employees of several members of MICA performed extensive analyses to ensure the validity of MICA's replication of the Model. OFHEO provided MICA with three sets of data for this purpose. The first set contained intermediate and final calculation results for the prepayment/default module for 43 loan groups, covering all loan types and LTV groups, for several different loan ages. The second set contained intermediate and final calculation results for the cash flow module for 54 loan groups. The third set contained balance sheet results for a hypothetical "little firm." For each data set, MICA ran the OFHEO-provided loan groups through its replication of the Model and verified that the intermediate and final calculations matched to a minimum of four significant digits. In rare instances, the results for an individual quarter did not match because small differences crossed boundaries in the buckets used by OFHEO. MICA considers these differences to be immaterial.

In this process of validating its replica of the Model, MICA discovered some discrepancies between NPR2 and the validation results provided by OFHEO. OFHEO verified the discrepancies and in some cases published corrections to NPR2. An example of this is that NPR2, as originally published, contained insufficient decimal places in the regression coefficients. In

other cases OFHEO stated that the validation data was incorrect. For example, OFHEO used a hard-coded inflation adjustment to home prices in developing the validation data sent to MICA. In its replication of the Model, MICA used the calculation provided by NPR2, rather than OFHEO's hard-coded value. Finally, as noted in the section titled "Miscellaneous Model Technical Observations," OFHEO did not allow loan group balances to fall to zero. In NPR2, OFHEO made no provision for limiting loan balances to nonnegative amounts. MICA chose, for its replication of the model, to allow loan balances to fall to zero and to set the Probability of Negative Equity for those groups to zero, also.