

## I. Executive Summary

The Cranston-Gonzalez National Affordable Housing Act (NAHA) requires an independent actuarial analysis of the economic net worth and soundness of the Federal Housing Administration's (FHA's) Mutual Mortgage Insurance (MMI) Fund. This report presents our findings with respect to this required analysis for fiscal year (FY) 2000 using data as of June 30, 2000.

The primary purpose of this review is to estimate:

- The economic value of the MMI Fund, defined as the sum of existing capital plus the net present value of current books of business, and
- The current and projected capital ratio, defined as the economic value divided by the total insurance in-force (IIF).

### Status of the Fund

NAHA mandated that the MMI Fund achieve a capital ratio of at least 1.25 percent by FY 1992 and a capital ratio of at least 2.00 percent by FY 2000. Last year's Actuarial Review estimated that the MMI Fund's capital ratio at the end of FY 1999 was 3.66 percent, the fifth consecutive year it exceeded the 2.00 percent FY 2000 requirement. This year, we estimate that the FY 2000 capital ratio has decreased to 3.51 percent. We also estimate that the FY 2002 capital ratio will be 4.17 percent and that the FY 2007 capital ratio will be 4.97 percent. Table I-1 provides our estimates of the Fund's current and future economic values and capital ratios.

In defining the capital ratio, NAHA stipulates the use of unamortized insurance in-force. However, "unamortized insurance in-force" is defined in the legislation as "the remaining obligation on outstanding mortgages" – a definition generally understood to apply to amortized IIF. Deloitte & Touche (D&T) uses the unamortized IIF measure (as generally defined) in calculating the capital ratio. However, it is also instructive to consider the capital ratio based on amortized IIF, which is the basis the General Accounting Office has used in its previous reports on the status of the Fund. Our estimate of the FY 2000 capital ratio using amortized IIF is 3.77 percent, our estimate of the FY 2002 capital ratio is 4.46 percent, and our estimate of the FY 2007 capital ratio is 5.35 percent. Unless stated otherwise, all references to the Fund's capital ratios in this report refer to the ratio computed using unamortized IIF.

## Sources of Change in the Status of the Fund

### *Change in Economic Value from FY 1999 to FY 2000*

We estimate the economic value of the MMI Fund (the Fund) to be \$16.962 billion at the end of FY 2000; this is an increase of \$0.325 billion over the FY 1999 estimate reported last year.

Our \$16.962 billion estimate of the Fund's economic value is comprised of an estimate of total capital resources as of fiscal year-end 1999 of \$14.326 billion, further expected collectible upfront premium of \$0.196 billion, and the present value of future cash flows for in-force business of negative \$0.419 billion. The sum of these three components ( $\$14.326 + 0.196 - 0.419 = \$14.103$  billion) is shown as the economic value of the Fund at the beginning of FY 2000 (see the first column of Exhibit 1 of this review).

The difference between the economic value of the Fund at the end of FY 2000 and at the beginning of the fiscal year is the result of the activity in the Fund during the fiscal year. That is, the \$14.103 billion economic value at the beginning of the year should increase by the present value of any new loans endorsed during the year, increase by the amount of investment income accrued during the year, and decrease by the amount of administrative expenses paid during the year.

The development of the \$16.962 billion FY 2000 estimate of economic value is as follows:

Economic value at beginning of year:	\$14.103 billion
Present value of FY 2000 endorsements:	\$2.087 billion
Investment income:	\$1.190 billion
<u>Less administrative expenses:</u>	<u>\$0.418 billion</u>
Economic value at end of year:	\$16.962 billion

The same calculation holds for future fiscal years, and is shown in Exhibit 1 for FY 2000 through FY 2007 (under the baseline economic assumptions).<sup>1</sup>

This 1.95 percent increase in the estimated economic value of the MMI Fund since fiscal year-end 1999 is accompanied by a 6.3 percent increase in the unamortized IIF. These changes resulted in the capital ratio decreasing by 0.15 percent (a relative change of 4.10%) from 3.66 percent to 3.51 percent for FY 2000.

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<sup>1</sup> As a point of comparison, the amount of total capital resources at fiscal year-end 1998, 1999, and 2000 (unaudited) are: \$12.988 billion, \$14.326 billion, and \$16.608 billion, respectively. Therefore, the anticipated change in total capital resources during FY 2000 is  $\$16.608 - \$14.326 = \$2.282$  billion, which is in line with the estimated change in economic value of the Fund during the same time period.

Table I-1

Projected MMI Fund Performance for FYs 2000 through 2007 (\$ Millions)						
Fiscal Year	Economic Value of the Fund	Capital Ratio	Volume of New Endorsements	Insurance In-force	Economic Value of New Business	Interest on Fund Balances
2000	\$16,962	3.51%	\$93,579	\$482,732	\$2,087	\$1,191
2001	\$20,233	3.80%	\$108,908	\$533,031	\$2,438	\$1,282
2002	\$23,777	4.17%	\$121,230	\$569,963	\$2,628	\$1,370
2003	\$27,586	4.53%	\$131,546	\$609,025	\$2,806	\$1,461
2004	\$31,516	4.78%	\$141,225	\$658,884	\$2,832	\$1,565
2005	\$35,528	4.92%	\$150,983	\$722,012	\$2,813	\$1,682
2006	\$39,530	4.96%	\$159,013	\$796,697	\$2,697	\$1,806
2007	\$43,537	4.97%	\$166,969	\$875,138	\$2,595	\$1,932

*Current Estimate of FY 2000 Economic Value Compared with the Estimate Presented in the FY 1999 Actuarial Review*

This year's estimate of the FY 2000 economic value is \$1.956 billion lower than the economic value projected for FY 2000 in the FY 1999 Actuarial Review. This decrease in the Fund's value is comprised of several factors:

1. The estimated total capital resources used in the FY 1999 Actuarial Review.
2. Change in economic forecasts.
3. Revisions to econometric models for conditional claim, prepayment rates, demand, and claim severities.

Of these changes, the primary factors are the differences between actual and estimated total capital resources at the start of FY 1999 and econometric model revisions. These three changes resulted in a net decrease of \$2.474 billion in the estimated economic value.

Two other factors, the estimated present value of the FY 2000 endorsements and the estimated investment income and administrative expenses, offset this decrease slightly, by a total increase in the economic value of the Fund of \$518 million, for a total change of \$1.956 billion. The separate impact of each factor is described in Table I-2 below, and in the paragraphs that follow.

Table I-2

<b>Summary of Changes in MMI Fund Estimated Economic Value Between FY 1999 and FY 2000</b> (\$ Millions)				
	<b>Change in FY 2000 Economic Value</b>	<b>FY 2000 Economic Value</b>	<b>Change in FY 2000 Capital Ratio</b>	<b>Corresponding FY 2000 Capital Ratio</b>
<b>FY 2000 Economic Value Presented in the FY 1999 Review, Excluding the FY 2000 Book of Business</b>		<b>\$16,637</b>		<b>3.81%</b>
Plus: Forecasted Value of 2000 Book of Business and Interest on Previous Business Presented in the FY 1999 Review	+\$2,281			
Equals: FY 2000 Economic Value Presented in the FY 1999 Actuarial Review		<b>\$18,918</b>		<b>3.81%</b>
Plus: Change in Estimated Present Value of Endorsements Originating in FY 2000	+\$195	\$19,114	+0.03%	3.84%
Plus: Change due to economic forecast	-\$255	\$18,859	-0.04%	3.80%
Plus: Change in Interest Income and Administrative Expenses	+\$322	\$19,181	+0.05%	3.85%
Plus: Change due to Total Capital Resources estimate	-\$1,049	\$18,132	-0.17%	3.68%
Plus: Econometric Model Refinements	-\$1,170	\$16,962	-0.17%	3.51%
Equals: <b>Estimate of FY 2000 Economic Value</b>	<b>-\$1,907</b>	<b>\$16,962</b>	<b>-0.30%</b>	<b>3.51%</b>

*Further details of these changes are provided below.*

- In the FY 1999 Actuarial Review, we used a total capital resource figure as of fiscal year-end 1998 that was based on an estimate derived from the FY 1998 Actuarial Review. This estimate turned out to be \$1.049 billion higher than the actual figure. For the FY 2000 review, our total capital resource number as of fiscal year-end 1999 is compiled from the FHA trial balance as of September 30, 1999. This change results in a \$1.049 billion decrease in the economic value of the Fund at the end of FY 2000 and a decrease in the FY 2000 capital ratio of 0.17 percent.
- The net effect of loans originating in FY 2000 is an increase in the economic value of the Fund of \$195 million and an increase of 0.03 percent in the FY 2000 capital ratio due to slower growth in the economic value relative to the IIF. This effect can be divided into two components. The FY 2000 book – through nine months actual and projected for a full year - is larger than had been projected in the FY 1999 review by \$11.45 billion. Updates were also made to the actual loan composition of FY 2000 originations, shifting FHA's portfolio composition toward a slightly larger share of adjustable rate mortgages and affecting the

anticipated profitability of the book. The impact of our current estimate of the level of endorsements is to increase the economic value by \$290 million; the revised estimate of the profitability of that book is to decrease the economic value slightly by \$95 million.

- The long-term macroeconomic forecast published by DRI as of November 2000 differs from the forecast used in the FY 1999 review. Interest rates are slightly higher which leads to slightly lower prepayment rates and higher claim rates for the next several years. We estimate the impact of this change to be approximately a \$255 million decrease in the economic value and a decrease of 0.04 percent in the FY 2000 capital ratio.
- The FY 2000 Actuarial Review incorporates changes to the conditional claim and prepayment models, the demand model, and the claim severity model. We estimate that the net effect of changes in all four model categories is a \$1.170 billion decrease in the value of the Fund and a 0.17 percent decrease in the FY 2000 capital ratio. The vast majority of this change is due to changes in the conditional claim and prepayment rate models.
- The level of projected interest income for FY 2000 increased by \$469 million over the 1999 report. This is due to a higher invested asset base (\$19.8 billion versus \$14.7 billion) and a slightly higher interest rate assumption (6 percent versus 5.7 percent). In addition administrative expenses are projected to be slightly lower at \$418 million versus \$448 million. The combined effect of the interest income and administrative expense change represents a \$322 million increase in the value of the Fund and a 0.05 percent increase in the FY 2000 capital ratio.

#### *Change in Estimated Future Insurance In-force*

The estimated IIF for FYs 2000 through 2007 shown in this review are higher than the corresponding figures reported in the FY 1999 Actuarial Review. For the most part, this is driven by our revised approach to modeling FHA mortgage demand; see *Appendix B, Demand Model*. The revised models are, for the most part, driven by forecasts of the overall mortgage market provided by DRI/McGraw-Hill. We forecast a FY 2000 endorsement year volume of approximately \$93.6 billion that compares to actual through June 30, 2000 of approximately \$86.2 billion. The estimated volume of new endorsements for 2000 provided in the FY 1999 Actuarial Review was \$74.8 billion. Again, the new demand model we have adopted for the FY 2000 review drives this difference. We believe that, relative to last year's model, the new model is more transparent, more logical, and consistent with forecasts of industry demand levels.

#### *Estimated Claim Severities*

In the FY 2000 review, we abandoned the approach used since 1995 to model claim severities and adopted a method that examines fiscal quarter loss rates and selects a claim severity rate by loan type – see *Appendix C, Claim Severity Model*. Since 1995 average claim severities have gradually decreased, particularly over the last few years. As explained in the *Claim Severity Model* appendix, we base the selected claim severity on the most recent experience. Using claim severities based on the

more recent has a positive impact on the estimated economic value of the fund. This selection is justified, and in fact is most likely conservative, in light of loss mitigation efforts – again, please see *Appendix C* for details.

*Effects of Loss Mitigation*

It is our understanding that during FY 1996, Congress passed legislation that authorized the FHA to recompense mortgagees for actions taken to mitigate potential losses by providing mortgage foreclosure alternatives, such as special forbearance, pre-foreclosure sales, deed-in-lieu-of-foreclosure transactions, partial claim payments, and loan modifications. It is also our understanding that in the private conventional mortgage industry, Fannie Mae and Freddie Mac have successfully employed many of these loss mitigation techniques.

The loss mitigation program is expected to reduce the number of foreclosures and to significantly reduce the costs associated with many foreclosures. Evidence is emerging that indicates this program is having economic benefits and perhaps social benefits.

The utilization of the program has increased significantly over the last two fiscal years for special forbearance, mortgage modifications, and partial claims. (See Table I-3 below.) These three tools are the least costly of the available loss mitigation tools and are designed to avoid foreclosure and to keep borrowers in their homes. Pre-foreclosure sale and deed-in-lieu of foreclosure activity actually decreased once again in FY 2000 and has decreased three years in a row. These are more costly tools that result in an insurance claim.

**Table I-3**

<b>Summary of Loss Mitigation Activity Change</b>			
<b>(Counts)</b>			
	<b>FY 2000</b>	<b>FY 1999</b>	<b>FY 1998</b>
Special Forbearance	13,665	5,724	2,583
Mortgage Modification	8,620	11,114	1,571
Partial Claims	8,835	3,977	935
<b>Subtotal</b>	<b>31,120</b>	<b>20,815</b>	<b>5,089</b>
Pre-foreclosure Sale	3,515	4,053	4,608
Deed-in-lieu of Foreclosure	774	905	1,347
<b>Subtotal</b>	<b>4,289</b>	<b>5,010</b>	<b>5,955</b>

The loss mitigation program has been employed for the past three years and has experienced rapid growth. The relatively short history of the program makes it difficult to incorporate in the conditional claim rate models. Because of this, the effects of the loss mitigation program have not been explicitly factored into the claim rate model. It should be noted that this provides a level of conservatism in our results. We are, however, beginning to reflect the impact of the loss mitigation program in the selection of the claim severities.

### *Additional Comments*

The estimates presented here reflect projections of events more than 30 years into the future. These projections are dependent upon a number of assumptions, including economic forecasts by DRI and the assumption that FHA does not change its refund, premium, or underwriting policies from those assumed for this review. To the extent that these or other assumptions are not sufficiently accurate, the actual results will vary, perhaps significantly, from our current projections.

Estimation of the equations used for predicting prepayments and claims require large amounts of loan level data. These data take many weeks of intensive processing before they can be used to estimate the model parameters. Additionally, complete data for a fiscal year are generally not available until a few months after the end of the fiscal year because of reporting and processing lags. We obtained a data extract from FHA in July 2000 that represents activity as of June 30, 2000. This data extract contains loan level information, providing information on both the aggregate level of activity and the distribution of that activity. We have used these data to estimate our econometric claim and prepayment rate models.

Finally, while we have reviewed the integrity and consistency of the data supplied by FHA and believe it to be reliable, we have not audited it for accuracy. Additionally, the information contained in this report may not correspond exactly with other published analyses that rely on FHA data compiled at a different time or obtained from other systems.

### **Impact of Economic Forecasts**

The economic value of the Fund and its pattern of capital accumulation depend on several factors. One of the most important factors is the future economic environment that will exist during the remaining life of the FHA's current books of business. We capture the most significant factors in the U.S. economy affecting the performance of the Fund's books of business through the use of the following economic variables:

- FHA mortgage contract rates – 30- and 15-year
- One-year Treasury Bill rates
- Appreciation in house prices
- Growth of mean household income levels
- Number of mortgage originations

The performance of the FHA's books of business, measured by the economic value of the MMI Fund, is affected by changes in these economic variables. Higher mortgage interest rates raise initial and ongoing payment burdens on household cash flows, and hence claim risks of new originations while decreasing the risk of claims on older loans with below-market interest rates. Lower mortgage interest rates have the reverse effect and tend to accelerate refinancing of earlier originations while increasing insurance claims. Faster average house price growth facilitates the accumulation of home equity, which

**Actuarial Review of MMI Fund as of FY 2000**

tends to reduce the likelihood of a claim. It also contributes to greater mobility and household asset portfolio rebalancing, leading to greater turnover of housing and refinancing, thereby increasing prepayment rates. Faster income growth reduces the relative burden of mortgage payments on household cash flows over time, reducing the risk of claims as mortgages mature.

The base case results in this report are based on DRI's U.S. Economy forecast as of November 2000 for interest rates, average house prices, and inflation rates. We also considered two additional DRI economic forecasts: a "recession" forecast, and a "pessimistic" forecast. The characteristics of these two forecasts are described in *Appendix F, Economic Forecast* of this report. It is important to note that these two scenarios do not represent the full range of possible outcomes, but represent variations from the base case that might reasonably be expected. Further, since these two alternative scenarios reflect lower interest rates without deterioration in other economic variables, we do not believe they show the Fund in a "stressed economic state." In *The Value of the MMIF under Alternative Economic Scenarios* section of this report we consider two additional scenarios that reflect a stressed environment. We encourage readers of this report to review this section. We present our estimates of the Fund's performance under each of the DRI economic scenarios in Table I-4, and under the two additional scenarios in Table I-5.

We project that, under all five scenarios, the Fund will exceed the NAHA FY 2000 capital ratio target of 2.00 percent.

**Table I-4**

<b>Summary of MMI Performance by Macroeconomic Scenario</b>			
<b>(\$ Millions)</b>			
	<b>Pessimistic</b>	<b>Base Case</b>	<b>Recession</b>
Current Economic Value (FY 2000)	\$15,788	\$16,962	\$16,311
Current Capital Ratio (FY 2000)	3.27%	3.51%	3.38%
Projected Capital Ratio (FY 2002)	4.34%	4.17%	4.10%
Projected Capital Ratio (FY 2007)	5.59%	4.97%	5.77%

**Table I-5**

	<b>Interest Rate Spike</b>	<b>Low HPA</b>
Current Economic Value (FY 2000)	\$17,156	\$15,650
Current Capital Ratio (FY 2000)	3.55%	3.24%
Projected Capital Ratio (FY 2002)	3.53%	3.72%
Projected Capital Ratio (FY 2007)	4.80%	4.38%