Appendix B – Demand Model

Introduction

The actuarial review of the MMI Fund includes projections of the economic value of future fiscal year's endorsements. The economic value is based on the volume of endorsements written and the projected performance of these endorsements. We must therefore forecast the volume of FHA endorsements for fiscal years 2003-2009.

Our procedure for projecting future levels of demand for this year's Review is the same as last year. Prior to the FY 2000 Review, the demand model consisted of a series of regressions intended to predict the overall level of endorsements and the allocation of those endorsements to the various loan categories. It is now generally accepted that the past models yielded less than satisfactory results. Furthermore, the models were sufficiently complicated to have little explanatory power.

The approach used for the last two years, described in more detail below, is intended to be simpler, easier to follow, and to rely on available information in a way that makes the projections more defensible and consistent, and that makes the driving factors behind the projections more identifiable. The critical feature of this year's method is to base the projections of future endorsements for the MMIF on DRI projections of sales on new and existing homes for the whole market. We can then estimate the MMIF's share of the market and the allocation to loan categories based on actual proportions in recent years.

Forecast Methodology

We forecast the overall level of demand for MMIF mortgages based on the DRI projections of the number of sales and the average sale price on new and existing homes. The size of the MMIF market share (number of loans) and loan size relative to the DRI projections are summarized in Table B.1 below. We also show the expected number of Streamline Refinancings relative to the number of purchase originations each year.

Table B.1

	New Homes	Existing Homes	Streamline Refinancings	Source
MMIF Loan Size Relative to Market	72%	60%	N/A	FHA Plan
MMIF Market Share (Number of Loans)	9%	16%	N/A	FHA Plan
Refinance Rate Relative to Purchase Originations	N/A	N/A	37%, 2002 20%, 2003 18%, 2004 15%, 2005-8	FHA Plan

Note that these market share estimates, refinance percentages, and average house price assumptions are consistent with FHA's own internal five-year plan working estimates. The actual projections will differ slightly because the plan was based on DRI's September projections, while we had October projections available to us.

In summary, therefore, the total number of originations projected for a given endorsement year is:

$$\underbrace{\left[\#ofsales\_new \cdot MMIFshare\_new\right]}_{\#new\_MMIF} + \underbrace{\left[\#ofsale\_existing \cdot MMIFshare\_existing\right]}_{\#existing\_MMIF} \cdot \left(1 + refi\_rate\right)$$

Similarly, the dollar volume of originations is:

$$\left(\left[\#new\_MMIF \cdot new\_price \cdot \frac{MMIFnew\_price}{new\_price}\right] + \left[\#existing\_MMIF \cdot exist\_price \cdot \frac{MMIFexist\_price}{exist\_price}\right]\right) \cdot \left(1 + refi\_rate\right)$$

Projected Demand

We project overall MMIF endorsement volume for all loan categories in future endorsement years to be as follows:

Table B.2

Endorsement Year	Endorsement Volume ($ millions)
2003	133,582
2004	131,789
2005	132,891
2006	134,920
2007	141,668
2008	149,726
2009	157,403

Note that all the calculations described above are performed on the basis of fiscal origination year data. We estimate the endorsement year volume by assuming a three-month lag, that is, by prorating the origination year estimates. Therefore, $V_{EY} = 0.75 \cdot V_{OY} + 0.25 \cdot V_{OY-1}$, where V_{OY} is the volume of endorsements for origination year *OY*, and V_{EY} is the volume of endorsements for endorsement year *EY*.

Allocation Process

The process outlined above results in a projection of total demand for MMIF mortgages for fiscal endorsement years 2003-2009. The final step in the demand model is to split the overall endorsement volume to the loan type and loan-to-value categories considered in the regression analysis underlying the conditional claim rate and conditional prepayment rate models. This allocation is selected on the basis of the distribution of FHA endorsements seen in the most recent year. The projected distribution is as follows for each fiscal endorsement year from 2003-2009:

Table B.3

	30-Year Fixed Rate Loans				15-Year Fixed Rate Loans							
	High	Mid	Investor	Low	High	Mid	Investor	Low				
EY	LTV	LTV	LTV	LTV	LTV	LTV	LTV	LTV	ARM	SRF30	SRF15	SRARM
2002	53.7%	6.7%	5.3%	2.5%	0.3%	0.2%	0.3%	0.4%	5.4%	20.9%	1.6%	2.8%
2003	56.5%	7.1%	5.5%	2.6%	0.4%	0.2%	0.3%	0.4%	5.7%	17.7%	1.4%	2.4%
2004	60.4%	7.5%	5.9%	2.8%	0.4%	0.2%	0.3%	0.5%	6.1%	13.1%	1.0%	1.8%
2005	62.8%	7.8%	6.2%	2.9%	0.4%	0.2%	0.3%	0.5%	6.3%	10.4%	0.8%	1.4%
2006	63.5%	7.9%	6.2%	2.9%	0.4%	0.2%	0.3%	0.5%	6.4%	9.6%	0.7%	1.3%
2007	63.8%	8.0%	6.3%	3.0%	0.4%	0.2%	0.3%	0.5%	6.4%	9.2%	0.7%	1.2%
2008	64.1%	8.0%	6.3%	3.0%	0.4%	0.2%	0.3%	0.5%	6.4%	8.9%	0.7%	1.2%
2009	64.4%	8.0%	6.3%	3.0%	0.4%	0.2%	0.3%	0.5%	6.5%	8.6%	0.7%	1.2%

Data Sources

We used the DRI 10-year forecast to project the total number of loans endorsed from 2003-2009, in terms of new homes and existing homes.

We used the MMIF forecast to estimate the proportion of FHA endorsements that will streamline refinance as well as the fiscal year 2002 average house price for FHA loans on new, existing, and streamline refinanced homes. Finally, we used the DRI forecast of average countrywide house price appreciation.