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Update to ARM Prepayment Model

The ARM prepayment model has been updated. There were two main motivations for the update:

- 1 To reflect prepayment experience since the last model update in May 1997
- 2 To incorporate a more accurate method for estimating historical WACs for Ginnie Mae pools.

⁵ The scenarios used can be found on *Yield Book* under the identifiers “bbsf100” and “cmb1yr.”

Recent Prepayment Experience

A comparison of actual versus projected speeds over the past year or so shows the following patterns:

- The model has been too fast for seasoned Ginnie Mae ARMs (1993 and earlier production years) in 1998.
- The model has been reasonably accurate, on average, for newer Ginnie Mae ARMs.
- The model has been too slow (by 10% CPR on average) for peak speeds on conventional ARMs, especially convertibles.
- Although the model has done a good job of tracking speeds on most hybrid cohorts, a few 3x1 and 5x1 coupons have prepaid faster than projections.

Changes to Model Parameters

The main changes to the model are as follows:

- 1 **Number of borrower types.** The model assumes that a pool contains a number of different types of borrowers, ranging from slow to fast refinancers, to capture heterogeneity of borrowers and hence burnout.⁶ The number of such groups has been increased for ARMs, to better capture the burnout seen with the seasoned Ginnie Maes.
- 2 **Sharper response when ARM coupons reset upward.** The pickup in speeds when coupons on newer ARMs reset upward has been more pronounced than expected, and certainly more than the simple increase in refinancing incentive would imply. We have introduced a media effect type of response based on the difference between the current and historical WACs.
- 3 **Stronger media effect.** The model has two types of refinancings, ARM-to-ARM and ARM-to-fixed, with a given borrower typically preferring one to the other. The model now assumes a sharper migration of ARM-to-ARM refinancers to fixed-rate loans when fixed mortgage rates hit multiyear lows (that is, when there is a strong media effect).

Figures 35 and 36 show actual and projected speeds for a selection of ARM vintages, using the updated model. Given the erratic nature of ARM speeds, the new model seems to do a commendable job of tracking actual speeds.

Seasoned Ginnie ARM projections are slower, while those on conventionals, hybrids and new Ginnies are faster.

Impact on Projected Speeds and Valuations

The impact of the parameter changes (along with some relatively minor effects of the more accurate historical WACs) is, as might be expected in light of our comments, **slower speeds for seasoned Ginnie Maes and faster speeds for newer conventionals.**⁷ This point is illustrated in Figure 37 for several representative ARMs.

⁶ See *Anatomy of Prepayments*, Lakhbir Hayre and Arvind Rajan, Salomon Smith Barney, June 1995.

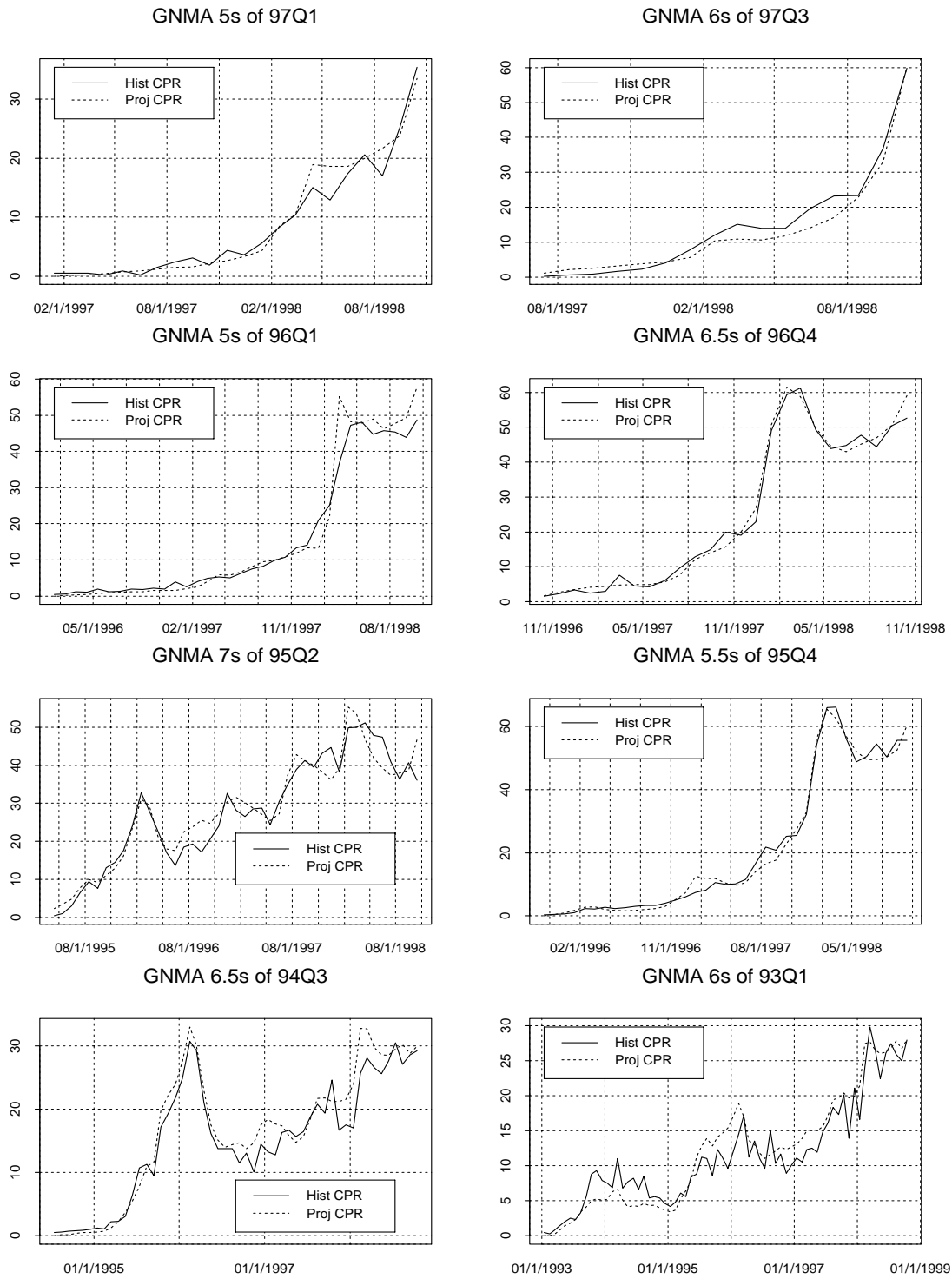
⁷ The new model is scheduled to go into production on *Yield Book* on the evening of Friday, December 18, 1998. Manifolds MB221, which has our positions, MB715 (the daily ARM OAS report), and MB723 (which gives detailed month-by-month projections) will also be switched to the new model on this date.

Note that projected speeds for newer Ginnie Maes also increase (marginally in most cases), mainly reflecting the effect of changes 1 and 2 to the model. The sharpest increases are in the projected speeds of newer conventionals and for 3x1 hybrids.

The OASs drop sharply for newer conventionals and hybrids — reflecting higher speeds and more responsiveness — drop marginally for newer Ginnie Maes, and typically increase for seasoned Ginnie Maes. Durations are slightly higher for seasoned Ginnie Maes and lower for newer ARMs.

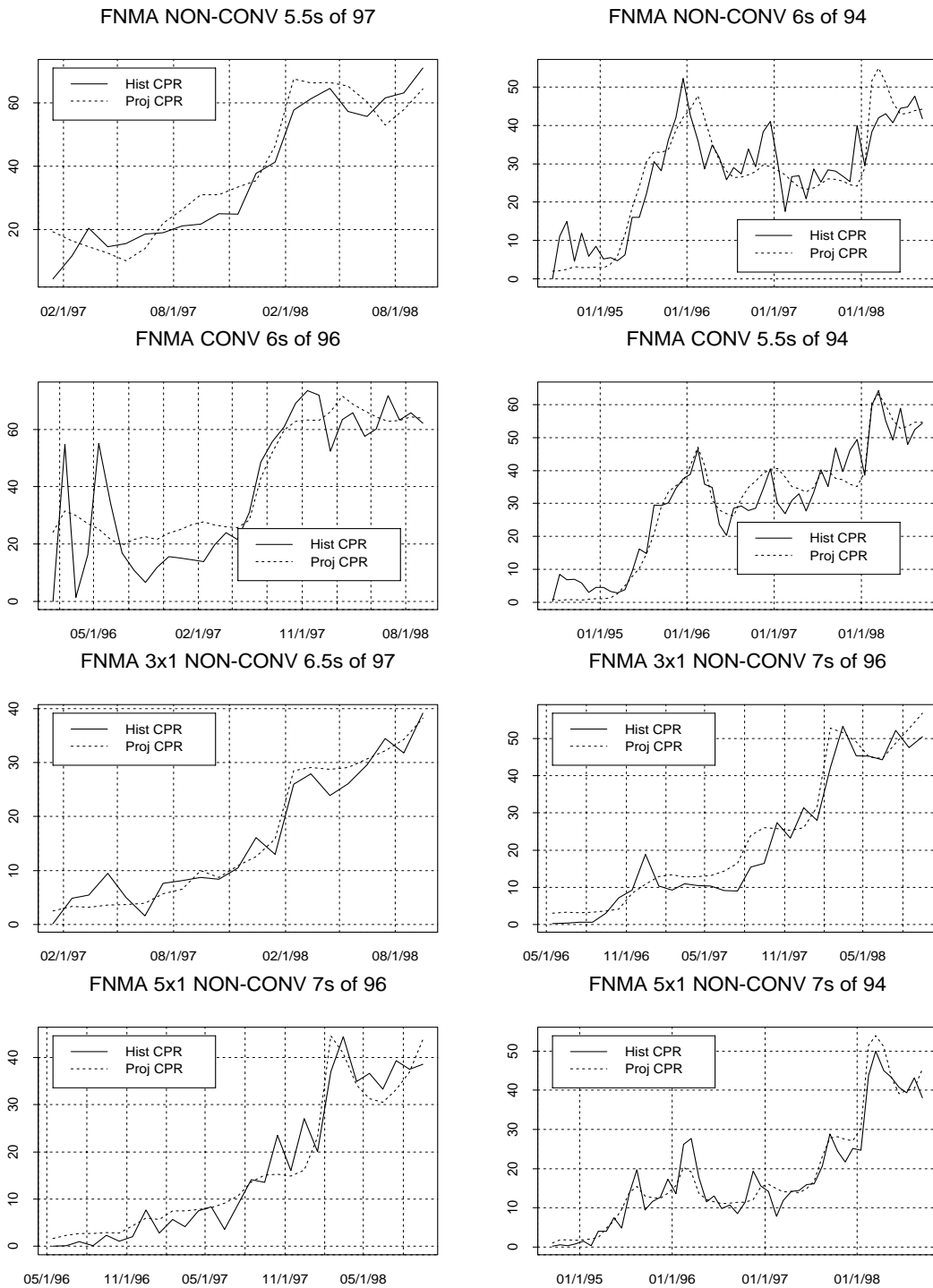
As Figure 37 shows, using the new model, OASs on Ginnie ARMs are 100bp–110bp, hybrids OASs are 120bp-125bp, and conventional one-year ARM OASs are around 135bp. Hence, ARMs offer value versus other comparable-duration instruments. We will discuss the relative-value implications of the new model in more detail in forthcoming issues of this publication.

Figure 35. Ginnie Mae ARMs: Actual and Projected Speeds



Source: Salomon Smith Barney.

Figure 36. Conventional ARMs and Hybrids: Actual and Projected Speeds



Source: Salomon Smith Barney.

Figure 37. Prepayment Projections and Valuations Using New and Old Models, 15 Dec 98

Pool ID	Type	Orig. Year (Months)	Coup	WAC	MTR	MDL	Prepay Projections						Price	OAS	Eff.	
							-100		0		100				Dur.	Cnvx.
							1-Yr	LT	1-Yr	LT	1-Yr	LT				
G80180M	GNMA	1998Q1 0-10	6.000	6.585	5	PROD	49.7	36.2	28.7	18.7	17.9	16.2	100-25	96	0.36	-0.11
						NEW	51.2	34.9	37.0	25.0	20.1	21.8	91	0.40	-0.29	
							1.5	-1.3	8.3	6.3	2.2	5.6	-5	0.04	-0.18	
G80054M	GNMA	1997Q1 1-10	6.875	7.936	5	PROD	52.7	34.5	32.0	19.5	23.4	16.9	100-28	106	0.59	0.52
						NEW	60.5	36.5	35.5	21.7	29.7	19.8	104	0.52	0.07	
							7.8	2.0	3.5	2.2	6.3	2.9	-2	-0.07	-0.45	
G80012M	GNMA	1996Q4 2-02	7.000	7.771	2	PROD	52.6	33.9	31.3	19.0	19.9	16.1	100-25	103	1.00	-0.34
						NEW	61.5	37.4	35.4	22.0	19.8	19.8	99	0.88	-0.71	
							8.9	3.5	4.1	3.0	-0.1	3.7	-4	-0.12	-0.37	
G 8770M	GNMA	1995Q4 3-01	7.000	8.195	2	PROD	51.7	32.4	31.7	18.6	21.5	16.0	100-27	102	1.00	-0.30
						NEW	56.5	33.5	30.5	19.5	18.2	17.8	101	0.93	-0.69	
							4.8	1.1	-1.2	0.9	-3.3	1.8	-1	-0.07	-0.40	
G 8459M	GNMA	1994Q3 4-05	6.625	7.168	11	PROD	51.1	31.0	29.6	17.2	21.8	15.0	101-13	98	0.82	0.01
						NEW	40.6	23.3	24.0	17.1	16.7	15.5	106	1.03	-0.23	
							-10.5	-7.7	-5.6	-0.1	-5.1	0.5	8	0.21	-0.23	
G 8855M	GNMA	1991Q4 7-03	7.000	7.609	2	PROD	51.7	27.6	20.8	13.4	15.7	12.1	100-31	108	1.06	-0.63
						NEW	30.3	18.7	18.7	15.0	14.3	13.9	113	1.32	-0.34	
							-21.4	-8.9	-2.1	1.6	-1.4	1.8	5	0.26	0.29	
N422254	FNMA NON-CONV	1998 3-08	7.065	7.680	6	PROD	35.7	19.8	28.4	17.2	24.1	15.9	101-20	161	0.48	-0.03
						NEW	52.0	39.1	37.7	24.3	30.4	21.2	136	0.02	0.00	
							16.3	19.3	9.3	7.1	6.3	5.3	-25	-0.46	0.03	
N421922	FNMA CONV	1998 3-08	7.460	7.995	6	PROD	48.1	24.8	36.7	19.6	27.4	16.9	101-12	160	0.53	0.03
						NEW	59.5	47.5	48.0	29.9	35.4	23.8	136	0.15	0.02	
							11.4	22.7	11.3	10.3	8.0	6.9	-24	-0.38	-0.01	
N434607	FNMA 3X1	1998 0-06	6.147	6.883	31	PROD	41.0	31.6	20.2	21.5	12.0	19.2	100-24	144	1.66	-0.67
						NEW	59.5	45.7	29.7	26.2	14.5	21.7	125	1.26	-0.98	
							18.5	14.1	9.5	4.7	2.5	2.5	-19	-0.40	-0.31	
N414070	FNMA 5X1	1998 1-0	6.127	6.782	49	PROD	40.8	31.6	18.4	17.7	10.7	15.1	100-20	132	2.26	-1.01
						NEW	53.6	36.8	18.8	20.5	10.9	16.9	122	1.96	-1.38	
							12.8	5.2	0.4	2.8	0.2	1.8	-10	-0.31	-0.38	

Source: Salomon Smith Barney.