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New Model of Subprime Mortgage Rates — Valuation Implications

In last week's issue of *Bond Market Roundup: Strategy*, we introduced a new model of subprime mortgage rates. The model computes the subprime rates from the conforming rates, by describing the spread between the two as a mean-reverting process dependent on changes in the conforming rate. This approach replaces the current calculation of the subprime-conforming spread, where the spread is projected to be a specified function of time, independent of movements of the conforming rate.[8] In this article, we review the valuation implications of the new model.

The new model projects lower and more stable prepayments.

Given the recent history of conforming rates, the current subprime-conforming spread in the new model is wider than its last recorded value, which is the starting point for projections in the old model. In addition, because of the recent runup in the spread, the long-term mean to which the spread reverts is slightly higher in the new model than the mean of the past several years. Therefore, in the unchanged interest-rate scenario, the new model leads to **lower projected speeds**. Under parallel shifts of the yield curve, the lower elasticity of subprime rates in the new model implies **more stable speeds**. A comparison of prepayment projections under the new and old models of subprime rates is shown in Figure 14.

[8] The spread is assumed to revert to its historical mean over one year, regardless of changes in the conforming rate.

Figure 14. Comparison of Prepayment Projections Under the New and Old Models

		Historical Speeds				Projected Speed (% CPR) for an Interest Rate Change of																	
	Issue	(% CPR)				-300 bp			-200 bp			-100 bp			0 bp			100 bp			200 bp			300 bp		
Deal	Date	1-Mo	3-Mo	1-Yr		New	Old	Diff.	New	Old	Diff.	New	Old	Diff.	New	Old	Diff.	New	Old	Diff.	New	Old	Diff.	New	Old	Diff.
RASC	9/98	17.9	17.4	20.2	LT	47.7	54.3	-6.6	42.1	48.7	-6.6	33.8	38.3	-4.5	24.6	26.4	-1.8	20.0	20.9	-0.9	17.5	18.1	-0.6	14.8	14.7	0.1
1998-KS3					1-Yr	50.4	58.8	-8.4	44.3	52.2	-7.9	34.3	40.6	-6.3	27.4	28.8	-1.4	24.5	23.9	0.6	22.6	21.3	1.3	20.6	18.3	2.3
RASC	9/99	17.5	18.3	17.2	LT	45.1	53.2	-8.1	39.0	46.0	-7.0	29.9	35.6	-5.7	23.4	25.6	-2.2	19.5	20.5	-1.0	16.4	17.6	-1.2	14.3	14.4	-0.1
1999-KS3					1-Yr	43.3	55.8	-13	36.9	46.7	-9.8	27.2	33.6	-6.4	22.7	23.7	-1.0	20.2	19.9	0.3	18.7	17.5	1.2	16.9	15.2	1.7
RASC	6/00	17.9	15.2		LT	45.3	50.9	-5.6	40.8	49.0	-8.2	34.5	38.8	-4.3	26.5	31.2	-4.7	22.0	23.9	-1.9	18.7	19.6	-0.9	15.6	17.1	-1.5
2000-KS3					1-Yr	45.7	54.1	-8.4	39.5	52.0	-13	30.6	38.1	-7.5	23.8	27.5	-3.7	21.1	21.5	-0.4	18.7	18.0	0.7	17.2	16.0	1.2
ADVN	6/98	13.6	16.1	19.2	LT	39.2	47.8	-8.6	33.3	39.3	-6.0	25.9	29.2	-3.3	22.3	24.0	-1.7	17.8	19.6	-1.8	15.1	15.7	-0.6	13.9	13.8	0.1
1998-2 g1					1-Yr	38.8	52.1	-13	31.0	42.3	-11	25.9	29.5	-3.6	23.6	24.9	-1.3	20.7	20.9	-0.2	18.7	17.8	0.9	17.5	16.3	1.2
ADVN	8/99	13.1	13.7	14.4	LT	40.2	46.1	-5.9	35.3	39.4	-4.1	29.1	30.9	-1.8	21.8	22.3	-0.5	18.6	18.9	-0.3	15.1	15.0	0.1	13.1	12.9	0.2
1999-3					1-Yr	43.0	51.9	-8.9	36.4	43.4	-7.0	27.5	31.7	-4.2	22.3	22.0	0.3	20.5	19.1	1.4	18.1	15.8	2.3	16.4	14.0	2.4
Centex	2/99	18.1	23.6	22.3	LT	40.3	46.4	-6.1	35.9	40.7	-4.8	29.3	32.1	-2.8	24.0	26.1	-2.1	21.3	22.8	-1.5	18.5	19.4	-0.9	15.6	16.0	-0.4
1999-1					1-Yr	42.5	49.7	-7.2	38.3	43.6	-5.3	28.5	32.4	-3.9	26.0	27.4	-1.4	24.6	24.9	-0.3	23.0	22.1	0.9	21.3	19.4	1.9

Yield curve and swap curve from March 6, 2001.

Source: Salomon Smith Barney.

One-year speeds in strong rate rallies are affected the most.

The differences between the two calculations can be as large as 13% CPR. They are most pronounced for one-year speeds in strong rate rallies. Long-term speeds are affected less by the model upgrade, because of the gradual compression of the subprime-conforming spread following a rate rally. In strong rate selloffs, the subprime-conforming spread initially tightens in the new model, leading to higher prepayment projections. Over the long term, however, the moving mean to which the spread reverts in the new model may be lower than the static mean used in the old model, leading to slightly *lower* speeds in several cases.

The slowdown of projected prepayments in the unchanged interest-rate scenario, together with the reduced variation of speeds under parallel shifts of the yield curve, have direct implications for the valuation of securities. Figure 15 compares the valuation parameters obtained from the new and old models of the subprime rates, for several securities from the RASC deals 2000-KS5 and 1999-KS3.

Figure 15. Comparison of WALs, OASs, Option Costs, Durations, and Convexities for the New and Old Models

RASC Deal and		WAL (Yrs.)			OAS (bp)			Option Cost (bp)			Eff. Duration (Yrs.)			Eff. Convexity (Yrs. Sq.)		
Class	Price ($)	New	Old	Diff.	New	Old	Diff.	New	Old	Diff.	New	Old	Diff.	New	Old	Diff.
2000-KS5 AI2	102.01	1.63	1.47	0.16	24	11	13	18	18	0	1.20	1.02	0.18	-0.78	-0.97	0.19
2000-KS5 AI3	102.63	2.33	2.10	0.23	22	11	11	33	35	-2	2.00	1.79	0.21	-1.13	-1.31	0.18
2000-KS5 AI4	103.16	3.57	3.17	0.40	26	20	6	58	60	-2	3.60	3.37	0.23	-1.69	-1.92	0.23
2000-KS5 AI5	103.83	5.73	5.06	0.67	51	43	8	69	74	-5	4.99	4.77	0.22	-1.26	-1.28	0.02
1999-KS3 AI7 (NAS)	104.88	5.03	4.77	0.26	45	35	10	31	38	-7	3.67	3.40	0.27	-0.71	-0.85	0.14

Pricing date: March 6, 2001. OASs are to swaps. All securities priced to call.

Source: Salomon Smith Barney.

Under the new model, the WALs, OASs, duration, and convexities increase, while option costs decrease.

Under the new model, all four sequential bonds and the NAS bond have **longer WALs and effective durations, higher OASs, less negative convexities, and lower or unchanged option costs**. The increase in OASs ranges from 6bp to 13bp, while the decrease in option costs ranges from 0bp to 7bp. Because all the bonds are premiums, the slower prepayment projections (longer WALs) naturally lead to higher OASs. The decrease in option costs is less straightforward.

As we discussed previously,[9] for most securities backed by subprime collateral, an extension of the security, resulting for example from a selloff in interest rates, leads to *higher* option costs. Therefore, a decrease in option costs that goes together with an extension of securities, as is the case for the new model, is an indication of a **significant reduction of prepayment sensitivity to yield-curve shifts**. This observation is in agreement with the results in Figure 15 and with the improvement in the convexity profile of all the bonds.

The new model is now available on Yield Book.

The new model of subprime rates is now available on Yield Book under the New Prepay Model option. The model will become the default option on Yield Book in a few weeks.[10]

Figure 16. Percentage of ABS Floating-Rate and Fixed-Rate Issuance, Year-to-Date 2000–2001

	2000	2001 (YTD)
Floating-Rate	62.8 %	58.8 %
Fixed-Rate	37.2	41.2

Source: Salomon Smith Barney.

Figure 17. Year-to-Date ABS Public and 144A Issuance by Sector, 2000–2001 (Dollars in Millions)

	2000 (YTD)	Percentage	2001 (YTD)	Percentage
Auto/Vehicle Loans	6,842.6	18.3%	17,801.4	29.8%
Equipment Loans	989.9	2.7	644.1	1.1
Credit Cards	5,955.6	16.0	16,256.9	27.2
Home Equity Loans	10,714.6	28.7	8,651.8	14.5
Manufactured Housing	1,906.8	5.1	648.5	1.1
Student Loans	3,583.2	9.6	1,755.3	2.9
Other	7,324.7	19.6	13,972.1	23.4
Total	**37,317.4**	**100.0%**	**59,730.1**	**100.0%**

Source: Securities Data Corp.

[9] See *Bond Market Roundup: Strategy*, January 12, 2001.

[10] We expect that the model will become the default option at the same time as the updates to the agency prepayment models.

Figure 18. Representative Fixed-Rate ABS Secondary-Market Spreads to Interest-Rate Swaps [a]

			AAA					A					BBB			
		9 Mar Swap Spread	9 Mar Spread	Spread Changes Over 1 Wk	Spread Changes Over 4 Wks	Spread Changes Over 52 Wks	1-Year SD of 1-Wk Spread Chgs	9 Mar Spread	Spread Changes Over 1 Wk	Spread Changes Over 4 Wks	Spread Changes Over 52 Wks	1-Year SD of 1-Wk Spread Chgs	9 Mar Spread	Spread Chg Over 1 Wk	Spread Chg Over 4 Wk	1-Year SD of 1-Wk Spread Chgs
2-Yr	Retail Auto	63bp	13bp	1bp	-1bp	4bp	1.5bp	50bp	0bp	0bp	18bp	2.0bp	95bp	0bp	5bp	NA
	Credit Card		8	0	0	0	1.0	35	0	-2	7	1.9	80	0	5	NA
	Equipment		28	0	0	7	1.6	58	0	0	12	2.3	105	0	0	1.6
	Stranded Assets		12	0	-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Home Equity		40	0	-3	2	3.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Man. Housing		38	0	-2	5	3.6	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Yr	Retail Auto	74	17	1	1	10	1.8	52	0	-1	20	2.6	100	0	2	NA
	Credit Card		9	0	-1	2	1.3	40	0	-2	13	2.7	90	0	5	NA
	Equipment		32	0	-1	7	1.6	63	0	0	21	3.2	110	0	0	NA
	Stranded Assets		16	0	-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Home Equity		57	1	-1	16	2.7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Man. Housing		52	0	-5	17	2.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-Yr	Credit Card	83	13	1	1	5	1.5	45	0	-3	26	3.4	95	0	-3	NA
	Stranded Assets		22	0	-3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Home Equity		82	2	0	20	4.4	143	0	0	6	5.0	NA	NA	NA	NA
	Man. Housing		75	0	-3	18	4.1	143	0	0	16	4.7	NA	NA	NA	NA
7-Yr	Credit Card	91	18	1	0	7	1.4	55	0	1	20	2.4	115	0	0	NA
	Stranded Assets		31	0	-3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Home Equity		107	0	0	17	6.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Man. Housing		104	0	0	29	4.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
10-Yr	Credit Card	92	25	0	-1	12	2.1	65	0	0	28	2.5	130	0	5	NA
	Stranded Assets		44	0	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Home Equity		115	0	0	31	6.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Man. Housing		110	0	-1	36	5.0	NA	NA	NA	NA	NA	NA	NA	NA	NA

[a] As of April 14, spreads are quoted versus interest-rate swaps. Historical spread data was converted into spreads to swaps in order to avoid distortions in historical comparisons.

SD Standard deviation.

Source: Salomon Smith Barney.

Figure 19. Representative Floating-Rate ABS Secondary-Market Discount Margins (Over One-Month LIBOR)

		AAA					A					BBB			
		9 Mar Spread	Spread Changes Over 1 Wk	Spread Changes Over 4 Wks	Spread Changes Over 52 Wks	1-Year SD of 1-Wk Spread Changes	9 Mar Spread	Spread Changes Over 1 Wk	Spread Changes Over 4 Wks	Spread Changes Over 52 Wks	1-Year SD of 1-Wk Spread Changes	9 Mar Spread	Spread Chg Over 1 Wk	Spread Chg Over 4 Wk	1-Year SD of 1-Wk Spread Changes
2-Yr	Retail Auto	8bp	1bp	-1bp	0bp	1.3bp	44bp	0bp	0bp	20bp	1.8bp	90bp	0bp	-4bp	NA
	Credit Card	8	1	1	0	0.5	35	0	-1	11	1.5	75	0	-1	NA
	Home Equity	23	0	0	-3	0.9	95	0	0	10	1.5	NA	NA	NA	NA
3-Yr	Retail Auto	9	0	-3	-2	1.5	53	0	0	25	2.5	98	0	0	NA
	Credit Card	9	0	-1	-2	0.5	40	0	0	12	1.8	85	0	5	NA
	Home Equity	24	0	0	-4	0.8	100	0	0	10	1.9	NA	NA	NA	NA
5-Yr	Credit Card	14	0	0	0	0.6	45	0	1	13	3.1	95	0	1	NA
	Home Equity	29	0	0	-4	1.1	110	0	0	15	2.9	NA	NA	NA	NA
7-Yr	Credit Card	20	0	0	1	0.7	55	0	5	16	1.8	115	0	5	NA
10-Yr	Credit Card	26	0	0	1	0.9	65	0	0	12	2.2	130	0	5	NA

SD Standard deviation.

Source: Salomon Smith Barney.

Figure 20. Recent Issuance

Date	Issuer	Type	Class	Size ($MM)	Credit Enhance.	WAL (Yrs)	Ratings	Spread
08 Mar 01	Irwin HELT 2001-1	HE/	A-2	57.43	AMBAC	1.00	Aaa/AAA	18/1M LIBOR
		HLTV	A-3	35.11		3.00	Aaa/AAA	65/SWAPS
			A-4	25.51		5.00	Aaa/AAA	95/SWAPS
			A-5	11.91		6.80	Aaa/AAA	110/SWAPS
			A-6	39.77		10.44	Aaa/AAA	132/SWAPS
			A-8	54.00		3.53	Aaa/AAA	26/1M LIBOR
			IO-2	26.98		1.21	Aaa/AAA	90/SYNTH LIBOR
08 Mar 01	Centex Home Equity 2001-A[a]	HE	A1	133.00	MBIA	0.91	AAA	36/SYNTH LIBOR
			A2	59.00		2.03	AAA	43/SWAPS
			A3	70.00		3.04	AAA	62/SWAPS
			A4	80.00		5.15	AAA	95/SWAPS
			A5	41.30		6.11	AAA	121/SWAPS
			A6	43.00		5.57	AAA	74/SWAPS
			A7	48.70		2.47	AAA	24/1M LIBOR
08 Mar 01	Airplanes Pass-Through Trust	AIR	A-9	750.0	Sr./Sub.	5.10	AA	55/1M LIBOR
07 Mar 01	Residential Funding Mtge Securities 2001-HS1	SLRM	A-1	113.1	Sr./Sub.	0.90	Aaa/AAA	39/SYNTH LIBOR
			A-2	43.7		2.00	Aaa/AAA	45/SWAPS
			A-3	48.8		3.00	Aaa/AAA	62/SWAPS
			A-4	41.5		5.00	Aaa/AAA	87/SWAPS
			A-5	31.1		7.14	Aaa/AAA	120/SWAPS
			M-1	16.0		4.96	Aa2/AA	225/TSY
			M-2	13.6		4.95	A2/A	250/TSY
			M-3	7.2		4.93	Baa2/BBB	300/TSY
			IO	32.0		1.22	Aaa/AAA	90/SYNTH LIBOR
07 Mar 01	GMAC Swift - VII Series 2001-A[a]	DF	A	2,000.0	Sr./Sub.	3.00	Aaa/AAA	9/1M LIBOR
06 Mar 01	Daimlerchrysler Auto Owners Trust 2001-A[a]	AL	A2	790.0	Sr./Sub.	1.00	Aaa/AAA	11/SYNTH LIBOR
			A3	370.0		2.07	Aaa/AAA	12/SWAPS
			A4	340.0		3.04	Aaa/AAA	17/SWAPS
06 Mar 01	Union Acceptance Corp 2001-A[a]	AL	A-1	99.0	MBIA	.28	P1/A1+	-2/3M LIBOR
			A-2	141.0		1.00	Aaa/AAA	14/SYNTH LIBOR
			A-3	142.0		2.00	Aaa/AAA	24/SWAPS
			A-4	152.0		3.30	Aaa/AAA	33/SWAPS
			B	35.0		3.99	Aaa/AAA	48/SWAPS
02 Mar 01	First USA 2001-2[a]	CC	A	1,250.0	Sr./Sub.	3.00	AAA	9/1M LIBOR
			B	96.7		3.00	A	36/1M LIBOR
			C	141.4		3.00	BBB	95/1M LIBOR
02 Mar 01	Detroit Edison Securitization Funding 2001-1[a]	UBA	A-1	127.2	OC	1.50	Aaa/AAA	14/SYNTH LIBOR
			A-2	181.5		3.30	Aaa/AAA	17/SWAPS
			A-3	327.6		5.80	Aaa/AAA	28/SWAPS
			A-4	408.6		8.80	Aaa/AAA	40/SWAPS
			A-5	327.1		11.30	Aaa/AAA	54/SWAPS
			A-6	379.0		13.30	Aaa/AAA	67/SWAPS
02 Mar 01	CIT Equipment 2001-1[a]	EL	A1	180.0	Sr./Sub.	.26	P1/A1+	-5/3M LIBOR
			A2	252.0		1.00	Aaa/AAA	15/SYNTH LIBOR
			A3	232.0		2.00	Aaa/AAA	21/SWAPS
			A4	129.5		3.07	Aaa/AAA	19/1M LIBOR
			B	12.6		1.53	Aa3/AA	38/SYNTH LIBOR
			C	16.8		1.53	A2/A	60/SYNTH LIBOR
			D	21.1		1.53	Baa3/BBB	120/SYNTH LIBOR

[a] Salomon Smith Barney has acted as a manager and/or comanager of debt issues of this issuer within the past three years.

ABS Asset-backed securities. AD Auto dealer floor plan. AIR Airplane leases. AL Auto loan. ALE Automobile lease. BL Boat loan. CA Controlled amortization. CC Credit card. CCA Cash collateral account. CHC Charge card. CIA Collateral invested amount. CON Consumer loans. DF Dealer floor plan. EL Equipment loan. FEL Farm equipment loan. FF Fed funds. FR Franchise loan. HE Home equity. HIL Home improvement loan. HLTV High LTV, ML Mortgage loan. MB Mortgage-backed. Mezz. Mezzanine. MH Manufactured housing. MCL Motorcycle loans. NA Not available. O Other. OC Overcollateralized. RIC Retail installment contracts. RV Recreational vehicle. SLRM Second Lien Residential Mortgage, BA Small business association loans. SL Student loan. TL Truck mortgage loan. Sr./Sub. Senior/subordinate. UBA Utility bill allocations. WAL Weighted-average life. WHI Wholesale inventory.

Source: MCM "Corporatewatch."