

## Value of Prepayment Penalty Cash Flows for Subprime Mortgage Collateral

Over the past several years, the proportion of penalty-protected loans in subprime mortgage/home equity loan (HEL) deals has increased dramatically. Less than 20% five years ago, loans carrying prepayment penalties now account for about 60% of RFC originations and about 80% of New Century, Ameriquest, and Long Beach originations. Figures for other issuers are similar.

**Prepayment penalties provide additional cash flows and affect the borrower's prepayment behavior.**

The impact of prepayment penalties is twofold. (1) Upon prepayment of a loan before penalty expiration, penalties provide additional cash flows to the loan owner. These cash flows are sometimes made available to investors through excess cash flow bonds. (2) Penalties change the borrower's prepayment behavior, lowering speeds before penalty expiration relative to speeds on no-penalty loans, and increasing them sharply for a short time period immediately following the expiration of the penalty. The presence of penalties also generally lowers borrowers' sensitivity to interest rates in rate rallies, but increases the extension risk in selloffs.<sup>6</sup>

In this article, we focus on fixed-rate loans and address the following question:

*What is the value of the prepayment penalty cash flow over the life of a loan, given a realistic prepayment pattern of a penalty-protected loan? In other words, what premium should a buyer of whole loans pay for a loan that has a prepayment penalty compared to one with no penalty?*

We set up four different pass-throughs. All of them have a WALA of zero months, a WAM of 30 years, loan WACs of 10.75%, a pass-through coupon of 8%, average loan balances of \$75,000, and LTVs of 77%.<sup>7</sup> Other loan characteristics are assigned the averages for recent deals issued by a large subprime originator. The differences between the pass-throughs are in the prepayment penalty terms, which take on the

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<sup>6</sup> For a detailed description of prepayments on penalty-protected loans, see *Prepayments on RFC Fixed-Rate Subprime/Home Equity Loans*, I. Gjaja, Salomon Smith Barney, August 2000.

<sup>7</sup> In this article, we do not consider credit issues. The difference between the WAC on the loan and the coupon on the pass-through may be assumed to pay for servicing as well as for credit insurance to the holders of the pass-through.

values of zero years (no penalty), two, three, and five years. The prepayment penalty amount is assumed to be six months' interest on 80% of original principal balance.<sup>8, 9</sup>

Two sets of calculations are done:

- 1 The no-penalty pass-through is priced at par, using the no-penalty prepayment model. The other pass-throughs are then priced at the same OAS, using the prepayment models appropriate for the penalty term. Differences in prices between the no-penalty pass-through and the penalty-protected pass-throughs give the value of the prepayment penalty cash flows.
- 2 All pass-throughs are priced at par, using the appropriate prepayment models, and the OASs are compared.

The results are shown in Figure 20.

**Figure 20. Effect of Prepayment Penalty on Price and OAS of a Pass-Through**

	No Penalty	2-Yr Penalty	Diff.	3-Yr. Penalty	Diff.	5-Yr. Penalty	Diff.
<b>OAS = 57 bp</b>							
Price	\$100.0	\$101.2	\$1.2	\$102.0	\$2.0	\$102.7	\$2.7
<b>Price = \$100</b>							
OAS	57bp	99bp	42bp	126bp	69bp	148bp	91bp

OAS calculated to the swap curve of August 17, 2000.  
Source: Salomon Smith Barney.

The value of the penalty cash flows ranges from \$1.2 to \$2.7, increasing with the increasing penalty term. Even though the speeds of two-, three-, and five-year penalty loans are similar before penalty expiration (and significantly lower than speeds on no-penalty loans), the increase in the value of the penalty cash flows is not proportional to the increase in the term. This is primarily the result of higher discounting of penalty payments that occur at higher loan ages.

The increase in OASs with increasing penalty terms indicates that borrowers who take out penalty-protected loans may be expected to pay lower loan rates than borrowers with no-penalty loans. To yield the same OAS, *given realistic prepayment patterns on no-penalty and penalty-protected loans*, a borrower who takes out a loan with a two-year prepayment penalty could pay a coupon that is approximately 42bp lower than the coupon on a no-penalty loan.<sup>10</sup> The differences are 69bp and 91bp, respectively, on three- and five-year penalty loans. Empirical evidence indicates that borrowers who take out penalty-protected loans generally do pay lower loan rates.

<sup>8</sup> This is the most common penalty for subprime loans.

<sup>9</sup> For simplicity, we assume that all prepayments before expiration of the penalty result in a payment of penalty. This is a slight overestimate, as defaulted loans generally do not pay a prepayment penalty.

<sup>10</sup> Changes in the coupon on the loan, and therefore on the coupon of the pass-through, are reflected in changes in the yield curve margin and therefore in the OASs. A change in the coupon is nearly exactly matched by the change in OAS.

**Figure 21. Percentage of ABS Floating-Rate and Fixed-Rate Issuance, Year to Date 1999–2000**

	1999	2000 (YTD)
Floating-Rate	49.7 %	76.8 %
Fixed-Rate	50.3	23.2

Source: Salomon Smith Barney.

**Figure 22. Year-to-Date ABS Issuance by Sector, 1999–2000 (Dollars in Millions)**

	1999 (YTD)	Percentage	2000 (YTD)	Percentage
Auto/Vehicle Loans	35,357.5	26.1 %	41,487.0	31.6 %
Equipment Loans	6,006.1	4.4	5,172.7	3.9
Credit Cards	27,578.0	20.4	26,761.2	20.4
Home Equity Loans	46,352.6	34.2	38,790.1	29.5
Manufactured Housing	6,892.4	5.1	6,363.5	4.8
Student Loans	5,075.8	3.7	10,586.6	8.1
Other	8,143.1	6.0	2,155.5	1.6
<b>Total</b>	<b>\$135,405.5</b>	<b>100.0 %</b>	<b>\$131,316.6</b>	<b>100.0 %</b>

Source: Securities Data Corp.

**Figure 23. Representative Fixed-Rate ABS Secondary-Market Spreads to Interest Rate Swaps<sup>a</sup>**

		AAA					A					BBB					
		18 Aug Swap Sprd	18 Aug Sprd	Spread Changes Over			1-Year SD of 1-Wk Sprd	18 Aug Sprd	Spread Changes Over			1-Year SD of 1-Wk Sprd	18 Aug Sprd	Sprd Chg Over			1-Year SD of 1-Wk Sprd
				1 Wk	4 Wks	52 Wks			Chgs	1 Wk	4 Wks			52 Wks	Chgs	1 Wk	
2Yr	Retail Auto	71	6bp	0bp	-1bp	-14	3.5bp	30bp	4bp	3bp	-15	3.8bp	75bp	-1bp	0bp	NA	
	Credit Card		4	0	1	-16	2.9	28	4	3	-17	3.4	68bp	4bp	-2bp	NA	
	Equipment		16	0	-2	NA	NA	41	0	-4	NA	NA	86bp	0bp	-4bp	NA	
	Stranded Assets		7	0	-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	Home Equity		45	10	6	-35	4.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	Man. Housing		42	10	3	-28	4.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	
3Yr	Retail Auto	78	7	0	-1	-9	3.1	35	3	2	-6	4.1	82bp	0bp	2bp	NA	
	Credit Card		5	0	1	-11	2.8	30	0	0	-11	4.0	75bp	0bp	0bp	NA	
	Equipment		22	0	-2	NA	NA	56	0	0	NA	NA	101bp	0bp	0bp	NA	
	Stranded Assets		8	-1	-9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	Home Equity		56	9	4	-26	4.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	Man. Housing		54	10	4	-18	4.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	
5Yr	Credit Card	91	8	1	1	-8	2.8	38	-2	-2	-5	4.7	83bp	-2bp	-2bp	NA	
	Stranded Assets		12	-1	-14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	Home Equity		78	10	-4	-29	6.2	125	0	0	NA	NA	NA	NA	NA	NA	
	Man. Housing		73	10	-4	-19	6.4	125	0	0	NA	NA	NA	NA	NA	NA	
7Yr	Credit Card	106	13	0	1	-13	3.5	48	-2	-2	-5	4.5	98bp	-2bp	-2bp	NA	
	Stranded Assets		18	0	-18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	Home Equity		90	0	-15	-38	7.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	Man. Housing		85	0	-10	-23	6.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	
10Yr	Credit Card	126	17	0	1	-5	3.9	58	-2	-2	6	5.1	113bp	-2bp	-2bp	NA	
	Stranded Assets		24	1	-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	Home Equity		110	0	-15	-28	7.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	Man. Housing		100	0	-15	-28	6.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	

<sup>a</sup> 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 24. Representative Floating-Rate ABS Secondary-Market Discount Margins (Over One-Month LIBOR)

		AAA					A					BBB				
		18 Aug				1-Year SD of 1-Wk Sprd Chgs	18 Aug				1-Year SD of 1-Wk Sprd Chgs	18 Aug				1-Year SD of 1-Wk Sprd Chgs
		Spread	Spread Changes Over				Spread	Spread Changes Over				Spread	Sprd Chg Over			
			1 Wk	4 Wks	52 Wks		1 Wk	4 Wks	52 Wks		1 Wk	4 Wk				
2-Yr	Retail Auto	8bp	0bp	0bp	-7bp	0.8	26bp	0bp	-5bp	-5bp	2.0	76	0bp	6bp	NA	
	Credit Card	6	0	0	-9	0.7	25	0	-1	-10	1.7	70	0	-5	NA	
	Home Equity	27	2	1	-8	0.9	90	0	0	0	13.1	NA	NA	NA	NA	
3-Yr	Retail Auto	12	0	0	-5	0.8	34	0	-2	-6	1.8	78	0	0	NA	
	Credit Card	9	0	0	-8	0.7	30	0	1	-10	1.5	74	0	5	NA	
	Home Equity	28	2	0	-12	0.9	95	0	0	0	1.3	NA	NA	NA	NA	
5-Yr	Credit Card	15	0	0	-9	0.7	40	0	0	-9	2.3	85	0	0	NA	
	Home Equity	33	2	1	-12	1.3	100	0	0	-5	2.7	NA	NA	NA	NA	
7-Yr	Credit Card	18	0	0	-11	0.8	52	0	2	-3	1.7	102	0	7	NA	
10-Yr	Credit Card	25	0	0	-9	1.1	62	2	0	-3	2.1	117	2	9	NA	

LIBOR London Interbank Offered Rate. SD Standard deviation.

Source: Salomon Smith Barney.

Figure 25. Recent Issuance

Date	Issuer	Type	Class	Size (Mil.)	Credit Enhancement	WAL (Yrs)	Rating Moody's/S&P	Spread
17 Aug 00	Capital One 2000-3 <sup>a</sup>	CC	A	807.50	Sr./Mezz./Sub.	6.98	Aaa/AAA	19/1M LIBOR
			B	92.50		6.98	A2/A	51/1M LIBOR
17 Aug 00	Fleet CCMT 20000-C	CC	A	529.75	Sr./Mezz./Sub.	4.97	Aaa/AAA	10/5YR SWAPS
			B	48.75		4.97	A2/A	39/1M LIBOR
16 Aug 00	Textron Financial Rcvbls Trust 2000-A	EL	A	195.30	Sr./Mezz./Sub.	1.30	Aaa/AAA	25/EDSF
			B	6.30		2.98	A2/A+	75/3YR SWAPS
16 Aug 00	Advanta MLT 2000-2	HE	A-2	54.60	Wrapped By FSA	2.00	Aaa/AAA	45/2YR SWAPS
			A-3	123.25		3.00	Aaa/AAA	67/3YR SWAPS
			A-4	83.10		5.00	Aaa/AAA	90/5YR SWAPS
			A-5	64.90		8.00	Aaa/AAA	123/8YR SWAPS
			A-6	65.00		6.39	Aaa/AAA	69/8YR SWAPS
16 Aug 00	Vanderbilt 2000-C	MH	A-A	30.90	Sr./Mezz./Sub.	5.28	Aaa/AAA	35/1M LIBOR
			A-1	55.00		1.03	Aaa/AAA	12/1M LIBOR
			A-2	50.00		3.03	Aaa/AAA	120/5.75 8/03
			A-3	34.00		5.15	Aaa/AAA	150/5.88 11/05
			A-4	44.40		9.62	Aaa/AAA	205/6.50 2/10
			A-5	11.90		13.11	Aa3/AA-	235/6.50 2/10
			M-1	10.60		9.28	A2/A	275/6.50 2/10
			B-1	10.60		6.29	Baa2/BBB	360/6.25 2/07
16 Aug 00	Dealer Auto Rcvbls Trust 2000-1 <sup>a</sup>	AL	A-1	190.00	Sr./Mezz./Sub.	0.23	P-1/A-1+	0/3M LIBOR
			A-2	274.00		1.00	Aaa/AAA	15/SYNTH LIBOR
			A-3	168.00		2.00	Aaa/AAA	18/2YR SWAPS
			A-4	83.30		2.84	Aaa/AAA	22/3YR SWAPS
			B	24.50		2.98	A2/A	57/3YR SWAPS
15 Aug 00	National City Credit Card Master Trust 2000-1 <sup>a</sup>	CC	A	525.00	Sr./Mezz./Sub.	4.98	Aaa/AAA	15/1M LIBOR
			B	36.00		4.98	A2/A	40/1M LIBOR
			C	39.00		4.98	BBB/BBB	88/1M LIBOR
11 Aug 00	Advanta Business Card Master Trust 2000-B <sup>a</sup>	AL	A	480.00		2.90	Aaa/AAA	17/1M LIBOR
			B	57.00		2.90	A2/A	55/1M LIBOR
			C	42.00		2.90	Baa2/BBB	125/1M LIBOR
10 Aug 00	Providian MT 2000-2 <sup>a</sup>	CC	A	450.00	Sr./Mezz./Sub	4.92	Aaa/AAA	17/1M LIBOR
			B	59.30		5.08	A2/A	51/1M LIBOR
			C	49.20		5.25	Baa2/BBB	114/INTERP SWAPS
10 Aug 00	MMCA 2000-1 <sup>a</sup>	AL	A-1	165.00	Sr./Mezz./Sub	0.31	P-1/A-1+	1/SYNTH LIBOR
			A-2	500.00		1.05	Aaa/AAA	15/SYNTH LIBOR
			A-3	490.00		2.10	Aaa/AAA	18/2YR SWAPS
			A-4	384.00		3.24	Aaa/AAA	25/3YR SWAPS
8 Aug 00	Americredit '00-C	AL	A-1	170.00	Wrapped By FSA	0.33	Aaa/AAA	0/SYNTH LIBOR
			A-2	370.00		1.00	Aaa/AAA	15/SYNTH LIBOR
			A-3	262.00		2.10	Aaa/AAA	20/SWAPS
			A-4	298.00		3.37	Aaa/AAA	21/1M LIBOR

<sup>a</sup> Salomon Smith Barney has acted as a manager and/or co-manager 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. Whole first and second liens. FR Franchise loan. HE Home equity. HIL Home Improvement loan. MB Mortgage-backed. Mezz. Mezzanine. MH Manufactured housing. ML Motorcycle Loans. NA Not available. O Other. OC Overcollateralized. RIC Retail installment contracts. RV Recreational vehicle. BA Small business association loans. SL Student loan. TL Truck loan. Sub. Subordinate. UBA Utility bill allocations. WAL Weighted average life. WHL Wholesale inventory. WI When issued.

Source: MCM "Corporatewatch."