

*Distribution of principal to subordinate classes is subject to conditions.*

## The Stepdown Test and Extension of HEL Subordinates

At present spread levels subordinate home equity loan (HEL) bonds appear attractive.<sup>5</sup> Compared to senior tranches, however, they carry additional risks of extension and loss of principal. Although for most HEL transactions the risk of principal loss for double-A-, single-A- or triple-B-rated tranches is small, the extension risk can be significant.

Distribution of principal to subordinate classes<sup>6</sup> in a senior-sub HEL deal is generally subject to several conditions:<sup>7</sup>

- ▶ Payment can occur only on or after the **stepdown date**, defined as the latter of the thirty-sixth month of the deal or the payment date when the **senior enhancement percentage** (also referred to as **credit support**) is greater than 26%. Credit support is defined as (sum of outstanding balance of the

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<sup>5</sup> See *Bond Market Roundup: Strategy*, Salomon Smith Barney, January 8, 1999.

<sup>6</sup> In this article we refer to all sequentials rated below triple-A as subordinates. They typically include double- and single-A-rated mezzanines and triple-B-rated B pieces (which themselves are often called subordinates).

<sup>7</sup> These conditions are typical of 1997 Conti senior/sub transactions, as well as those of many other HEL issuers.

subordinate tranches + overcollateralization amount)/(total principal balance outstanding).

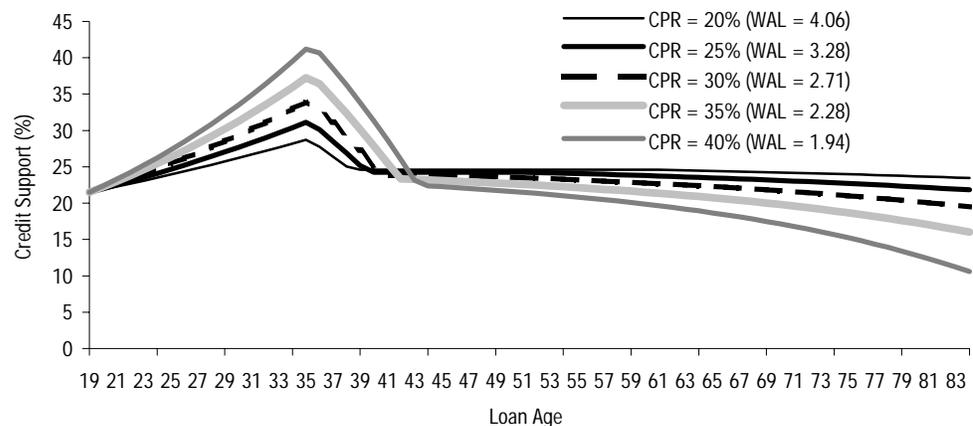
- ▶ The **trigger event** is not in effect (also known as passing the **stepdown test**). The trigger event has occurred if the three-month rolling average of loans delinquent 60 days or more (including foreclosures and REOs) equals or exceeds 50% of credit support.

*If the stepdown test is failed, subordinate classes extend and seniors shorten.*

The stepdown test is performed each month after the stepdown date. If the test is failed, all principal payments for that month are directed to senior classes. Because this distribution of principal increases the credit support (the denominator decreases while the numerator remains unchanged), in the absence of increases in 60+ day delinquencies, in the subsequent months the deal comes closer to passing the test each month. Once the test is passed, the distribution of principal cash flows between subordinate and senior tranches then determines the amount of credit support available for the next month. Depending on the scheduled cash flows and the realized delinquency and prepayment rates, it may happen that the collateral **oscillates** between passing and failing the stepdown test **from month to month** for an extended period, thus directing principal to subordinate classes in an intermittent fashion. One obvious result of stepdown test failure in any month is the extension of subordinate classes and the shortening of seniors.<sup>8</sup>

Figure 15 shows the credit support levels for five different prepayment scenarios, **assuming that the stepdown test is satisfied each month.**<sup>9</sup> Taking 50% of each curve gives the maximum 60+-day delinquency levels that will just pass the stepdown test. In all cases the levels peak at the loan age of 35 months, just prior to the first payout to subordinate classes.

**Figure 15. Credit Support as a Function of Loan Age for Different Prepayment Scenarios**



Source: Salomon Smith Barney.

<sup>8</sup> After all senior tranches have been paid off, a modified version of the stepdown test determines if all the principal goes to the mezzanines or is distributed between mezzanines and B pieces according to the outstanding balances.

<sup>9</sup> For simplicity, we assume that the OC credit support is constant at 2%. This assumption is reasonable given that the targeted OC amount is 2%.

*Actual delinquencies of several recent HEL deals are near the trigger level.*

Although the delinquency levels at 50% of the curves appear high, they are close to the range of observed delinquencies for some recent HEL deals. Figure 16 shows the 60+-day delinquencies for three 1997 Conti deals. Clearly, failure of the stepdown test for at least some portion of the deals' lives cannot be excluded. For example, the required credit support for Conti 97.1 would have to be in excess of 30%, whereas the current level is only 26.2%. Thus, we believe that it is likely that some deals **will** fail the stepdown test.

**Figure 16. Selected HEL Deals — 60+-Day Delinquencies**

Loan Age (Mth.)	14	15	16	17	18	19	20	21	22	23	24	25
Conti 97.1	9.32%	10.00%	9.71%	10.93%	10.78%	11.62%	12.12%	12.63%	13.29%	13.48%	14.21%	15.31%
Conti 97.2	8.48	9.01	9.73	10.26	10.74	11.60	12.19	12.46	12.94	13.38		
Conti 97.3	8.21	9.24	9.90	10.46	11.07	11.63	11.77	11.99				

Source: Salomon Smith Barney.

To understand the extension risk of subordinate tranches in Conti 97.3, we model the delinquency curve as follows: 0% between months 0 and 3, rising to 5% in month 12, then to 20% in month 30, remaining at 20% until month 36, then declining to 10% in month 72, to 5% in month 120, and to 3% in month 180, after which it remains constant. The actual delinquency curve used in the calculations is the model curve multiplied by an overall factor, the delinquency multiplier (DM).

Figure 17 shows the WALs of senior and subordinate tranches of Conti 97.3 under several delinquency and prepayment scenarios. The losses are assumed to be sufficiently small so that all subordinate bonds receive the full principal.

If DM is less than about 0.75, the stepdown test is satisfied for all months in all three prepayment scenarios, and delinquencies do not play a role. As expected, increasing values of DM lead to shortening WALs for senior bonds and extensions for subordinates. The effect is not uniform, however, across either WALs or prepayment speeds.

*Shortening of each senior class depends on its position in the structure.*

In general, sequentials that receive most of their cash flows prior to the stepdown date are nearly insensitive to the stepdown test. Which bonds are included in this group, of course, is a matter of prepayment speed. Similarly, the NAS bond is stable across a wide range of DMs for all prepayment speeds displayed. Bonds that are most susceptible to shortening at relatively low values of DM, that is in cases when the stepdown test fails for a small number of iterations before recovering, are narrow-window sequentials whose payments immediately follow the stepdown date. At 20% CPR these include the A7, and at 30% CPR the A6. At higher values of DM, wider-window sequentials are affected, as well. Note that the continuous failure of the stepdown test, when subordinates simply become sequential bonds following the seniors, provides the maximum possible shortening for all triple-A bonds.

Figure 17. Effect of Delinquencies on WALs of Senior and Subordinate Classes

CPR = 20%										
DM										
Security	0	0.75	0.9	1	1.25	1.5	2	2.5	3	Always Fail
A3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
A4	1	1	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
A5	2.3	2.3	2	1.8	1.7	1.7	1.7	1.7	1.7	1.7
A6	3.6	3.6	3.6	3.5	2.9	2.4	2.4	2.4	2.4	2.4
A7	6.4	6.4	6.4	6.4	6.3	6.1	4.9	4.1	3.5	3.3
A8	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.8	11.8	4.9
A9 (NAS)	5.3	5.3	5.4	5.3	5.3	5.3	5.4	5.4	5.3	3.9
M1F	4.7	4.7	4.9	5	5.4	5.7	6.3	6.9	7.4	6.8
M2F	4.4	4.4	4.5	4.6	4.8	5	5.3	5.6	5.9	9.4
B1F	3.5	3.5	3.6	3.6	3.8	4	4.3	4.5	4.8	12

CPR = 30%										
DM										
Security	0	0.75	0.9	1	1.25	1.5	2	2.5	3	Always Fail
A3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
A4	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
A5	1.1	1.1	1	1	1	1	1	1	1	1
A6	2	2	1.8	1.6	1.4	1.4	1.4	1.4	1.4	1.4
A7	3.2	3.2	3.2	3.1	2.6	2.2	2	2	2	2
A8	7.7	7.7	7.7	7.7	7.6	7.5	6.4	4.7	2.8	2.8
A9 (NAS)	4.8	4.8	4.7	4.7	4.8	4.7	4.7	4.8	5	2.8
M1F	3.2	3.2	3.4	3.6	3.9	4.3	4.8	5.4	6	4.4
M2F	3	3	3	3.1	3.3	3.5	3.8	4.1	4.5	6.1
B1F	2.3	2.3	2.3	2.4	2.6	2.7	3	3.3	3.7	7.9

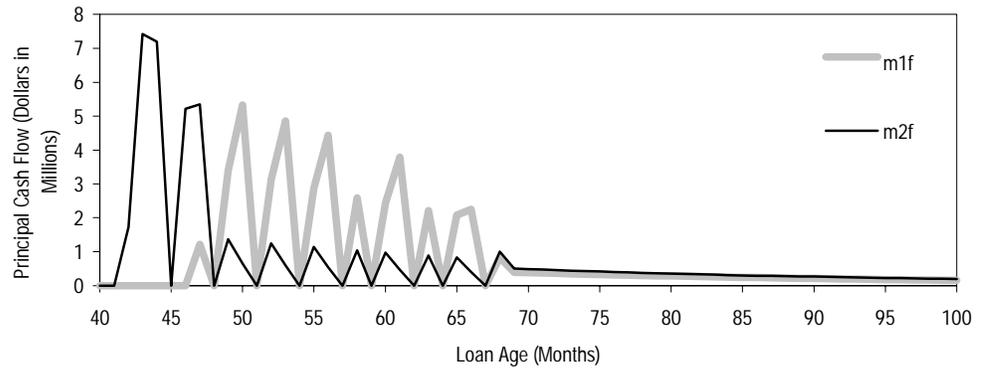
CPR = 40%										
DM										
Security	0	0.75	0.9	1	1.25	1.5	2	2.5	3	Always Fail
A3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
A4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
A5	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
A6	1	1	1	1	0.9	0.9	0.9	0.9	0.9	0.9
A7	1.7	1.7	1.6	1.6	1.4	1.3	1.3	1.3	1.3	1.3
A8	3.8	3.8	3.8	3.7	3.4	2.7	1.8	1.8	1.8	1.8
A9 (NAS)	4.5	4.5	4.5	4.5	4.4	4.5	4.2	3.4	2.2	2.1
M1F	2.6	2.6	2.6	2.7	3.1	3.4	3.9	4.5	5.5	3
M2F	2.3	2.3	2.3	2.3	2.4	2.6	2.9	3.2	3.6	4.3
B1F	1.8	1.8	1.8	1.8	1.8	2	2.3	2.6	2.9	5.6

DM Delinquency multiplier.  
 Source: Salomon Smith Barney.

*The subordinate structure does not become fully sequential under any realistic delinquency scenario.*

While the mezzanines and the B piece extend under increasing delinquencies, the calculated WALs are very different than the values obtained for a continuous failure of the stepdown test, even for high values of DM. This suggests that **the subordinate structure does not become completely sequential under any realistic delinquency scenario**. Rather, principal payments to subordinate bonds occur intermittently, as the stepdown test is alternately passed and failed. Figure 18 shows the principal cash flows to M1F and M2F under the constant prepayment rate of 30% CPR and delinquencies that are 1.25 times the model curve.

Figure 18. Principal Cash Flows to Mezzanines



Source: Salomon Smith Barney.

The results in Figures 17 and 18 suggest that the sequential limit is of little practical relevance in estimating the likely WAL extension. Even worse than significantly overestimating the WALs of the subordinate classes, it **underestimates** the WAL of the M1F.<sup>10</sup>

Loss of Principal

The risk of principal loss on one of the subordinate tranches due to realized losses on the collateral is small. As an illustration, we calculate the **average lifetime default rate** required for various non-triple-A bonds to sustain principal loss. The voluntary prepayment rate is taken to be 25% CPR, the recovery rate on foreclosed loans 50%, and the lag between foreclosure and recovery nine months. The required default rates are then 15.7% CDR for the double-A-rated M1F, 9.9% CDR for the single-A-rated M2F and 9.1% CDR for the triple-B-rated B1F. These rates are much higher than **peak** defaults observed on almost all HEL transactions.

*Risk of principal loss on subordinates is small.*

<sup>10</sup> Once the seniors have been paid off, M1F has priority over M2F and B1F and, therefore, shortens while the other two bonds extend.

**Figure 19. Percentage of ABS Floating-Rate and Fixed-Rate Issuance, 1998–99YTD**

	1998	1999
Floating Rate	40.3%	14.6%
Fixed Rate	59.7	85.4

Source: Salomon Smith Barney.

**Figure 20. Year-to-Date ABS Issuance by Sector, 1998–99 (Dollars in Billions)**

	1998 (YTD)	Pct.	1999 (YTD)	Pct.
Auto Loans	0.1	1.8%	\$3.2	55.2%
Credit Cards	2.0	35.7	0.0	0.0
Home Equity Loans	2.6	46.4	1.4	24.1
Manufactured Housing	0.9	16.1	1.2	20.7
Student Loans	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0
Total	5.6		5.8	

Source: MCM "Corporatetwatch."

**Figure 21. Comparison of Quoted Spreads and Static Spreads**

	Avg. Life (Yrs)	Quoted Spread (bp/Curve)	Static Spread <sup>a</sup> (bp)	Difference (bp)
Three-Year Bullet	3.00Yrs	63bp	58bp	5bp
Five-Year Bullet	5.00	67	56	11
Wide Window Auto <sup>b</sup>	1.81	72	70	2
Short Auto <sup>c</sup>	1.06	L+22	66	NA
Wide Window HEL <sup>d</sup>	3.63	130	122	8
Short HEL <sup>e</sup>	1.16	L+55	99	NA

<sup>a</sup> Static spread of bullets incorporates the richness or cheapness of the on-the-run Treasury benchmarks. <sup>b</sup> Assumes collateral original WAM of 60 months and remaining WAM of 54 months, 9% coupon, 1.3% ABS prepayment speed. <sup>c</sup> Assumes collateral original WAM of 60 months and remaining WAM of 30 months, 9% coupon, 1.3% ABS prepayment speed. <sup>d</sup> Assumes collateral remaining WAM of 174 months, 11% coupon, 20% CPR prepayment speed. <sup>e</sup> Assumes collateral remaining WAM of 120 months, 11% coupon, 20% CPR prepayment speed, security maturity in 30 months. bp Basis points. CPR Constant prepayment rate. HEL Home equity loan-backed securities. NA Not available. WAM Weighted average maturity.

Source: Salomon Smith Barney.

**Figure 22. Fixed-Rate ABS Secondary-Market Spreads to Benchmark Treasuries**

		AAA			A		
		29 Jan 99 Spread	1-Week Change	1-Year SD of 1-Week Spread Changes	29 Jan 99 Spread	1-Week Change	1-Year SD of 1-Week Spread Changes
2-Year	Retail Auto	65bp	0bp	5.1bp	115bp	0bp	8.2bp
	Credit Card	59	-1	4.5	78	-2	5.2
	Home Equity	110	-5	7.8	NA		
	Man. Housing	100	-10	6.5	NA		
3-Year	Wholesale Auto	63	0	4.6	83	-2	5.0
	Credit Card	63	0	4.5	83	-2	5.0
	Home Equity	120	-5	8.1	NA		
	Man. Housing	105	-10	6.6	NA		
5-Year	Wholesale Auto	67	0	5.8	90	-2	6.8
	Credit Card	67	0	5.9	90	-2	6.8
	Home Equity	145	-10	8.0	NA		
	Man. Housing	118	-22	7.7	NA		
7-Year	Wholesale Auto	77	-3	6.9	102	-3	8.0
	Credit Card	77	-3	6.9	102	-3	8.0
	Home Equity	170	0	10.2	NA		
	Man. Housing	135	-30	9.7	NA		
10-Year	Wholesale Auto	95	0	7.9	115	-5	8.4
	Credit Card	95	0	7.9	115	-5	8.4
	Home Equity	185	-5	12.1	NA		
	Man. Housing	170	-5	10.8	NA		

bp Basis points. NA Not available. SD Standard deviation.

Source: Salomon Smith Barney.

**Figure 23. Floating-Rate ABS Secondary-Market Discount Margins (over One-Month LIBOR)**

		AAA			A		
		29 Jan 99	1-Week	1-Year	29 Jan 99	1-Week	1-Year
		DM	Change	SD of 1-Week	DM	Change	SD of 1-Week
				Spread Changes			Spread Changes
2-Yr	Auto	10bp	0bp	1.8bp	30bp	0bp	2.7bp
	Credit Card	10	0	1.8	30	0	2.7
	Home Equity	35	0	3.4	100	0	6.8
3-Yr	Wholesale Auto	12	0	1.8	32	0	2.6
	Credit Card	12	0	1.8	32	0	2.6
	Home Equity	40	0	3.1	105	0	7.4
5-Yr	Wholesale Auto	15	-1	2.0	35	-2	3.0
	Credit Card	15	-1	2.0	35	-2	3.0
	Home Equity	50	0	3.1	110	0	8.1
7-Yr	Wholesale Auto	18	-2	2.4	45	-5	3.8
	Credit Card	18	-2	2.4	45	-5	3.8
10-Yr	Wholesale Auto	30	0	3.7	60	-3	4.0
	Credit Card	30	0	3.7	60	-3	4.0

bp Basis points. LIBOR London Interbank Offered Rate. SD Standard deviation.

Source: Salomon Smith Barney.

**Figure 24. Representative Secondary Trading Levels**

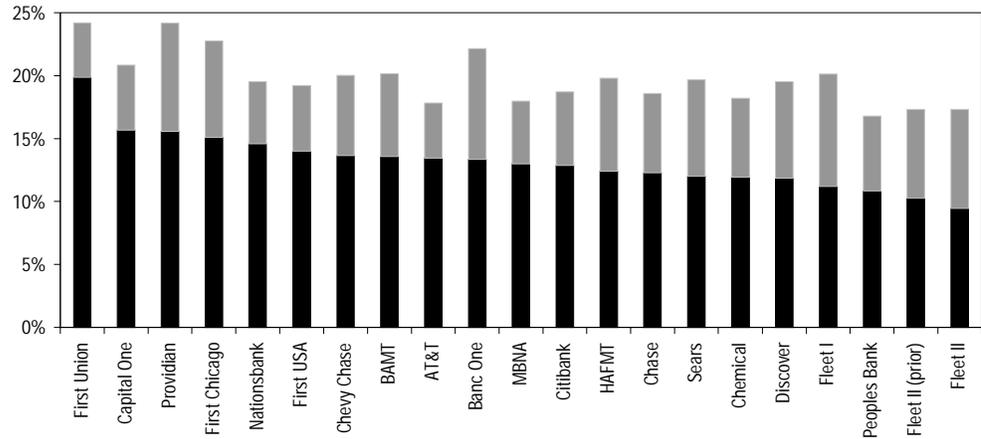
Floating-Rate Issue	Avg. Life	DM	Price	Cap
MBNA 97-N A	1.8Yrs	9	99-31	None
FUSAM 95-2 A	3.1	12	100-11	None
CCIMT96.5 A	4.6	14	99-27	None
MBNA 96-B A	7.1	18	100-15	None
FUSAM 98-6 A	9.5	29	99-00	None

Fixed-Rate Issue	Coupon	Avg. Life	Spread	Price	Yield	Static Spread
ONYX 98-1 A	5.95	1.5@1.6 ABSYrs	85bp	100-22	5.505	85bp
PRAT 98-3 A3	5.88	1.5@1.5 ABS	64	100-29+	5.294	64
CHAS 98-C A4	5.85	2.7@1.5 ABS	65	101-16+	5.306	65
CCIMT 98-1 A	5.75	2.0	59	100-30	5.233	59
FUSAM 97-6 A	6.42	3.5	63	103-21+	5.310	63
MBNA 97-1 A	6.55	5.6	70	105-24+	5.403	70
CCIMT 98-2 A	6.05	9.0	92	102-16	5.689	86

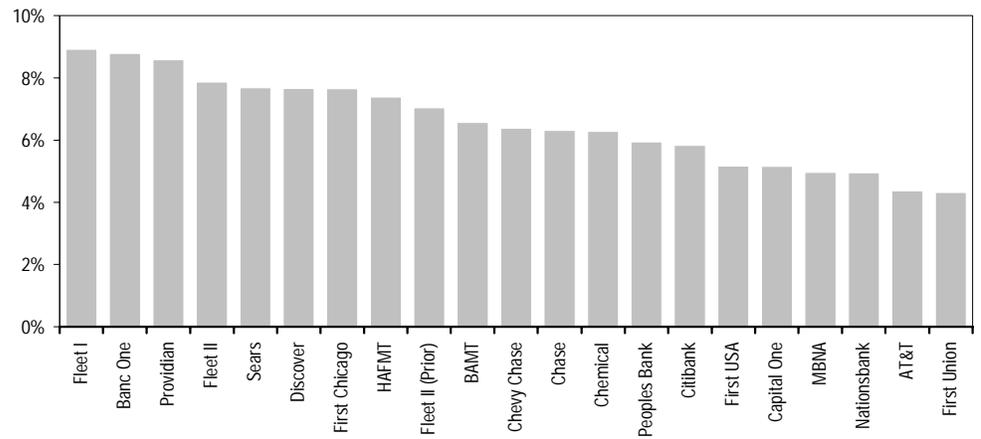
Source: Salomon Smith Barney.

**Figure 25. Credit Card Master Trust Gross and Net Portfolio Yields Reported for Dec 98**



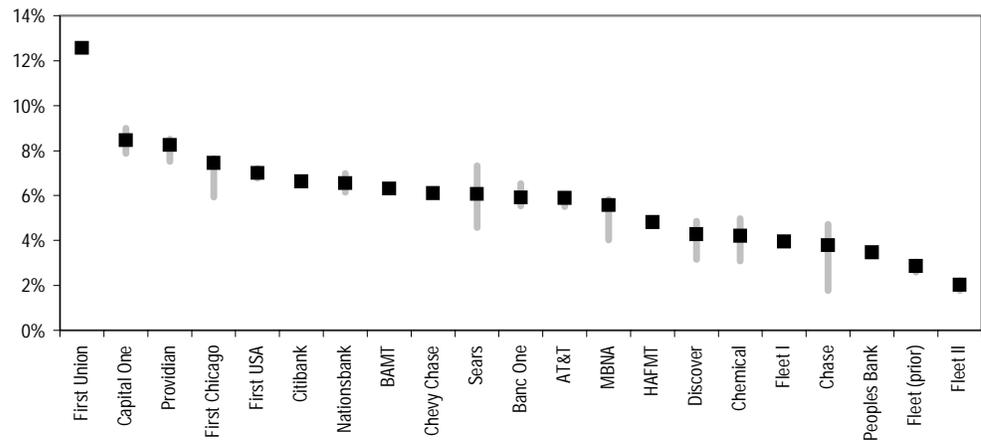
Sources: Master Trust 8Ks, Bloomberg, Bloomberg Credit Card Report.

**Figure 26. Credit Card Master Trust Defaults Reported for Dec 98**



Source: Master Trust 8Ks, Bloomberg, Bloomberg Credit Card Report.

**Figure 27. Credit Card Master Trust Excess Spreads Reported for Dec 98**



Note: The performance results for Fleet Credit Card Master Trust II (Fleet II) reflect a change in accounting that Fleet is implementing during October through December. As a result of this change, Fleet's defaults appear higher than they otherwise would have. For consistency with prior periods, we have included the results for Fleet II under both the old and new accounting methodologies.

Sources: Master Trust 8Ks, Bloomberg, Bloomberg Credit Card Reports.

Figure 28. Recent Issuance

Date	Issuer	Asset Type	Class	Size (Mil.)	Credit Enhancement	WAL	Pricing Speed	Spread	
1/26/99	Green Tree Financial Corporation 1999-1	MH	A-1	\$30.20	Sr/Sub	0.32	175% MHP	1/4ML	
			A-2	70.30		1.11		N/A	
			A-3	134.00		2.58		105/6.50 8/01	
			A-4	104.00		4.74		118/5.75 8/03	
			A-5	100.00		7.81		140/6.50 10/06	
			A-6	43.50		10.91		170/5.625 5/08	
			A-7	104.25		15.21		190/5.625 5/08	
			M-1	36.75		9.90		190/5.625 5/08	
			M-2	21.00		9.90		270/7.05 2/05	
			B-1	24.50		5.95		405/5.625 5/08	
B-2	31.50	13.22	NA						
1/22/99	Bombardier 1999-A	MH	A-1	\$35.00	Sr/Sub	0.99	160% MHP	N/A	
			A-2	31.00		3.00		113/6.25 2/02	
			A-3	22.00		4.97		137/5.875 2/04	
			A-4	34.00		10.07		178/5.625 5/08	
			A-5	14.38		16.78		168/5.25 11/28	
			M-A	13.50		11.32		210/5.625 5/08	
			M-s	9.00		11.32		300/5.625 5/08	
			B-1	8.55		11.32		5.625/5/08	
1/14/99	Block Mortgage Finance 1999-1 <sup>a</sup>	HE	A-1	\$79.00	100% MBIA	1.00	115% PPC	EDSF+60	
			A-2	48.00		2.99		130/6.25 2/02	
			A-3	16.00		5.25		155/7.25 5/04	
			A-4	19.00		7.49		185/6.875 5/06	
			A-5	18.00		6.29		147/6.50 5/05	
			A-6	165.00		2.60		28% CPR	1ML+49
			A-7	55.00		2.43			115/6.625 6/01
1/13/99	Oakwood Mortgage Investor Inc. 1999-1	MH	A-1	\$50.20	Sr/Mezz/Sub	1.10	200% MHP	1ML+32	
			A-2	44.30		3.10		113/Tsy	
			A-3	22.80		5.10		140/Tsy	
			A-4	53.19		10.92		185/Tsy	
			A-5	100.00		5.22		165/Tsy	
			M-1	22.83		9.61		215/Tsy	
			M-2	17.56		9.61		300/Tsy	
			B-1	15.81		9.41		410/Tsy	
B-2	24.59	9.74	490/Tsy						
1/13/99	Freddie Mac Structured Pass-Throughs T-15	HE	A-1	\$95.00	FHLMC Wrap	0.83	N/A	N/A	
			A-2	56.00		2.00		100/5.25 1/01	
			A-3	37.00		3.00		115/6.25 ½	
			A-4	70.00		5.00		140/5.875 2/04	
			A-5	31.00		6.70		160/6.50 8/05	
			A-6	505.00		2.70		1ML+20	
1/13/99	Option One Mortgage Loan Trust 1999-1	HE	A-1	\$66.00	100% FSA	2.98	N/A	165/6.25 1/02	
			A-2	128.00		2.73		1ML+50	
12/16/98	Union Financial Services 1998-A <sup>a</sup>	SL	A-7	\$125.00	Sr/Sub	3.93	7% CPR	105/5.625 12/02	
			A-8	125.00		5.04		110/5.75 8/03	
			A-9	125.00		6.26		120/7.50 2/05	
12/15/98	First USA Master Credit Card Master Trust 1998-9 <sup>a</sup>	CC	A	\$650.00	Sr/Sub	5.07	14.5% MPR	97/5YR	
			B	44.83		5.07		127/5Yr	
			C	52.30		5.07		180/5YR	
12/11/98	Arcadia Automobile Receivables Trust 1998-E	AL	A-1	\$64.00	100% FSA	0.93	1.6% ABS	60/EDSF	
			A-2	100.00		1.68		120/6.00 8/00	
			A-3	61.00		3.67		125/6.25 8/02	
12/10/98	NewCourt Equipment Trust Securities 1998-2 <sup>a</sup>	EL	A-1	\$322.00	Sr/Sub	0.43	6% CPR	5ML+7	
			A-2	85.30		1.00		42/EDSF	
			A-3	470.00		2.01		105/5.50 12/00	
			A-4	201.40		3.53		100/6.25 6/02	
			A-5	122.90		2.02		110/5.50 12/00	
			B	15.40		2.32		125/6.25 4/01	
			C	51.40		2.32		180/6.25 4/01	
			D	74.50		2.32		285/6.25 4/01	

<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 1st & 2nd liens. HE Home equity. HIL Home Improvement loan. MB Mortgage-backed. Mezz. Mezzanine. MH Manufactured housing. ML Motorcycle Loans. N/A 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."