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Impact of One-Year CMT Rates on the Valuation of ARMs

The Treasury recently changed the auction of the one-year bill from a monthly to a quarterly cycle. Though there is a possibility that the one-year bill auction might be discontinued,[10] it is important to understand the behavior of one-year CMT during the current quarterly auctions. The one-year bill auctioned in March 2000 remained the on-the-run bill for three months, when it was replaced by the bill auctioned in

[10] In this context, Gary Gensler, the undersecretary of the Treasury for Domestic Finance, said: "In February, we announced reductions in the frequency of issuance of one-year bills from 13 to four times a year. As our borrowing needs decline, it is likely that we will reduce or eliminate issuance of one-year bills."

June. This gave us an opportunity to study the impact on the one-year CMT over a full auction cycle.

Recent spreads between the one-year CMT and one-year bill: Figure 48 shows the spread between the one-year CMT and the one-year bill between March 9, 2000, and June 9, 2000. The one-year bill rate changed from the yield on the March issue to that of the June issue on June 1. The following are our observations.

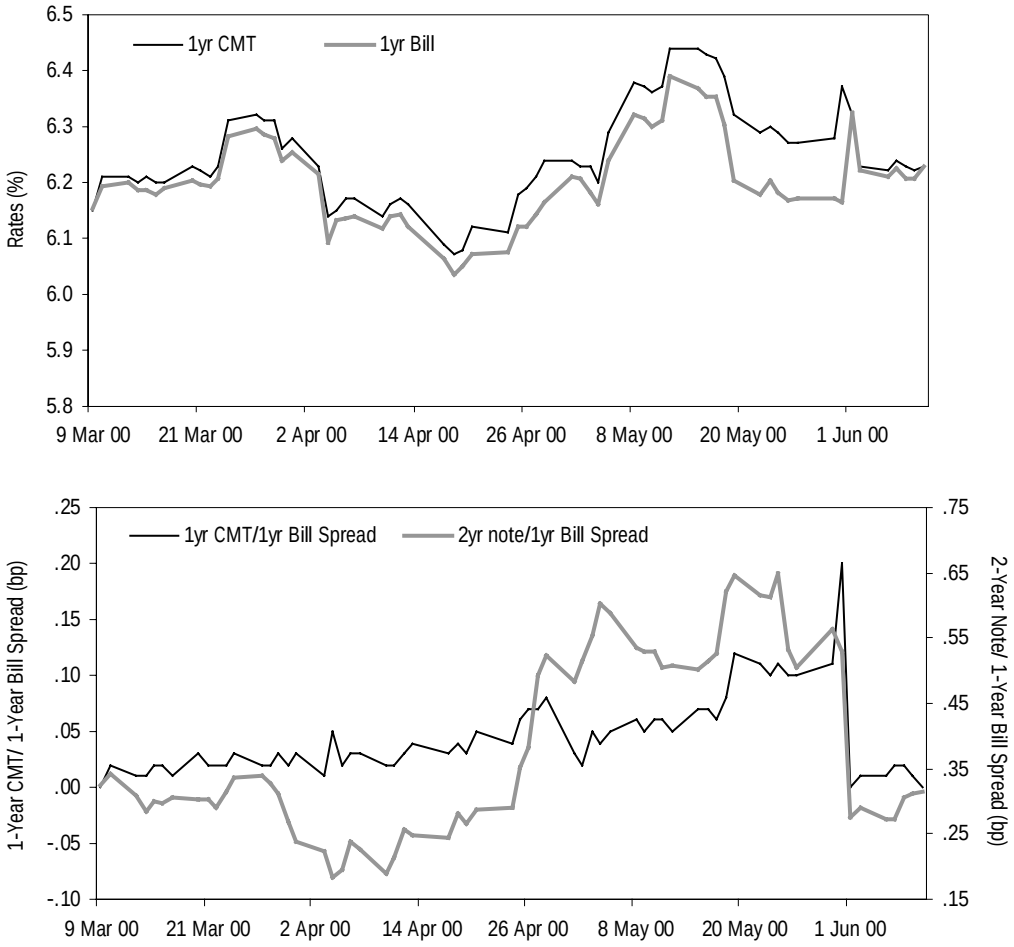
- The one-year CMT to one-year bill spread gradually widened until the end of the auction cycle (to almost 20bp at the maximum point) and then snapped back to 0bp on June 1 with the new issuance. At the end of the cycle, although the rate of the one-year bill jumped, the CMT rate remained relatively stable.
- The one-year CMT to one-year bill spread behaved similarly to the six-month bill to one-year bill spread, as well as the two-year note to one-year bill spread, especially around the end of the cycle. Historically, the one-year CMT to one-year bill spread has been relatively insignificant (and hence would have had little correlation to the six-month bill/ one-year bill spread or the two-year note/ one-year bill spread).

Although the Fed has likely taken into consideration the rolled-down one-year bill, as well as the six-month bill and the two-year note to determine the one-year CMT rate, it seems that the influence of the six-month bill and the two-year note has been greater than that in the past, especially at the end of the auction cycle.

Fitting a CMT curve: To test our concept, we fitted a simple cubic spline using the standard par yield nodes but *excluding* the one-year point (as denoted by the rolled-down one-year bill rate), on May 31, 2000, when the CMT/bill spread had reached its maximum. We show the results in Figure 49.[11] We got back a one-year rate very close to the published one-year CMT on that day. Hence, on the last day of the auction cycle, the one-year CMT appeared to be determined mainly by the six-month bill and two-year note rates, and hence the jump in the one-year CMT was much lower than that of the one-year bill rate on June 1.

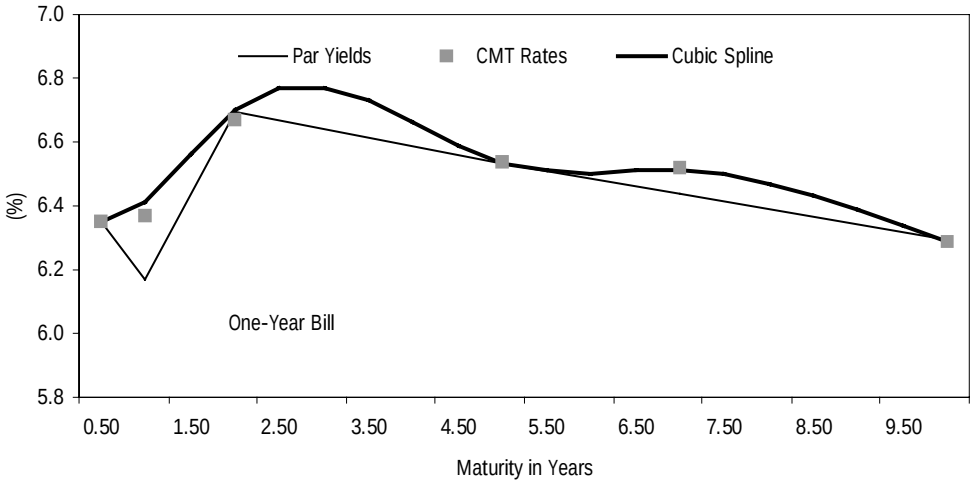
[11] The Fed uses the 13-week, 26-week, 52-week bills, the two-year and five-year on-the-run notes, the 30-year on-the-run bond and the off-the-run seven-year note and 20-year bond to fit a cubic spline. The constant-maturity yields are read off the fitted curve.

Figure 48. Spread Between the One-Year CMT and the One-Year Bill Rates (9 Mar 00–9 Jun 00)



Source: Salomon Smith Barney.

Figure 49. Comparison of Par Yields, CMT Rates, and a Spline-Fitted Yield Curve 31 May 00



Source: Salomon Smith Barney.

Limited impact of rich one-year bill rates on the one-year CMT: Hence, we note the similarity in the behavior of spreads (one-year CMT/one-year bill, two-year note/ one-year bill, and six-month bill/one-year bill), and the low weight on the one-year bill in the calculation of the one-year CMT close to the next one-year bill issuance. These facts seem to suggest that the Fed reduces the weight on the one-year bill in the one-year CMT calculation toward the end of the auction cycle. Going forward, we would expect the one-year CMT to become increasingly detached from the one-year bill as it rolls down the yield curve through the auction cycle. We also expect the movement of the CMT rate to be smoother than that of the one-year bill at the end of the cycle. Hence, the rich one-year bill might not have a significant impact on the securities indexed to the one-year CMT.

Extending the argument, in a situation in which the one-year bill is discontinued altogether, we would expect a similar balance between the on-the-run issues and the rolled-down securities. (In other words, if the yield on the rolled-down security moves away significantly from the interpolated yield using just the on-the-run issues, the latter are likely to have more influence on CMT rates).

Impact on valuation in the Yield Book: The Yield Book™ uses the one-year bill rate as a part of the par yield curve to value securities. In Figure 42, we show the impact of changing the one-year interest rate from the bill rate to the CMT rate on the valuation of a GNMA TBA 6.0% ARM (as of May 31, 2000).

Interestingly, though the difference in the bill rate and the CMT rate causes a significant change in yield to maturity and discount margin, it does not have a big impact on option-adjusted measures.[12] Using the CMT rate increases the yield to maturity on the pool because it increases the pool's future coupons (and, under current conditions, higher long-term prepays are not likely to offset the beneficial effect of the higher coupon). The discount margin is also affected since the coupons are not fully index for almost two years (because of reset periods and periodic caps).

However, there is no significant change in either OAS or effective duration[13] because the current (starting) value of the one-year rate is only partially responsible for determining the forward curves since the rest of the yield curve and the volatilities (which remain unchanged in the two methods of valuations) play a bigger role in determining the family of forward curves. In addition, an increase in the one-year rate has the opposing effect of increasing the coupons and discount rates.

[12] However, this is a discussion about how the Salomon Smith Barney model uses the one-year rate (and does not include any speculation on how the *actual* CMT rates would react compared to the forward rates used in the model).

[13] Also, for bonds closer to reset or in a situation in which the periodic cap is out-of-the-money in an unchanged scenario under *both* rate assumptions, the impact may be a few basis points higher.

Figure 50. Comparison of GNMA ARM Valuation Under Assumptions for the One-Year Interest Rate 31 May 00

Security	Cpn	WAC	Net Margin	Months to-roll	Price	1yr interest rate assumption	YTM	DM	Eff Dur	Eff Cnvx	Oas-to-tsy	Oas-to-swap	Projected Speed (% CPR) 1-yr	Projected Speed (% CPR) LT	Coupon Projection (%) 1yr	Coupon Projection (%) 2yr	Coupon Projection (%) 3yr
GNMA TBA ARM	6.00 %	6.75 %	150 bp	14	96-31+	@1yr bill rate of 6.17%	7.89 %	173 bp	2.54	-0.67	125 bp	4 bp	4.3	19.0	6.00	6.83	7.52
						@1yr CMT rate of 6.37%	8.01	165	2.51	-0.70	125	3	3.9	19.4	6.00	6.83	7.73
						Difference	0.12 %	-8 bp	-0.03	-0.03	0 bp	-1 bp	-0.4	0.4	0.00	0.00	0.21

Source: Salomon Smith Barney.