Federal Housing Finance Board

To: Federal Home Loan Bank Interest Rate Risk Modelers

From: Fred Graham, Associate Director, Risk Modeling Division,
Office of Supervision

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Subject: Technical Guidance for Calculation of Market Value of Equity
(MVE) and Duration of Equity (DOE) in Low Interest Rate
Environments and Related Reporting Requirements

Background

In advisory bulletin AB 03-09, the Office of Supervision provided Banks with a uniform method for implementing a parallel interest rate down shock when a full -200 basis point shock would cause some Treasury rates to fall below 35 basis points (0.35 percent). That bulletin also required Banks to calculate and report the effects on market value of equity (MVE) of a non-parallel rate shock when a full -200 basis point shock to the term structure would cause some rates to fall below 35 basis points (0.35 percent) but others to remain well above that rate.

In developing AB 03-09, we did not foresee the recent extremely wide spreads between the swap and CO curves and the Treasury curve. On March 19, 2008, for example, based on the Federal Reserve's H.15 Statistical Release, the one-month constant maturity Treasury rate was 0.26 percent. Using the method outlined in AB 03-09, such a low Treasury rate would produce, at most[1], a zero basis point constrained parallel down shock as the rate was already below the 0.35-percent threshold. On that same day, the one-month swap (LIBOR) rate was 2.70 percent, and the one-month CO rate was 1.82 percent. In this situation, therefore, the guidance in AB 03-09 would dictate a zero basis point down shock for the swap and CO curves. The swap and CO curves, however, could quite possibly experience a much larger down shock, the modeled effects of which would be of interest when assessing risk exposures. In other words, the Treasury curve, which has little direct effect on Bank business, is dictating the shock scenarios modeled for the swap and CO curves, which have significant direct effects on Bank business. The current technical guidance is designed to address this issue, to reduce the number of results we require Banks to report, and to override the guidance in AB 03-09.

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[1] We also did not foresee Treasury rates falling below 0.35 percent; so AB 03-09 does not actually address the appropriate shock for a situation such as this one.

When to Calculate a Constrained 200 Basis Point Down Shock

When interest rates are such that the -200 basis point parallel shock would produce some swap or CO rates below 0.50 percent, Banks should employ a smaller down shock (i.e., a constrained down shock).[2]

Two Alternative Methods for Calculating a Constrained Down Shock

Banks may choose either of the following methods to produce constrained down shock results in low-rate environments.

1) A Constrained Parallel Down Shock

Under this alternative, a Bank would submit results from a constrained parallel down shock that produces post-shock swap and CO rates no lower than 50 basis points. If a Bank's standard set of parallel shock scenarios includes a down shock scenario within 12.5 basis points of the prescribed shock, it may report the results from that shock rather than producing an additional shock scenario.

If, for example, the lowest swap or CO rate were the three-month CO rate of 2.10 percent, the constrained parallel down shock would be 160 basis points as such a shock would generate a post-shock three-month rate equal to 50 basis points. If a Bank's standard set of parallel shock scenarios included, say, a -150 basis point scenario, it could submit results from that scenario. Alternatively, if the lowest swap or CO rate were the one-month swap rate of 1.20 percent, the constrained down shock would be 70 basis points. In this case, if a Bank's standard set of parallel shock scenarios included, say, a -75 basis point scenario, it could submit results from that scenario. When the lowest swap or CO rate is 2.50 percent or above, Banks should use the full -200 basis point shock.[3]

Under this alternative, Banks should apply the same basis point reduction in rates to all maturities and all other rates, including Treasury rates where possible. In cases where a shock of this size would produce negative Treasury rates or Treasury rates that cause problems in calculating the effective duration of equity, Banks may choose one of the following approaches for Treasury rates:

(i) Shock Treasury rates by a smaller amount so that its lowest post-shock rate is 0.35 percent;

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[2] For the purpose of applying this guidance, a Bank should use the swap and CO rates that it would normally use to discount the cash flows for its instruments to assess whether a swap or CO rate falls below the threshold for instituting the procedures outlined here. If, for example, a Bank uses the TAP curve to discount its CO cash flows, then the TAP curve is the applicable curve for CO rates.

[3] A Bank could choose to report results for the full -200 basis point shock when the lowest swap or CO rate was as low as 2.375 because it would be within 12.5 basis points of the constrained down shock of 1.875.

(ii) If a Bank's model restricts any shock from producing negative post-shock rates, shock the Treasury curve by the same amount as the other curves and rely on this model feature to avoid generating negative rates; or,

(iii) If the effects of doing so are immaterial, leave the Treasury curve unshocked.

(The example in the Attachment shows the results of applying this procedure to hypothetical swap and CO curves, using approach (i) for the Treasury yield curves.)

2) A Constrained Non-Parallel Down Shock[4]

Under this alternative, Banks would submit results for a 200 basis point down shock from a model that imposes a zero boundary on post-shock rates. Such a boundary would allow base case rates that are above 2.00 percent to be shocked down by the full 200 basis points, while it would allow lower rates to be shocked down only to zero. Effectively, this would be a constrained non-parallel shock that, under most circumstances, would produce a down shock of 200 basis points at longer maturities in conjunction with a smaller down shock at shorter maturities.

A Bank choosing this approach should shock down the Treasury curve by the same amount and allow the model to constrain the lowest post-shock Treasury rates to fall no lower than zero, or, if the effects of doing so are immaterial, leave the Treasury curve unshocked.

Calculating the Duration of Equity Under Either Constrained Down Shock

To determine the post-shock DOE, Banks should calculate, using the same procedures they normally use, an effective duration based on the post-shock MVE.

Reporting Requirements

Effective September 30, 2008, when a 200 basis point down shock produces some post-shock swap or CO interest rates that are less than 50 basis points, all Banks should calculate, as of each quarter-end date, MVE and DOE corresponding to a constrained shock using one of the methods described above. The Banks should report these results on the CRS.NET lines normally associated with the full 200 basis point down shock. They should also report these results to the Office of Supervision, Risk Modeling Division (grahamf@fhfb.gov), as part of their quarterly submission of Data Items for Off-Site Market Risk Monitoring Data in the column normally used for the 200 basis point down shock. See the instructions and template available at http://resource.fhfb.gov/OffMRM_download.aspx. Note that Banks are no longer required to submit results from the specific non-parallel down shock described in AB 03-09.

Questions

Questions and comments regarding this guidance should be directed to Fred Graham, Associate Director, Risk Modeling Division, Office of Supervision, at (202) 408-2960, or grahamf@fhfb.gov.

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[4] Note that this constrained non-parallel down shock differs from the one described in AB 03-09.

Example:

Constrained Parallel down shock scenario

Term	1 mo	3 mo	1 yr	2 yrs	5 yrs	10 yrs	30 yrs
Actual base swap rates	1.90	1.85	1.95	2.00	2.40	3.40	4.00
Actual base CO rates	1.70	1.65	1.80	1.90	2.35	3.50	4.10
Actual base Treasury rates	1.20	1.10	1.25	1.35	1.65	2.45	3.00
*Rate shock - CO and swap	-1.15	-1.15	-1.15	-1.15	-1.15	-1.15	-1.15
**Rate shock - Treasury	-0.75	-0.75	-0.75	-0.75	-0.75	-0.75	-0.75
Swap rates in down- shock scenario	0.75	0.70	0.80	0.85	1.25	2.25	2.85
CO rates in down-shock scenario	0.55	0.50	0.65	0.75	1.20	2.35	2.95
Treasury rates in down-shock scenario	0.45	0.35	0.50	0.60	0.90	1.70	2.25

*For this example, if a Bank regularly produced parallel shock results for shocks of, say, -125 basis points (within 12.5 basis points of -115), it may opt to submit those results.

**If all Treasury rates were such that they could accommodate the down shock used for the CO and swap curves without producing unreasonable results or, if the Bank's model restricts any rate from being shocked below zero, then the Bank should apply the same shock to the Treasury rates. Alternatively, if the effects are immaterial, a Bank may opt to leave the Treasury curve unshocked.

Constrained Parallel Down Shock