

Possible Legislative Guidelines for Constructing the Corporate Bond Yield Curve

March 10, 2006

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POSSIBLE LEGISLATIVE GUIDELINES FOR CONSTRUCTING THE CORPORATE BOND YIELD CURVE

S. 1783 and H.R. 2830 provide that the interest rates used to measure pension liability will be determined on the basis of a yield curve that the U.S. Department of the Treasury (Treasury) will construct. The bills provide little direction to Treasury other than to state that the yield curve is to be based on “investment-grade corporate bonds” and that liability is to be valued using three “segment” interest rates derived from the yield curve.

It is critical that final legislation specify the basic parameters of the yield curve. The interest rate is arguably the most important assumption in the calculation of pension liabilities. Pension plans need to manage interest rate risk, i.e., the risk that interest rate movements will increase minimum contributions. To manage interest rate risk, most plans invest a portion of their assets in the same types of bonds that are used to measure their liability. How plans “hedge” their liabilities against interest rate fluctuations may also be affected by the availability of the bonds that underlie the rates used to measure that liability. Final legislation needs to ensure that the yield curve reflects an “investable” universe of bonds to allow plans to manage their interest rate risk.

It is also important that the legislation ensure that the yield curve is transparent and capable of being replicated in the marketplace. To this end, an open process and sufficient time for input from stakeholders is needed. A yield curve is not a market instrument like a bond. It is a tool that must be estimated from market instruments and behavior and its creation is as much art as science. It is absolutely essential that financial experts have a meaningful opportunity to analyze and comment on the myriad complex decisions that will ultimately produce the yield curve. While Treasury has published a white paper (with a recent update) on how it would construct a yield curve, these papers do not allow interested parties to fully understand the Treasury approach. For example, the papers do not link Treasury’s theoretical approach to market data and do not consider other approaches to extracting a yield curve. A meaningful opportunity and sufficient time to comment is essential.

Bond Classes

One of the most important elements of the yield curve is the classes of bonds that will be taken into account. From the perspective of investability, the final legislation should expressly provide that the top four classes of corporate bonds (AAA, AA, A and BBB-rated bonds) are to be included in the yield curve. These bonds comprise the category of bonds known as investment-grade. The vast majority of investment-grade bonds that are available for plan investments are A- and BBB-rated and a yield curve that does not reflect those bonds will make it very difficult for pension plans to invest in the bonds that underlie the yield curve.

The chart below summarizes the number of issues and the market value of outstanding corporate bonds as of February 28, 2006.

Issues and Market Value by Rating Category¹				
Bond Type	AAA	AA	A	BBB
Number of Issues	122	439	1285	1284
Market Value (in billions)	\$99	\$343	\$779	\$671

As reflected in these numbers, the corporate bonds that plans can invest in are predominantly within the bottom two categories of investment-grade bonds, which comprise over 75 percent of all investment-grade corporate bonds (77 percent by market value; 82 percent by number of issues). It would be inappropriate, for example, to use only AA-rated bonds -- as the Treasury initially proposed -- because there are simply too few AA bonds for plans to invest in. Efforts to do so could create market dislocations by creating an imbalance in supply and demand. In this regard, it is particularly important that BBB-rated bonds be included in the yield curve because they represent more than 40 percent of all investment-grade corporate bond issues.

Apart from number of issues, there are also problems with the lack of diversity among the bonds that are included in the top two tiers -- AAA and AA-rated bonds. These bonds tend to be concentrated within certain sectors of the economy and tend to be issued in large part by only a handful of issuers. Over 80 percent (by market value) of the AAA and AA bonds are issued by companies in the financial sector. By contrast, just under 50 percent of A bonds are issued by companies in the financial sector, and under 10 percent of BBB bonds are issued by companies in the financial sector.² At this time, there are only seven AAA issuers. It is essential that the yield curve not reflect a bias toward a particular sector (and certainly not a particular company) because that bias will inevitably introduce unnecessary volatility into the yield curve.

Bond durations also make AAA and AA-rated bonds problematic as the basis for a yield curve. As a general matter, the market for bonds that mature within the third segment of the yield curve (20 plus years) is extremely thin. Within this already thin market, BBB-rated bonds account for approximately 42 percent of all investment-grade corporate bonds. This contrasts to the first two segments of the yield curve (maturities of less than 20 years) where BBB bonds are only 34 percent of the corporate bond universe.³

The effect of including BBB bonds in the yield curve is material in terms of enhancing the investable universe but modest in terms of its effect on liability measurements. In this regard, the spread between the Merrill Lynch A-AAA corporate bond index (comprised of AAA, AA and A-rated bonds) and the Merrill Lynch BBB-AAA corporate bond index (comprised of AAA, AA, A and BBB-rated bonds), both of which weight by market prevalence, finds a difference of less than 14 basis points as of February 28, 2006. In

¹ Data derived from Merrill Lynch corporate bond indices.

² Ibid.

³ Ibid.

other words, adding BBB-rated corporate bonds to a blend of AAA, AA, and A-rated bonds increases the effective discount rate by only about one-eighth of one percent.

Weighting

Another element of the yield curve that is critical is weighting. S. 1783 and H.R. 2830 are silent on the weighting to be given to the different bonds that comprise the yield curve. Judgments about how to weight the bond classes can have an enormous impact on the yield curve as well as on pension plan investments. It is essential that the final legislation specify the weighting of the bonds. In this regard, consistent with the principle of investability, the yield curve should weight the bonds based on market value. Market value reasonably approximates the market prevalence of bonds and therefore reflects the bonds that are available for investment. As illustrated above in the chart, the overwhelming market value is bonds in the lower two tiers of investment-grade corporate bonds. That is, consistent with the number of bond issues illustrated in the chart, the vast majority of investment-grade bond dollar value is also in BBB and A-rated bonds.

Moreover, any approach that does not weight based on market prevalence would significantly undermine the ability of plans to invest in the bonds that underlie the yield curve. In this regard, for example, Treasury recently published an update to its white paper on constructing the yield curve. The update nominally uses AAA, AA and A-rated bonds to construct the yield curve, but the three different bond classes are weighted equally. This makes no sense given that the overwhelming preponderance of bonds in these classes are A-rated bonds. Further, an equal weighting approach would make investing in the bonds that make up the yield curve very difficult, if not impossible. Significantly, Treasury's approach is directly contrary to the standard weighting methodology among major corporate bond indices.

Segment Rates

S. 1783 and H.R. 2830 direct Treasury to establish three segments of interest rates derived from the yield curve. The first segment rate applies to payments expected to be made during the five-year period beginning on the first day of the plan year; the second segment rate applies to payments expected to be made between 5 and 20 years; and the third segment rate applies to payments expected to be made after 20 years. It is these segments that will actually be used to measure liability. However, the bills do not provide guidance as to how Treasury is to determine the segment rates and it is critical that final legislation address the segment rates appropriately.

The only guidance in the bills could actually complicate the process of developing accurate yield curve segments. The bills provide that each segment rate is a single interest rate determined monthly by the Secretary of the Treasury "on the basis of the corporate bond yield curve for such month, taking into account only that portion of such yield curve which is based on bonds maturing during" the segment. This appears to assume that the yield curve is based directly on corporate bonds that are available in the marketplace. In fact, the yield curve will be based only indirectly on corporate bonds that

are available in the marketplace. In creating a yield curve, it is generally accepted that corporate bonds, which are overwhelmingly coupon bearing, need to be converted into equivalent hypothetical zero coupon bonds (i.e., bonds that provide a single payment at a future time when the bond matures). Without this adjustment, a yield curve based on “bonds maturing” during the segment periods would appear to include coupon payments that have a shorter duration than the bonds maturing during the segment. That is, virtually all coupon bearing bonds maturing in the second or third segment would have coupons that are payable in the first and second segments. This could produce estimates that overweight the front end of each segment.

In addition to this drafting issue, it is important that the legislation spell out the manner in which the segment rates are derived from the yield curve. For example, without any guidance, it appears that each segment rate could be based on any particular point in time during the segment. For example, the second segment (5 to 20 years) could be based entirely or primarily on six-year bonds. Congress should provide direction to Treasury on how to set the segment rates because it would be inappropriate to vest this much discretion in the hands of regulators. The most accurate solution to arriving at a single segment discount rate would be to geometrically average the zero coupon yields at each semi-annual maturity point.⁴ For example, the rate for the second segment (5 to 20 years) would be the geometric average of the rates for 5 years, 5.5 years, 6 years, etc.

Finally, transparency and public comment are particularly critical for construction of the third segment of the yield curve since the availability of appropriate bonds with maturities greater than 20 years is very limited.

Transparency

It is critical that the legislation require Treasury to publish a description of the methodology used to determine the yield curve and the segment rates that is sufficiently detailed to permit financial experts to review and critique Treasury’s approach and enable plans to make projections.

As indicated above, the yield curve is not a market instrument. It is derived and created with significant discretion and variation in results depending on particular judgments. In this regard, for example, the yield curve is not created by simply taking bond prices and determining the implicit interest rate in those bonds. As mentioned above, coupon bearing bonds need to be converted to hypothetical zero coupon bonds. Similarly, bond issues that are “too small” because they are not investable need to be screened out. Moreover, in developing the yield curve, data is not available for every point on the yield curve. In filling these gaps, significant discretion is involved in placing the nodes (called cubic splines) that determine the slope of the yield curve. All of these decision points can have a material effect on the yield curve and it is critical that these decisions not get made in a black box or without time for adequate input.

⁴ The Treasury white paper published the yield curve interest rates on a semi-annual basis.

One particularly noteworthy issue is the extent to which bonds with embedded options, such as calls, should be considered in constructing the curve. We are not aware of any firm data on the prevalence of embedded options. Anecdotal experience suggests that corporate bonds with embedded options that potentially affect the implicit interest rate on these bonds may represent anywhere from one-fifth to one-third of all corporate bonds.⁵ These embedded features can greatly distort the implicit interest rate, particularly for bonds of longer duration. There are different approaches that can be taken to account for these embedded options. Because of the absence of a single consensus method of accounting for embedded options, these features could add enormous discretion to the construction of the yield curve. However, given the very large percentage of corporate bonds that include embedded options, we believe that these bonds should be included in the yield curve for purposes of broadening the universe of included bonds. Nonetheless, the necessary bond price adjustment to account for embedded options is extremely complicated and we are concerned about the manner in which these adjustments are made. It is absolutely essential that this methodology be fully disclosed and vetted.

S. 1783 and H.R. 2830 do not provide for public comment on the proposed methodology that will be used in constructing the yield curve and it is important that the final bill provide for such a process. For example, the legislation should require that Treasury disclose the methodology by which bonds are selected and rejected, the universe of bonds that were considered, which bonds are reflected in the yield curve, the mathematical formulas for converting bond yields into the yield curve (including the formula for adjusting bond prices to account for embedded options), the methodology for estimating the slope of the yield curve, and the methodology for developing rates to be used for the third segment of the yield curve (20 plus years). The legislation should also ensure a meaningful opportunity to comment by providing that the regulations will not become effective until after a period of public comment of at least 180 days.

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Possible statutory language and conforming legislative history consistent with the parameters discussed above is attached.

⁵ A paper published by the Society of Actuaries on constructing the yield curve suggests that corporate bonds with embedded options may represent as much as one-third of all corporate bonds. However, it is not clear whether this takes into account options that do not affect interest rates, for example, options with “make-whole” features. Hofling et al., Understanding the Corporate Bond Yield Curve, The Pension Forum Vol. 15, No. 1 (2004).

Possible Statutory Language

‘(C) SEGMENT RATES.- For purposes of this paragraph –

(i) FIRST SEGMENT RATES.- The term ‘first segment rate’ means, with respect to any month, the single rate of interest which shall be determined by the Secretary of Treasury for such month and that produces the same present value as would be developed under the yield curve for payouts during the 5-year period commencing with such month.

(ii) SECOND SEGMENT RATES.- The term ‘second segment rate’ means, with respect to any month, the single rate of interest which shall be determined by the Secretary of Treasury for such month and that produces the same present value as would be developed under the yield curve for payouts during the 15-year period beginning at the end of the period described in clause (i).

(iii) THIRD SEGMENT RATES.- The term ‘third segment rate’ means, with respect to any month, the single rate of interest which shall be determined by the Secretary of Treasury for such month and that produces the same present value as would be developed under the yield curve for payouts during the periods beginning at the end of the period described in clause (ii).

(D) CORPORATE BOND YIELD CURVE.- The term ‘corporate bond yield curve’ means, with respect to any month, a yield curve which is prescribed by the Secretary of the Treasury for such month and which reflects the average, for the 12-month period ending with the month preceding such month, of yields on the top four classes of investment-grade corporate bonds with varying maturities. Such regulations shall not become effective until after a period of public comment of at least 180 days. The Secretary is directed to weight the classes according to market value.’⁶

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‘(F) PUBLICATION REQUIREMENTS.- The Secretary of the Treasury shall promulgate regulations that prescribe the methodology used to determine such yield curve and such rates which is sufficiently detailed to enable plans to make reasonable projections regarding the yield curve and such rates for future months based on the plan’s projection of future interest rates. The Secretary of the Treasury shall publish for each month the corporate bond yield curve for such month and each of the rates determined under this paragraph for such month.’

⁶ This paper does not address the appropriate period over which interest rates should be determined and the possible legislative language above follows the approach in S. 1783 that determines interest rates over a 12-month period. We believe, however, that material smoothing of interest rates is needed to provide for predictability and to minimize volatility.

Possible Legislative History

“Each segment rate is a single interest rate determined monthly by the Secretary of the Treasury so as to produce equivalent present value results as the full corporate bond yield curve. In order to determine the present value under the corporate bond yield curve, an assumption must be made with respect to the pattern of plan payments during each segment. It is intended that the Secretary of the Treasury shall assume equal plan payments each year during each segment. It is further intended that the Secretary of the Treasury shall assume that plan payments in the third segment shall continue for such period determined by the Secretary of the Treasury based on projections of payment periods for typical plans, provided that such period shall be no less than 20 years.”

“In developing the corporate bond yield curve, the Secretary of the Treasury shall take into account investment-grade corporate bonds at every quality level. Because the intent is to use as broad and deep a class of investment-grade corporate bonds as possible, the different classes and issues of bonds shall be weighted in proportion to the value of such bonds in the market.”

“Regulations published for comment shall include the methodology by which bonds are selected and rejected, the universe of bonds that were considered, which particular bonds are reflected in the yield curve, the mathematical formulas for converting bond yields into the yield curve (including the formula for adjusting bond prices to account for embedded options), the methodology for estimating the slope of the yield curve, and the methodology for developing rates to be used for the third segment of the yield curve. The list of all bonds used in developing the yield curve should be published monthly in a Revenue Notice.”