PPA...READY OR NOT
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Note from the editor: 2008 is upon us. Pension reform, a concern for most of the decade, is here. This article provides a review of the single-employer funding rules under PPA, reflecting regulatory guidance through December 2007. The discussion does not cover special issues for hybrid plans and does not consider at-risk calculations or benefit restriction rules.

Overview

Many of the mechanical aspects of the minimum-required and maximum tax-deductible pension funding calculations under PPA are fairly well understood by now.

Beginning in 2008, a plan's minimum funding requirement for a plan year, determined as of the valuation date (which must be the first day of the plan year for plans with at least 100 participants) is equal to the target normal cost plus an amortization payment on any unfunded liability. So far, this is all very familiar.

Plan liabilities (the funding target and target normal cost) are calculated using the unit credit funding method. For pay-related plans, benefit increases due to current year pay are reflected in the normal cost, very much like current liability or ABO calculations. For tax deduction purposes, liabilities may reflect the value of future pay increases on benefits earned to date — a projected unit credit or PBO-type number.

It may be useful to think of PPA funding rules as putting pay-related and non-pay related plans on a similar footing, with required contributions based on benefits earned to date and tax deductions that are indexed for pay (or assumed multiplier increases based on past practice.)

If this were all there was to it, we might be forgiven for wondering what the big deal is. However, the assumptions used to determine the funding target differ from those used for current liability in a couple of important ways, and the mechanics for setting up bases and amortizing unfunded liabilities is different from prior law.

Let's look at assumptions first. PPA provides new rules around several important assumptions used to measure pension liabilities, including mortality, interest rates, and the valuation of lump sum benefits, as discussed below. Afterwards, we'll touch on other aspects of the minimum funding calculations, including asset valuation and amortization calculations.

Mortality

PPA changed the mortality used to value pension liabilities, but the IRS effectively accelerated the adoption of the new mortality basis by requiring its use in calculating current liability for 2007.

The mortality table is based on RP 2000, which was developed based on the experience of participants in single-employer US pension plans, so it is arguably a better reflection of plans' anticipated mortality than other tables. RP 2000 publishes separate tables for annuitants and non-annuitants, and PPA requires separate annuitant and non-annuitant mortality be used for plans with more than 500 total participants.

The standard mortality rates under PPA are determined separately for periods prior to and after benefit commencement. Prior to benefit commencement, rates are based on the RP 2000 non-annuitant table projected (using scale AA) 15 years beyond the valuation year — for 2008 valuations, that's a 23 year projection. For periods after benefit commencement, rates are drawn from the RP 2000 annuitant table, projected seven years beyond the valuation year.

For plans that only pay annuities, the new mortality table may increase liabilities as much as 7-8 percent for heavily male populations. Since the new table was required for 2007 current liability, plans should already be aware of the impact.

For annuity plans, the impact of the new mortality table will be more significant than any other change to the liability calculation for 2008.

For plans that pay lump sums, the opposite is true: since these plans are not underwriting significant mortality risks, they saw little impact on liabilities due to the new mortality table in 2007, but will see a more significant increase in liabilities (barring a change in the calculation of lump sum benefits under the plan) in 2008.

The mortality used in each valuation after 2008 will be slightly lower than the preceding year's table, producing liability "creep" of maybe 0.1-0.2 percent per year.

The rules do allow for the use of a fully generational version of the RP 2000 mortality table, which will generally increase liabilities by about 2 percent as compared with the standard table, while eliminating the "creep" alluded to above.

Finally, large plans (with 1,000 deaths per gender over a four-year period) can submit tables based on their own experience (with Scale AA generational improvements added in). However, our sense is that obtaining IRS approval for this change may be difficult and not timely.

Interest Rates

The most challenging computational aspect of the new funding rules is the use of a yield curve, rather than a single interest rate, to discount plan liabilities. The key point in applying the yield curve to plan cash flows is that the curve is composed of spot rates— i.e., yields available on zero-coupon bonds that mature at that point. So, cash flows for any given year under a plan will be discounted to the valuation date using a single interest rate, but different rates will apply to cash flows at different points in time. The example below illustrates these calculations:

Example 1

Year	(a) Benefit Payments	(b) Discount Period (Years)	(c) Interest Rate (Oct 2007)	(d) Discount Factor, $\{1/[1+(c)]\}^{\wedge}(b)$	(e) Liability, (a) x (d)
2008	1,000	0	-	1.0000	1,000
2009	1,200	1	5.09%	0.9516	1,142
2010	1,400	2	5.05%	0.9062	1,269
2011	1,300	3	5.12%	0.8609	1,119
2012	1,100	4	5.26%	0.8146	896
2013	900	5	5.41%	0.7684	692

The example assumes cash flows occur at the beginning of each year and applies the corresponding rate from the yield curve to each of those cash flows.

The published yield curve includes rates at 6-month intervals, and actuaries will need to think about how to apply the curve to actual valuations. Depending on the form of payment assumed (lump sums vs. annuities) and the timing of decrements (beginning or middle of year), it may make sense to use beginning of year yield curve rates, middle of year rates, or both in a given valuation.

The PPA yield curve is similar to curves many actuaries are familiar with from consulting around FAS 87, but there are a couple of differences:

(1) Single-A and triple-A bonds are included, in addition to double-A. Since there are lots more single-A bonds than triple-A and the curve reflects this weighting, this produces slightly higher rates than under FAS 87.
(2) Yields are based on bid prices. Auditors may prefer data from actual trades or a bid/ask average. Again, the PPA methodology produces slightly higher rates.
(3) Rates are averaged over one month, rather than being based on a specific day. So, the PPA curve will be slightly less volatile than FAS 87, and liabilities may diverge from "market liabilities" based on a significant within-month movement in rates.

Based on the data so far, it appears the PPA yield curve will produce "effective interest rates" within about 0.1-0.2 percent of FAS 87 rates. In most cases, PPA liabilities valued using the full yield curve should provide a reasonably tight fit with "market liabilities" for purposes of liability-driven investment strategies.

But PPA doesn't require the use of the full yield curve to value liabilities. As one of the more dubious aspects of pension simplification, PPA introduces the concept of "segment rates." The first segment rate is simply the average of the first ten data points from the yield curve (maturities 0.5 through 5.0), the second segment rate is the average of the next thirty data points (5.5 through 20.0), and the third segment is the average of the next eighty data points (20.5 through 60.0).

The impact of using segmented interest rates vs. the full yield curve to value liabilities is negligible, a couple of basis points at most (apart from unusual cases for small plans where the liability is concentrated among a few participants and the yield curve is steep). The salient difference between these two methods, however, is that, under PPA, plans that use segment rates base the rates on 24-month, rather than 1-month, averages. In essence, the difference between the full yield curve and the segment rates is the 24-month smoothing, not the segmenting itself.

The example below applies the 24-month segment rates in lieu of the full yield curve from example 1:

Example 2 - 24 Month Average Segment Rates

	(a)	(b)	(c)	(d)	(e)
			Interest		
		Discount	Rate	Discount	
	Benefit	Period	(Oct	Factor,	Liability,
Year	Payments	(Years)	2007)	{1/[1+(c)]}^(b)	(a) x (d)
2008	1,000	0	-	1.0000	1,000
2009	1,200	1	5.31%	0.9496	1,139
2010	1,400	2	5.31%	0.9017	1,262
2011	1,300	3	5.31%	0.8562	1,113
2012	1,100	4	5.31%	0.8131	894
2013	900	5	5.88%	0.7515	676

One curiosity of the segmenting approach is that the 5.0 rate from the full yield curve (5.41 percent), which is used to discount the 2013 benefit payments in Example 1, is included in the calculation of the first segment rate in Example 2, while the second

segment rate from Example 2 (5.88 percent), which is used to discount the 2013 benefit payments in Example 2, is based on rates during the period 5.5 to 20.0 years. C'est la vie.

In addition to the full yield curve/segmented yield curve decision (which is essentially a smoothing decision), plans have the option to phase-in to the PPA interest rates, using a weighted average of the PPA rates and the pre-PPA (4-year long-term corporate bond average) basis. The phase-in would use 2/3 of the pre-PPA basis for 2008 and 1/3 for 2009. The phase-in is the default election, so plans that do not wish to use the phase-in must make an affirmative election not to do so.

Finally, plans have the option of choosing from among five "lookback" months for determining interest rates. Note that for plans that use the phase-in and blending with pre-PPA rates, the same lookback month used for the post-PPA rate will be used to determine the pre-PPA rate (and not the one-month lookback that was effectively dictated under pre-PPA law).

Based on recent IRS guidance, it does not appear that plans that adopt the full yield curve have access to the phase-in or lookback options. In any event, it seems unlikely that plans using the full yield curve would be interested in the phase-in or lookback options anyway.

All told, plans will be able to choose from at least 11 combinations for determining the 2008 interest rate. How do we help them navigate?

In general, whatever plans choose for 2008 will determine the approach used in subsequent years unless the plan gets IRS approval for a change. There are, however, two exceptions to this:

(1) Plans that use 24-month segment rates can move to the full yield curve later.
(2) Plans that adopt the phase-in for 2008 can choose not to apply the phase-in for 2009.

Why might a plan choose to adopt the full yield curve? Generally, this approach will be attractive to sponsors that wish to "mark liabilities to market." Plans may wish to do this for a variety of reasons:

(1) As part of an asset/liability matching strategy
(2) To improve the transparency of the plan's funded status
(3) To better align funding and accounting liabilities

At the other end of the spectrum, a sponsor with a more traditional asset allocation may want to maximize the predictability and minimize the volatility of pension funding.

In this case, the 24-month segment rates will reduce volatility and the August lookback month will maximize the predictability of future pension funding.

As for the phase-in, this is a comparatively minor decision, since it only affects results for the next two years. For all but very short duration plans, the phase-in will produce lower interest rates (i.e. higher liabilities) for 2008. For many long duration plans, this will continue to hold true for 2009, in which case the phase-in has no value. For some shorter duration plans, however, the phase-in may produce higher rates for 2009, particularly if interest rates move lower in the months ahead.

Rather than merely identifying the approach that produces the best 2008 result, plans will want to consider the longer-term impact of the PPA interest rate decision. The graphs below estimate the effective interest rate for a short and long duration plan for 2008 and 2009. For purposes of the estimates, we assume no change in the shape of the yield curve after January 7, 2008 (monthly averages after December 2007 are

estimated):

Example 3 - Estimated effective interest rates for 2008 and 2009
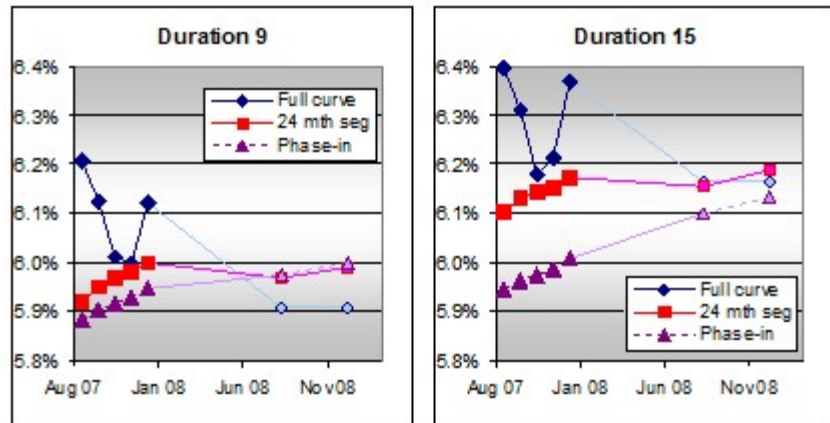
The graphs reinforce a couple of points made above: (a) 24-month segment rates produce less volatile results, and (b) the phase-in is of limited value.

In the preamble to recently-released proposed regulations, the IRS has indicated that the basis used to determine the plan's funding target for minimum funding purposes will carry over to other PPA liability calculations, such as the maximum deductible contributions and the AFTAP calculations in connection with benefit restrictions under IRC section 436.

Finally, for all the attention paid to the subject, the fact is that the new interest rate basis will not be a major source of disruption for most plans for 2008. The maximum current liability rate for January 2007 was 5.78 percent. As you can see, the effective rate for 2008 for most plans will be higher.

The table below summarizes the 24-month segment rates (with and without phase-in) for each lookback month of relevance for January 1, 2008 valuations:

Lookback Month	Segment Rates			Segment Rates with Phase-in		
	1st	2nd	3rd	1st	2nd	3rd
August 2007	5.26%	5.82%	6.38%	5.66%	5.85%	6.03%
September 2007	5.29%	5.86%	6.40%	5.68%	5.87%	6.05%
October 2007	5.31%	5.88%	6.40%	5.70%	5.89%	6.06%
November 2007	5.31%	5.90%	6.41%	5.70%	5.90%	6.07%
December 2007	5.31%	5.92%	6.43%	5.72%	5.92%	6.09%

Valuation of Lump Sums

Prior to PPA, pension liabilities were discounted using long-term corporate bond rates, but lump sum benefits were determined using 30-year Treasury rates. Valuation rules, specifically for current liability, did not allow plans to reflect the additional liability associated with the fact that the yield on 30-year Treasuries is lower than that on long-term corporate bonds.

Under PPA, this situation has been corrected, so that any "subsidies" associated with lump sum payments versus the PPA yield curve must be reflected in liabilities to the extent the plan assumes lump sums are elected (which, generally, is most of the time).

So, plans that continue to pay lump sums using 30-year Treasury rates in 2008 and beyond will see an increase in liability as compared to prior law, reflecting the value of the more generous 30-year Treasury basis.

Of course, in conjunction with PPA's change to the IRC section 417(e) rates, plans can change their lump sum calculation to the yield curve basis, which is phased in over five years beginning in 2008. By doing this, plans can reverse most of the increase in liability they would otherwise see in 2008 due to this lump sum subsidy issue.

Presumably, Congress viewed the disconnect under prior law as a problem for pension funding rules. One of the benefits of harmonizing the interest rates for calculating pension liabilities and the rates for calculating lump sum benefits is that it addresses this issue.

The result is that, for plans that adopt the yield curve basis for calculating lump sums, the lump sum is no longer subsidized versus annuities, so the liability should be the same whether participants elect annuities or lump sums (other than a mortality difference, because of the blending of male/female and annuitant/non-annuitant mortality for lump sum calculations.)

Under this approach, we implicitly assume that the yield curve at the time the lump sum is paid is based on the forward rates embedded in the current yield curve.

Some actuaries have approached the problem in a different way. Calculating liabilities, they reason, is a two-step process: (1) calculate the benefit payable at decrement, and (2) discount the benefit to the valuation date. The first calculation requires an assumption about the shape of the yield curve at the time of decrement. It may be reasonable to suppose for this purpose that the curve is identical to today's curve.

Following this approach, the (typically lower) short-term interest rates from today's yield curve will be used to determine, in part, the value of any lump sum, even for a person not expected to receive benefits for fifty years. For decrements prior to year five, the short end of the yield curve is applied to the liability calculation twice – once to determine the lump sum benefit and again to discount it to the valuation date.

Proposed regulations issued in December are consistent with the first interpretation above. The IRS view is that, for plans that adopt the new 417 lump sum basis, lump sum benefits should be valued as annuities, using the unisex 417 mortality table rather than the sex distinct PPA morality assumption for the period after benefit commencement.

Generally, these calculations will reflect the current 417 mortality table for all future years. In other words, 2008 valuations will use the 2008 417 mortality table after benefit commencement to value 417 lump sums payable in all future years.

However, plans that opt to use generational mortality to value pension liabilities may, but are not required to, use a 50/50 unisex version of the generational mortality table for purposes of valuing 417 lump sums.

This leaves the small matter of the phase-in of the corporate bond yield curve between 2008 and 2012. The proposed regulations allow, but do not require, plans to reflect differences between the 417 phase-in interest rates and the valuation interest rates with respect to these benefits. The math can get pretty complex however; so many plans (and their actuaries) will welcome the opportunity to ignore this additional liability in 2008-2011 valuations.

Finally, plans that continue to pay lump sums on a more generous basis than PPA, such as the pre-PPA 417 basis, will need to reflect the additional value of these lump sum benefits in their funding target.

*   *   *

One additional change under PPA is to clarify that the funding target and target

normal cost reflect only benefit liabilities. Unlike pre-PPA rules, there is no scope under PPA for reflecting expected plan expenses in the liability calculations.

Asset Valuation

PPA retains some ability to smooth out changes in asset values, allowing an average over the prior 24 months. IRS proposed regulations, however, interpret the term average quite literally, as an average of historical asset values adjusted for intervening cash flows (contributions, benefit payments, and administrative expenses) only. Unlike pre-PPA asset smoothing rules, plans cannot reflect expected earnings on prior asset values in determining the average.

Contributions for the prior plan year made after the valuation date are included, discounted to the valuation date using the prior year's effective interest rate. Since 2007 is a pre-PPA year, though, such accrued contributions included in the 2008 asset value are not discounted. Also, for small plans that use a valuation date other than the first day of the plan year, current plan year contributions made prior to the valuation date, and earnings based on the plan's effective interest rate, are subtracted from the value of plan assets.

Averaging of prior asset values must use historical values that reflect equal periods of time (e.g. monthly, quarterly, annually) not greater than twelve months and can't include data prior to the last day of the twenty-fifth month preceding the current year valuation date.

Finally, the result of asset averaging must be between 90-110 percent of the fair market value at the valuation date.

The example below comes directly from the proposed regulation:

Example 4-Asset Smoothing

Average value as of January 1, 2019	2017	2018	2019
Fair market value: January 1	196,500	238,000	228,000
Net Adjustments:			
Contributions	128,000	66,000	
Benefits Paid	49,000	25,000	
Expenses Paid	14,500	7,500	
Total	261,000	271,500	228,000
Average value as of January 1, 2019 equals: [$261,000 + $271,500 + $228,000] ÷ 3 = $253,500			

Because asset values are expected to increase over time, PPA averaging will tend to produce lower values than fair market value, although, as the example above shows, this will not be the case if assets decline in value during the averaging period.

So, plans face a trade-off: averaging asset values will reduce volatility at the expense of higher expected contributions. Because the averaging rules are less favorable to plans than pre-PPA rules, we expect fewer plans will avail themselves of this option under PPA.

This is particularly true for plans with a "market value" orientation that use the full yield curve to calculate their funding target. Even in this case, though, since the yield curve is really a one-month average of rates, plans may consider minimal asset averaging, such as one-month.

Amortizing Unfunded Liabilities

The issues discussed so far relate only to the measurement of assets and liabilities. Once we have these amounts, the rest of the funding calculations are fairly straightforward.

The first question is: does the plan wipe out prior year amortization bases? Of course, this is not an issue for 2008, since there are no prior bases, but it will be an issue for succeeding years.

The answer to the question is yes if and only if:

$$\text{Assets} - \text{COB} - \text{PFB} >= \text{FT},$$

where

COB: carryover balance (pre-2008 credit balance)
PFB: prefunding balance (post-2007 credit balance)
FT: funding target

Also, if this is the case, the minimum contribution for the year is based on a full funding-type calculation:

$$\text{Minimum} = \text{FT} + \text{TNC} - [\ \text{Assets} - \text{COB} - \text{PFB}\ ], \text{ not less than zero,}$$

where

TNC: target normal cost

The next question is: do I set up a new amortization base for the current year?

The answer to this question is no if:

$$\text{Assets} - \text{PFB}^* >= \text{FT}$$

* The PFB is not subtracted if no part of it is used to meet the current year funding requirement.

There is a transition rule available to plans that are exempt from the deficit reduction contribution rules for 2007. For these plans, no new base is established for 2008-2010 if the plan is "fully funded," as defined below:

$$\text{Assets} - \text{PFB}^* >= \text{Y percent} \times \text{FT},$$

where

Y = 92, 94, and 96 for 2008, 2009, and 2010, respectively. If the transition funding target is not met in any year, it is unavailable for subsequent years.

For plans that must set up a base, the next step is to calculate the funding shortfall:

$$\text{Funding shortfall} = \text{FT} - [\ \text{Assets} - \text{COB} - \text{PFB}\ ]$$

The outstanding value of prior bases, if any, is subtracted from the funding shortfall to determine the current year amortization base.

The calculation of the amortization payment is a little funky, since it is based on both the first and second segment rates. Also, the calculation of the outstanding amount of prior bases is strictly forward-looking, applying the current year segment rates to the remaining amortization payments.

The example below illustrates these calculations. For this purpose, the plan uses the 24-month segment rates, no phase-in, and the October lookback month (2009 rates are estimated) and applies the carryover balance to the 2008 funding requirement:

Example 5- Amortization calculations

			2008	2009
(1)	Funding Target (FT)		20,000	21,000
(2)	Assets		18,000	18,700
(3)	Carryover Balance (COB)		1,000	0
(4)	AFTAP including COB		90.00%	89.05%
(5)	AFTAP subtracting COB		85.00%	89.05%
(6)	Wipe out old shortfall bases? [No if (5) < 100%]		No	No
(7)	Establish new shortfall base? [Yes if "fully funded*"]		Yes	Yes
(8)	Funding shortfall [(1) − (2) + (3)]		3,000	2,300
(9)	Prior Base ***		0	2,657
(10)	New shortfall base [(8) − (9)]		3,000	(357)
(11)	Target normal cost		1,000	1,050
(12)	Shortfall amortization **		502	442
(13)	Minimum contribution [(11) + (12)]		1,502	1,492
(14)	Plan year contribution (Made at the beginning of the year)		502	1,492

* "Fully Funded" means line (4) is at least 100% or, for plans eligible for transition targets, 92%, 94%, and 96% for 2008 - 2010.

** $502 = 3{,}000 / [\ 1 + 1/1.0531 + 1/1.0531^2 + 1/1.0531^3 + 1/1.0531^4 + 1/1.0588^5 + 1/1.0588^6\ ]$

*** $2{,}657 = 502 \times [\ 1 + 1/1.0498 + 1/1.0498^2 + 1/1.0498^3 + 1/1.0498^4 + 1/1.0593^5\ ]$

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Preparing for 2008 is a major challenge for pension actuaries. The new pension funding rules contain some complexities, particularly related to valuing lump sum benefits, but there is much that is familiar, too. The challenge is compounded by regulatory guidance coming out with little lead time. All things considered, it should be an interesting year.

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