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In the case of the risk-free rate, the liability starts larger but only grows at the slower risk-free rate, and the both contributions and the resulting portfolio are similarly larger. Even invested in a typical portfolio of equities, this portfolio will disappoint the discount rate assumption only a small portion of the time—call it 15% or 20% instead of 50% (the exact proportion depends on the investment policy).

And of course, by amortizing the deficits, we push them off to the future, where they often get larger—50% of the time, in the expected return on assets case instead of 20% of the time. So the deficits are amplified. So much larger deficits can more often build up, when we discount using the expected return assumption than when we use the risk-free rate. And large deficits mean proportionally larger contributions. And remember—periods of extended disappointing performance are quite normal—we're in a long one right now, we're still using the expected return assumption, and as a result we're experiencing very large deficits. (It isn't an accident that the corporate sector is enjoying higher funded ratios today than does the public sector, even though their investment policies are not that much different—corporate plans have been using lower discount rates for some time.)

This is just one employee. How does the example generalize across an entire population of employees? Of course, in the overall plan population of an organization with a longstanding and fully mature pension plan, an employer has people that have a full range of tenures, from just hired, to those there 10 years, to those nearing retirement, and of course those at different stages of retirement. Those close to retirement—either before or after—have the highest individual liabilities and the highest contributions, and this group will dominate the plan. So with lifetime amortization, look at the 25 to 35 year range of this graph, and that shows the nature of the plan sponsor's aggregate experience:<sup>10</sup> Contribution requirements, when markets are trending below the level of the expected return assumption, have very realistic probabilities of being two, three, or more times the baseline expectation (the baseline being that contributions will be equal to service cost).

The ongoing scale of the problem is revealed when we note that few sponsors today have more than doubled their baseline contribution under actuarial guidance: Think about the biggest state plans, many of whom have doubled their contribution rates above baseline levels, yet are not making a dent in their deficits. This is after failing to meet their expected return assumption for only the last 10 or 15 years—we don't know what the next 10 years will bring, but it seems unlikely to restore these plans to solvency.<sup>11</sup> This is why I say repeatedly that in persistent bad

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<sup>10</sup> Because the volatility is from the markets, it affects the liability of each individual liability identically, and so the effect on aggregate contributions is perfectly additive across the population.

<sup>11</sup> The situation would be much better today if the plans had not given away the surpluses of the 1980s and 1990s in the form of enhanced benefits. Those surpluses have a natural role of providing a cushion from the good years to help a plan through the bad years. (An additional, but very practical, reason why the rationale that good and bad years offset each other, doesn't work!)

markets, the probability of plan failure is very high, for plans discounting the liabilities based on the expected return assumption.

This is the risk/return trade-off of the markets, as seen through the pension contribution calculation. For a given investment policy, the risk of persistent negative contribution surprises is much less if the discount rate used is the risk-free rate.

And this shouldn't be any real surprise, as we all know that risk and return go together like hand in glove. It is unfair to sponsors and participants alike to encourage the use of the expected return on assets as the discount rate, when the resulting risk is so great.

So the real reason for the Board to stop using the expected return on assets is because of the downside risk that happens when the expected return is not achieved over long periods, and of course I showed in Section III that it can readily underperform for long periods—it is inevitable, sooner or later: When market return below the expected return for long periods, the plans fall deeper and deeper into deficit. And then contributions will spiral up beyond any possibility that the employer can pay them, causing plan failure.

From these charts it is easy to see why sponsors have been increasingly bedeviled with negative surprises in the contribution department as we moved from the persistent generous returns of the 1980s and 1990s, with average returns *above* the expected return on assets, to a period of very disappointing returns since then. But something that can be above average for long periods of time can also be below average for long periods of time.

And it has: In fact, we're in the middle of just such a long term downside scenario right now. The geometric average annual return for the period beginning with the year 2000, through the end of 2010 (11 years), is just below zero, at  $-.28\%$ —far below the customary expected return assumptions of 7% to 8% per year in use today, fact roughly two standard deviations below expectations over such a period.

How long will this extended period of well-below-average returns continue?

How long can pension plans *survive* this long period of below average returns? It isn't looking good.

I argued in my cover letter to the Board that the problem is not likely to be solved without many compromises by the parties, and that the use of the risk-free rate and a market value orientation of pension accounting will give constituents the tools to negotiate such compromises. If we continue the use of the expected return assumption, we may well be guaranteeing failure.

## VI: HIGH QUALITY MUNICIPAL BOND RATES SHOULD NOT BE USED

The only difference between high quality municipal bond rates and the risk-free rate is the yield spread for municipal credit risk, often called a credit risk premium. Because of changes in the credit risk spread, bonds subject to credit risk have pricing movements that behave differently than risk-free bonds. And they have the possibility of full or partial default.

In the markets, credit risk is added to the discount rate if the debt owed is subject to credit risk and might not get paid. Credit risk premia are a form of advance compensation to the lender for the possibility of a later default. Applied to a set of cash flows, it gives an answer that states the market worth of the debt given the credit risk, and this market value will be less than it would be for a debt expected and intended to be paid without risk of default.

If we want retirement benefits to be paid with certainty, i.e., in the absence of sponsor credit risk, as is strongly suggested by *Appendix B, at ¶137*, then we need to establish funding targets—i.e., the accrued liability<sup>12</sup>—that reflect the market value of that liability with the same absence of credit risk. Then, if the accrued liability is fully funded, we know the benefits should be safe by virtue of that fund. This will only happen if the discount rate used for calculating reported service cost, and the discount rate used for reporting liabilities, is the risk-free rate (curve).

If you assume some possibility that the debt might not be paid—which is what you are doing when you include a credit risk premium as by using high quality municipal bond rates, then the accrued liability is going to be discounted at a higher than risk-free rate, and both service cost and the accrued liability will have a lower value reflecting that chance of default. This lower measure of the accrued liability, even if fully funded, won't assure payment of all benefits—it's too small if *any* of that credit risk is ever realized.

If you want the benefits to be paid with virtual certainty, then there need to be contributions made equal to service cost computed with a risk-free rate, building up an accrued liability valued at a risk-free rate. This accrued liability tells you what the value of the earned portion of benefits is without risk, which is what you actually want to know for funding purposes. You aren't interested in the market value of the benefits *given* the sponsor's credit risk or the indexes' credit risk—you're not trying to sell the benefit promises to a third party in the markets. Instead you want the market value of fully secure benefits, because that is what you're trying to finance and fund. Why set it up as if you were financing and funding a benefit meant to be insecure?

Using the credit risk premium may give you a version of a fair market value for liabilities, but it is a version that presumes that the possibility of default is acceptable. It doesn't give you a market value of a risk-free liability that is consistent with security of benefits, a funding target value. How could you ever build up a full PVB, entirely protecting the benefits, if the payments needed to do so were reduced by use of the credit risk premium?

Let me also point out that assets invested in a high quality municipal bond index will not protect or hedge the pension liability. To see this most clearly, think of a two year zero-coupon bond with a credit risk premium reflecting some possibility of default, and we want to use it to hedge a two-year \$100 liability. At the end of year one, perhaps credit risk has gone up, and if so then the

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<sup>12</sup> Ditto for the discount rate used to determine the underlying liability, the present value of benefits. The accrued liability is just the portion of the present value of benefits that is already owed, it is not the entire liability.

price of that bond will have come down and it will then be insufficient to secure the entire original liability.

And we can't solve the problem by waiting for the bond's two year maturity to occur. Looking forward, at the end of the two year period there is some identifiable chance that the bond will have defaulted in whole or in part. Again, the \$100 liability will not be protected in that case. Nor does turning this into a 30 year problem instead of a two year problem change anything.

***Summary of Board's argument: Use of the municipal bond index, or the sponsor's own debt rate? The Board argues that the high quality municipal bond index return should be used as the discount rate rather than the rate of return required by the market for like debt issued by the sponsor, because the sponsor-specific municipal bond rate would be "counter-intuitive" (Appendix B at ¶192).***

I will quote the argument for this lack of intuitiveness completely: "If an employer's credit rating were downgraded, the discount rate applied would increase to the extent it reflects a liability-based rate, resulting in a smaller amount reported for the net pension liability and a decrease to pension expenses (and deferred pension expenses)."

Allow me to argue that this is not counter-intuitive, but exactly what one should expect if one is including a credit risk premium in the discount rate—which as I have been arguing is not correct in the first place. And for exactly this reason. The addition to the risk-free rate of any credit risk premium—either the sponsor's credit risk premium or that of the high quality municipal bond index—will reduce the value of the liability below that found using the risk-free rate. We don't want to reduce the funding target measure of the liability, the accrued liability, by virtue of a credit risk premium.

Why is it not just as "counter-intuitive" to reduce the value of the liability based on the general credit-worthiness of the governmental bodies included in the index, and not the specific sponsor's creditworthiness? After all, any increase in the credit risk premium of the index as a whole also reduces the value of the liability.

What is counterintuitive is the notion of using any credit risk premium whatsoever if our goal is, as posited under Appendix B, at ¶137, to honor the high status of deferred compensation. As I pointed out earlier, in the risk-free rate discussion of Section IV, whether or not there is credit risk is entirely in the control of the sponsor. If the sponsor makes all contributions, and either a) invests in a hedging portfolio, or b) makes up all investment losses immediately with makeup contributions, there is no risk to the pension. Why should we allow the sponsor to reduce the value of the liability with a presumption that it will act so as to put credit risk into the plan?

The use of the credit risk discount rate is just a means of mollifying sponsors that want a higher discount rate and a lower liability on their books. It has no economic meaningfulness whatsoever.

This is true for an credit index and also for the sponsor's own credit risk. A credit index doesn't represent the credit risk of the sponsor: If credit risk must be used, it should be the credit cost of the sponsor, which varies by sponsor, rather than the cost of credit of the market as a whole as the Exposure Draft proposes. It isn't the market whose risk of default the employees face—it is the specific sponsor and its risk of default.



Even so, any form of credit risk makes the discount rate the wrong rate, and it won't adequately insure secure funding. It is credit risk of any kind that is counter-intuitive in the discount rate, not the sponsor's credit risk.

## VII: GASB'S DISCOUNT RATE PROPOSAL IS UPSIDE DOWN

*Risky discount rates on the "funded" but therefore riskless portion; high quality municipal bond rates on the unfunded and therefore more risky portion!*

The discount rate proposal in the Exposure Draft is quite interesting. One can imagine that the use of the high quality corporate bond rate in the role proposed is the Board's attempt at compromise—discounting some portion of the liability at a rate “close enough” to the risk-free rate to give a nod to the financiers and economists (even if not quite all the way risk-free), but keeping the status quo in the biggest portion, by leaving the discount rate for the rest of the liability at the traditional expected return on assets. If indeed it is the case that this is such a compromise, maybe baby steps such as this are in order and reflect good Board wisdom, a means to get the community used to the idea of using a close-to-risk-free rate for at least some portion of the pension obligation.

But from the point of view of a rational discount rate scheme supported by sound financial principles, this is completely upside down, with the (more or less) risk-free rate applied the unfunded and therefore most risky portion of the portfolio, and the risky expected return on the asset portfolio applied to the most free-of-risk portion of the portfolio, the portion that is fully funded.

So if it's a compromise, it's a bad compromise, completely backwards to what actually happens when financing anything else, anywhere else. And backwards in a manner that continues to hide the biggest portion of the true monetary size of governmental pension deficits.

It isn't acceptable.

## VIII: THE INTELLECTUAL DEBATE ABOUT DISCOUNT RATES HAS LONG BEEN OVER: THE REAL DISCOUNT RATE ISSUE IS THE TRANSITION ISSUE

The right market-related discount rate for pension benefits intended to be riskless is the risk-free rate. The intellectual debate about the preference of the risk-free rate over the old expected return on assets discount rate has been over for some time in every arena of debate—other than in pension finance.

In fact, one can argue that there never was a real debate about this issue—the expected return on assets was an old method, developed before finance became a mature discipline in the 1960s, a method which since that time has never been given a second look by financiers or academics—it was put away on the shelf as old technology, without need for debate.

But it simply never went away in actuarial pension finance, where it stubbornly hangs on. It isn't used anywhere else, by anyone else. Its main attraction seems to be its ability to hide the true cost of pension plans from sponsors and participants; understandably the actuarial community responsible for persuading its clients that the liability is half its true size fears revealing the true size. Of course we would all like to believe that there is something magic about pensions that allows them to be financed and granted quite inexpensively, and actuaries have done much good in promoting pensions—before the bottom dropped out of the market's returns around 2000. And now the crisis is upon us, there is a mess to be cleaned up.

My counsel to the actuarial community is to acknowledge the embarrassment—technologies do change after all—and move on. Market value accounting for pensions opens up a myriad of opportunities to do consulting to these clients that will be extraordinarily high in value, with improved management, risk control, and investment policy tools that are much more effective than those used in the past. This is a good future for actuaries that embrace the technology, not a grim one. They can be part of the solution to the problem, not continuing to be part of the problem.

Let me give a very concrete example. One very large state plan (the numbers are changed by a constant fraction to protect their identity) had as of two years ago a stated accrued liability of \$150 billion at book, using a 7.75% expected return on assets discount rate. Internal staff estimates suggested that the market value of the liability was about \$275 billion, using then-current 3.75% long term risk-free rate. A more accurate figure could be computed by the actuaries, but this looks about right given the difference in discount rates and the long duration of these liabilities.

The PVB was estimated to be about 35% larger than the accrued liability at market, or about \$375 billion. Again, this number could be refined, but it is in the right ballpark or even low. The assets were only \$100 billion, leaving a \$275 billion PVB deficit to be amortized.

If we use 14 years to represent the weighted average remaining working life of the employees, and amortize the \$275 PVB deficit over that period on a level payment basis at 3.75%, we find that the total contribution payment—service cost plus makeup—required to get this plan back to fully funded solvency on a risk-free

basis is \$26 billion per year.<sup>13</sup> Out of this, only \$9.3 billion is a market-valued service cost, known by amortizing the difference between the PVB and the accrued liability.

\$26 billion is of the same order of magnitude as this state's entire payroll! How is this going to be fixed? This plan has increased its planned total contribution level to \$10 to \$12 billion per year, about doubling its traditionally-calculated service cost, but absent heroic market returns it is apparent that this is nowhere near sufficient to guarantee payment of all deferred compensation here. (The reader can replicate all these contribution payment calculations on a hand held financial calculator.)

So the discount rate should be changed to the risk-free rate, so that actuarial finance is consistent with all other finance and so we can get plans working back towards high ground. The risk-free rate method has the benefit of creating present values and payment plans that will work as well for pensions as market-based discount rates work in the rest of finance. Sadly, the expected rate of return method isn't working for pensions anywhere near so well; there are too many woefully underfunded public employee pension plans out there today to make any contrary claim.

**Transition:** But undeniably there are dangers to the system from forcing an immediate adjustment to the new discount rate. I want to see this done with a transition plan for easing the political/financial issues faced by the plans themselves: we don't want legislators shutting down the plans in a panic when they first see the true size of the liabilities, and we want employee groups and employers to have time to understand the true economics of their plans, to get good numbers for them on a market basis, and to educate themselves enough to reach the conclusion that their pension "deal" was negotiated originally with bad information—as if benefits were on sale at half price when they weren't really—and have the time to come to the table to renegotiate them peacefully. We want to keep defined benefit plans as a primary retirement institution—they have tremendous advantages over strong competitive models such as the defined contribution plan. (I have articles about this on my website, [www.bartonwaring.com](http://www.bartonwaring.com); in particular "Don't Kill the Golden Goose! Saving Pension Plans," with Laurence B. Siegel, *Financial Analysts Journal* Vol. 63 No. 1, January/February 2007, <http://www.cfapubs.org/doi/pdf/10.2469/faj.v63.n1.4405>.)

Such a transition plan will take some thought.

GASB has tremendous respect and tremendous moral authority, and that gives the Board the opportunity to provide critical leadership here. My recommendation is that the Board immediately withdraw the sections of the exposure drafts dealing with discount rates, with the announced plan to begin a new project on that single issue stating that you have come to agree in principle with the notion of market-based liability valuation for all purposes. Signal your intentions to move to market valuations (and a continued effort to reduce or eliminate amortization and smoothing towards that same end), but also signal that you intend to develop a thoughtful transition plan that will help plans learn how to reposition themselves for long term success, success not presently being enjoyed.

My suggestion is that the transition be over 5 years for reporting purposes. During this period, require the sponsor to reduce the discount rate used for reporting on a stepwise basis, a half

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<sup>13</sup> If the weighted average remaining working life is as long as 20 years—which is not likely—the required contribution payment only goes down to \$20 billion, still a backbreaking amount.

percent or one percent per year, till they get to market risk-free rates or to the end of the transition period. Require that plans begin to calculate and make available to interested parties actual market values beginning immediately. This will allow employer and employee groups to see what the real numbers are, and to begin taking advantage of them. Recommend joint employee and employer committees that will first educate themselves on the nature and reasons for this change, and then begin the process of reconciling the benefits desired with the total compensation levels that can reasonably be expected.

This is two levels of preparation, one of announcing the Board's goal, and the other of providing time and encouragement for new accommodations. This will let organizations and employees process the news without a "body slam," and help them with the education and the market value tools they need to take care of the problem of massive underfunding through their own efforts at the bargaining table.

We didn't get where we are overnight, and we won't fix it overnight. The Board itself can mount a major education campaign: These changes are made to support and strengthen the pension system for the long term. They'll reduce employer risk, raise employee benefit security, and in all ways be better. And it's better to face realities on underfunded plans earlier, rather than later, when the accrued liabilities have built up unjustified expectations even more. (I'll volunteer my efforts to assist the Board in developing such a plan.)

Hard questions require clear thinking. Pension liabilities really are already as big as they appear to be when using economic valuation principles—it is simply not true that they are really half that size, as GASB standards have allowed them to be reported in the past. And we are in crisis, because benefits have been awarded as if they were only half their true cost, and then after a long period of disappointing market returns it appears that only half the needed funding was provided. Accounting matters, as people use it as inputs for decisions, decisions about benefits, about required contributions, and about investment policy. Accounting doesn't create reality, but it would be very good if the accounting accurately reflected reality.

This is an accounting question, and accounting needs to represent hard numbers stated in money or money's worth. Economic, or market values, do this best, particularly where, as here, we are financing large sums over long periods of time. Values that have been arrived at by the actuaries' traditional funding approaches do not. GASB seems to recognize this and seems to be looking for compromise— but halfway measures aren't in order.

I know that the Board wants to help pension plans survive and prosper, so help them tell the truth to themselves about the size of the liability and the cost of benefits—don't support them in believing happy falsehoods. They can still invest in equities, and if high returns do come in as expected, well, congratulations – contribution costs will have turned out to be the same as under the current method, and that will be a pleasant surprise (in contrast to the constant negative surprises employers experience today). But in the meantime, no fooling of ourselves, nor denying the massive contribution and funding risk taken on in holding today's high equity positions with today's archaic discount rate methods.

Good information leads to good decisions. In recent decades, bad information has led to bad decisions. Benefit levels are higher than they would have been had the true costs been known. And I suspect that sponsors have actually paid in the contributions that they were told to expect to pay. But market movements have proven them to be insufficient, but as shown above we can understand why as soon as we give up the old saw that one gets the expected return if one is a

long term investor. Instead, acknowledge that investments have risk, and that the risk to wealth grows with time.

Through no fault of sponsors and participants, the system isn't working. Let's do as much as in GASB's power to fix it. Getting the accounting right won't fix it by itself, but it's a good start.

## IX. ABOUT MYSELF: WHY I CARE ABOUT PENSION PLANS

I am a financial economist, and have spent my career giving investment strategy advice to large institutional investors, the biggest portion of which were defined benefit retirement plans in the US and in the other countries where these plans are heavily used. I am the retired chief investment officer for investment policy and strategy at Barclays Global Investors, where I had been for many years. Before that I started the DC retirement funds business for Morgan Stanley Asset Management. I went there from Towers Perrin, the large international actuarial consulting firm, where I ran the asset consulting business for the largest part of the USA (Central and Western regions). At Towers Perrin, I worked in close contact with senior actuaries conducting many major asset-liability studies, learning how actuaries think about accounting and pension finance. Before that, I managed the well-known investment strategy and market studies firm, Ibbotson Associates, where I became an investment strategy and financing expert using modern portfolio theory and financial economics.

I recently published a book, titled *Pension Finance: Putting the Risks and Costs of Defined Benefit Pension Plans Back Under Your Control*. Robert Merton of MIT, a very eminent professor of economics and finance, wrote the foreword for the book, and a long list of highly respected pension and finance people have endorsed it. It is available now in electronic form from both Apple and Amazon, and will be out in hardback very shortly. For more information, see Amazon's listing, [http://www.amazon.com/Pension-Finance-Putting-Defined-Benefit/dp/1118106369/ref=sr\\_1\\_1?ie=UTF8&qid=1314642384&sr=8-1](http://www.amazon.com/Pension-Finance-Putting-Defined-Benefit/dp/1118106369/ref=sr_1_1?ie=UTF8&qid=1314642384&sr=8-1). I have also written many articles for the finance journals on topics related to pensions, their investment strategy, and related subject. A list of these articles, with complete citations, is found at [www.bartonwaring.com](http://www.bartonwaring.com).

I am now an independent financial economist engaged in research and lecturing. I have no money management firm, no consulting firm, and no financial stake in your decisions on these topics. I am, however, a user of government pension plan financial statements, both personally as a taxpayer in jurisdictions that sponsor pension plans and professionally in the course of rendering advice to interested parties. I am external to the organizations issuing them, so I believe that I am within the purview of those invited to comment.

I do have a social interest in the long term viability of the defined benefit pension institution, as it is by far the most efficient means of spreading a portion of one's lifetime earnings over one's retired life. They are under threat, largely because the accounting does not recognize economic reality, leading to bad decisions leading to underfunded plans and employers that think that such plans must always be too costly and too risky to sensibly sponsor. Neither the employer nor the employee gets the deal they expected, today.

And I have an interest in the transparency and accuracy of financial statements, particularly those of taxpayer supported bodies. That is not true today, and it won't be true if the exposure draft is adopted. And although I am not a participant in any public employee retirement plans, I have many friends and acquaintances who are – and I hope that they get the benefits they need for their retirements. That won't happen under the current system, and the discount rate portions exposure draft does little to change this.

In short, I'm a citizen, with special knowledge and expertise in the financing, investment management, and funding of defined benefit retirement plans. I want them to be successful, and I'm willing to give of my knowledge and time toward that end.