



Ryan ALM, inc.

Asset/Liability Management

The Solutions Company

Solutions for: Detroit and Public Pensions

By

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The city of Detroit filed for bankruptcy on July 18, 2013 due to \$18 billion in debt of which \$10 billion was pension and OPEB benefits. Overall, public pensions have a shortfall of over \$3 trillion if they mark to market. If TARP I was a national emergency at \$800 billion, what do you call this financial situation?

I recommend four solutions to the Detroit and Public pension/budget crisis:

- 1. Cut the Budget** – Just a 1% cut per year can be meaningful especially if there is growth in revenues. Hiring freezes and attrition could be a less painful approach to budget cuts.
- 2. Pension Lottery** – Lotteries are big business throughout the world. There are currently 43 U.S. states and Washington D.C. with games. Since the first lottery in New Hampshire in 1964 government programs have raised over \$320 billion with \$19 billion just in 2012. Most are dedicated to education. A pension lottery would be prudent without taxing any citizen.
- 3. Sell and/or Lease Valuable Assets (Buildings, Land, Libraries, Roads, Schools, Tunnels, etc.)** Most cities and states have valuable and underutilized assets that could be sold or leased.
- 4. Fix the Pension deficit** – Pensions tend to be the largest debt item of any city or state. Fixing the pension deficit is the key to solving the budget crisis, **and it is the focus of this research paper.**

(Note: my book “The Pension Crisis” should be out in September!)

The Pension Problems

The reason this pension dilemma is a crisis is that it becomes a ***budget crisis*** for most cities and states. Due to spiking pension *contribution* costs, most cities and states were not prepared for such budget cost escalations resulting in deep budget deficits, which led to increased taxes and reduced services. Although increased pension benefits have seriously affected contribution costs, they are not the intrinsic *cause* of the pension crisis. The true cause of the public pension and budget crisis is the improper GASB accounting rules.



Ronald Ryan, CEO, CFA

William F. Sharpe
Lifetime Achievement
Award

Money Management Letter
Lifetime Achievement
Award

Capital Link
Most Innovative ETF
Award

IMN
ETF of the Year Award

*Bernstein Fabozzi/Jacobs
Levy*
Research Paper of the Year
Award



The villain of our story is the GASB pension accounting rules. These inappropriate accounting rules misled pensions through inappropriate valuations of both pension assets and liabilities. This caused the Funded Ratios (present value of assets/liabilities) to be greatly exaggerated, which led to inappropriate asset allocation, benefit and contribution decisions... they all link! When I testified before the ERISA Committee in 2003 I brought in a five foot pencil which I introduced as “**Woody**” the weapon of mass destruction in financial America. Indeed, if you thought Enron and WorldCom had magic accounting pencils that led to their debacle, wait till to see what the pension pencil “Woody” can do.

Instead of marking to market, GASB (“Woody”) allows public pension plans to *smooth* assets over a moving five year average.¹ Imagine the stock that went from \$100 to \$80 to \$60 to \$40 to \$20 to \$0 over five years (sounds like GM from 2003 thru 2008). On average it is a \$40 stock, which would seriously *overvalue* this asset. Of course it could go the other way as it did in the late 1990s. The point here is that a 5-year *average* price or valuation is not a reflection of reality and may mislead you into the wrong decision(s) affecting your assets.

GASB accounting allows for pension liabilities to be valued at a discount rate equal to the Return on Asset (**ROA**) assumption. Based on the study by the Center for State and Local Government Excellence² the average ROA used by public pensions is 8.0%. Such an ROA tends to be a *static* and robust projection. This annual growth rate is in sharp contrast to the history of liability growth rates, which are quite volatile with high positive and high negative annual growth rates. Based on the generic Ryan Liability Index benchmark (equal weighting of the Ryan STRIPS yield curve) we see how volatile the liability growth rates (returns) of a typical pension should have been using the Treasury STRIPS yield curve as the discount rates.

Based on the calculations of Ryan ALM, Inc., in our quarterly Newsletter entitled “**The Ryan ALM Pension Letter**”, here is our estimate of the economic growth rates of pension assets and liabilities for the last 13 years ending 12/31/12.³

Table 1
The Ryan ALM Pension Letter

Total Returns										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Assets	-2.50	-5.40	-11.41	20.04	8.92	4.43	12.25	6.82	-24.47	19.43
Liabilities	25.96	3.08	19.47	1.96	9.35	8.87	0.81	11.76	33.93	-19.52
Difference:										
Annual	-28.46	-8.48	-30.89	18.08	-0.43	-4.44	11.44	-4.94	-58.40	38.95
Cumulative		-37.60	-73.40	-60.08	-66.13	-76.75	-64.60	-78.38	-181.57	-106.94
Funded ratio	77.41	71.04	52.68	62.01	61.76	59.25	65.97	63.22	35.66	52.91

¹ GASB 25, paragraphs 139 & 140

² Center of State and Local Government Excellence, “Valuing Liabilities in State and Local Plans”, June 2010

³ Ryan ALM, Inc., “The Ryan ALM Pension Letter” , December 2012

	2010	2011	2012
Assets	11.89	3.27	11.79
Liabilities	10.13	33.77	4.46
Difference:			
Annual	1.76	-30.50	7.33
Cumulative	--115.67	-195.73	-194.30
Funded Ratio	53.75	41.50	44.41

Based on market valuations shown above, pension assets would have grown by **55.20%** and pension liabilities would have grown by **249.51%** cumulative since 12/31/99 thru 12/31/12. As a result, **pension liabilities should have outgrown pension assets by 194.30% over the last 13 years. This would have caused Funded Ratios to deteriorate by -55.59% requiring a Funded Ratio of 225.19% in 1999 to be fully funded today!** Moreover, given a deficit the assets have to grow faster to catch up to liabilities. A Funded Ratio of 50% suggests assets have to grow twice as fast as liabilities to catch up, a 75% ratio requires 33% more asset growth, etc...

Given that interest rates are quite volatile, the GASB accounting rules ignore reality and the true economic valuation of liabilities. Indeed, such accounting rules were established to avoid volatility in contribution costs by smoothing assets and keeping liability growth a constant. In the end **these GASB accounting rules created volatile contribution costs, added benefit costs and produced inappropriate asset allocation by misleading pensions as to the proper return objective (ROA instead of economic liability growth) and proper valuation of their Funded Ratios (smoothing overvalued assets + ROA undervalued liabilities).**

The worst consequences of the GASB rules are its effect on Asset Allocation, Benefit and Contribution decisions... it all links to the ROA! Because GASB made the ROA the liability growth rate, the ROA became the *target growth rate* for assets. Notably, pensions are told that when assets don't grow at the ROA level they create an actuarial and GASB accounting deficit that is funded through extra contributions. **This is not correct thinking since GASB grows assets and liabilities at the same ROA growth rate!** If there is a deficit, then even if the assets grow at the ROA rate, the deficit and contribution costs go up!

Mathematically, the ROA on a higher value (liabilities) will outgrow in \$ the same ROA on a lower value (assets). Table 2 shows that if assets and liabilities both grow at 8% with a 60% Funded Ratio there will be a 46.93% increase in the deficit after just 5 years, which will increase contributions. With any deficit, assets must *outgrow* liabilities for the \$ deficit and contributions to stay the same. Table 2 shows that asset growth must exceed liability growth by 5.33% per year just to stay at the same \$ deficit level. If there is a surplus, assets can grow *less* than the ROA and still have NO Contribution costs (pension holiday)! With a 40% surplus, Table 2 shows that for assets to have the same \$ growth as liabilities it can grow about 2% less per year (@ 5.71% - 6.18%).

Table 2

	(Deficit Scenario)			The Funded Ratio			(Surplus Scenario)			
	Assets	Liabilities	Funded Ratio	Deficit \$	Deficit %		Assets	Liabilities	Funded Ratio	Asset Growth = Liability Growth in \$
Start	\$60.00	\$100.00	60%	\$40.00	NA		\$100.00	\$71.43	140%	
Year 1	64.80	108.00	60%	43.20	8.00%		105.71	77.14	137%	5.71%
Year 2	69.98	116.64	60%	49.66	24.15		111.89	83.32	134%	5.85%
Year 3	75.58	125.97	60%	50.39	25.97		118.55	89.98	132%	5.95%
Year 4	81.68	136.05	60%	54.37	35.93		125.75	97.18	134%	6.07%
Year 5	88.16	146.93	60%	58.77	46.93		133.52	104.95	127%	6.18%

Deficit: Assets > Liabilities by 5.33% per year for Deficit /Contributions to stay level

With a deficit, assets have to *outgrow* liabilities to reduce contribution costs and reach full funding. With a surplus position, assets don't need to grow at the ROA. If assets just match liability growth in economic \$ (market value growth) they will secure the surplus. At 100% funded, liabilities yielding 4% require 4% asset growth to match liabilities not the ROA of 8%. In truth, assets and liabilities never grow at the ROA so the ROA is a bad forecast that leads to a lot of bad decisions... it all links! The ROA problems start with Asset Allocation.

The ROA needs to be validated by an asset allocation model. Usually, the pension consultant is required to come up with an asset allocation that has the highest probability of achieving the ROA. Asset allocation models use an optimization technique based on the average returns from long historical index data bases (@ 20 years) for every asset class but one... bonds! Bonds go into the asset allocation models at their current yields. In the 1990s most pension funds enjoyed surpluses wherein they reduced, if not eliminated, contribution costs. Benefit increases were also a beneficiary of these surplus times. One would think the prudent pension investor would have altered their asset allocation to more and more bonds matched to liabilities (i.e. immunization strategy) to secure this victory and lock in reduced contributions for the future (i.e. pension holiday).

But **asset allocation models are based on achieving the ROA and never consider the Funded Ratio... a fatal flaw.** When bond interest rates went below the ROA (8%) back in the late 1980s bonds became a drag on achieving the ROA so asset allocation models reduced their allocation to bonds. This continued as a consistent trend such that by 1999 most asset allocation models had the lowest allocation to bonds in modern history and the highest allocation to equities... the \$3 trillion mistake! When the equity correction arrived in 2000 through 2002, public pensions were hard hit due to their asset allocation skewness to equities. Most pension assets underperformed liability growth by over 70% in those three years (see Ryan ALM Pension Letter in Table 1).

Pension Boards of Trustees were given reports that communicated their Funded Ratio based on GASB accounting and actuarial valuations, but not economic reality. Such accounting *overvalued* assets in the early 2000s by over 20% due to *smoothing* and *undervalued* liabilities by 30% to 50% during most of the last 13 years. This caused a severe exaggeration

of the Funded Ratio such that pensions increased benefits and reduced contributions at a time they could not afford either.

The Pension Protection Act (PPA) is a good model here that requires private pensions to have a high Funded Ratio based on market values before they can increase benefits. I recommend that public pensions adopt the PPA guidelines based on economic valuations and not GASB or actuarial valuations such that **there can be no benefit increases if the Funded Ratio falls below 90% based on market values**. I also recommend that these are an **annual benefit bonus** rather than a permanent benefit increase due to the volatility of the Funded Ratios. Most pensions have been brain washed into thinking the ROA is their focus and target. Had pensions matched asset to liabilities using high quality zero-coupon bonds in the surplus years of the 1990s they would have secured a fully funded position for the future thereby reducing or even eliminating contribution costs.

The focus of pensions should be their Funded Ratio and *not* the ROA. A surplus Funded Ratio should have a radically more conservative asset allocation than a deficit position to secure the surplus and reduce contribution costs long-term. But in the 1990s and 2000s the opposite took place because of a secular trend towards lower interest rates, which skewed asset allocation increasingly away from bonds (which yielded < ROA) into more risky securities trying to validate the ROA... **the \$3 trillion asset allocation mistake!**

Pension Solutions

1. Tell the Financial Truth (Economic Books)

Until a *Custom Liability Index* (CLI) is installed as the proper benchmark, all asset allocation, asset management, benefit and contribution decisions will be made based upon erroneous and misleading calculations trying to achieve the ROA (wrong objective). Imagine a doctor who gets the wrong blood work and x-rays... I wouldn't want that surgery. Imagine the pension consultant (i.e. pension doctor) getting the wrong valuation of assets and liabilities... I wouldn't want that asset allocation. The proper benchmark for pension assets must be a ***Custom Liability Index*** since no two pensions are alike due to different salaries, mortality and plan amendments. The CLI will allow pensions to know the market value of liabilities such that the true economic Funded Ratio will now be known frequently and accurately so all decisions are well informed with accurate economic valuations. The pension actuaries have a most difficult job to calculate future benefits. As a result, actuarial reports come out annually several months delinquent. Moreover, these reports tend to use actuarial valuation of liabilities and not economic or market values. As a result, public plan sponsors have infrequent and erroneous valuations to base their asset allocation, benefit and contribution decisions. With a CLI, the Board of Trustees and their consultants will now have monthly accurate valuations of liabilities including size, shape, growth rates and interest rate sensitivity tests based on market values and GASB valuations so they can see the great differences.

2. Replace the ROA with the CLI as the Pension Growth Objective

The pension growth rate objective should be positive *relative* growth vs. liability growth and not an *absolute* growth rate (ROA). With the CLI in place just like a scoreboard in

sports, the pension plan can now adjust its asset allocation whenever the score (Funded Ratio) indicates it's time to do so. The sports team way ahead will change its strategy and get conservative (and vice versa)... all based on the *relative* score vs. their opponent. The same should be true for pensions. As the Funded Ratio improves asset allocation should be responsive (i.e. Tactical). A 90% Funded Ratio should have more bonds than a 70% Funded Ratio. What was missing all these years was a scoreboard (i.e. the CLI) measuring assets vs. liabilities continually and accurately.

3. Base Asset Allocation on Funded Ratio not the ROA

Asset allocation is the most important asset decision since it affects all assets. **It should be based on the *economic* Funded Ratio and not the ROA.** A funded ratio deficit should have a radically different asset allocation than a funded ratio surplus. Any surplus Funded Ratio should be immunized with a core portfolio of a Liability Index Fund (i.e. Liability Beta Portfolio) to match and fund liabilities at no risk (proper way to de-risk liabilities). A separate surplus portfolio should be created for the excess funds as a reserve against actuarial noise in their liability projections. A 70% economic Funded Ratio would require a more aggressive asset allocation to makeup the deficit over time. Fortunately, pensions have time to cure deficits equal to the average life (duration) of their liabilities. This is best measured by the CLI. A 30% deficit with 10-year duration suggests that assets have to outgrow liabilities by 4.29% per year ($100/70 - 1$ divided by 10 years) on average for 10 years to reach full funding. With 10-year Treasury STRIPS yielding around 2.72% currently suggests that the assets need to grow around 6.99% annually to reach full funding in 10-years.

4. Interest Rates Go UP as a Secular Trend

If interest rates trend upward in the next five years then the present value growth rate of liabilities will be less than their YTM of 2.72%. In fact with 10-year duration, an average interest rate increase of only 60 bps per year would cause liabilities to have a slightly negative cumulative growth over five years. If assets could grow at just 6% per year than in five years the plan would be fully funded. Please note that at no time would the assets achieve the ROA growth rate! Perhaps, the best way for Public pensions to enhance their Funded Ratios is through a trend of higher rates. It is most difficult for assets to outperform liability growth by enough to restore full funding. They will need help by liability growth being low to negative.

5. Separate Liability Beta from Liability Alpha Assets

The next asset allocation step is to separate the Liability *Beta* assets from the Liability *Alpha* assets. **For pensions Beta is redefined as the portfolio that *matches* the liability objective risk/reward behavior (not a generic market index).** As proven through Defeasance, Dedication and Immunization this is best executed with a portfolio of high quality bonds matched to the cash flows of the liability benefit payment schedule. With a CLI in place, the Liability Beta portfolio is a **Liability Index Portfolio**. Without a CLI, it would be hard or impossible to immunize the liabilities risk/reward behavior.

Performance measurement studies (i.e. PIPER) prove that active bond management using investment grade bonds have little or no Alpha vs. a bond market objective like the Lehman (now Barclay's) Aggregate index. PIPER shows consistently that the median bond manager loses to the market index (especially after estimated fees of 25 bps) over extended periods of

time (i.e. 10 years⁴). This performance trend gives more credence why a Liability Beta portfolio should be installed as the *core* portfolio for liability objectives. If any asset class consistently underperforms its market index benchmark... you index that asset class! The only question is... what index to use? The answer is: the Index that best represents the client (i.e. Custom Liability Index). As a result, pensions need to reconsider active bond management. Investment grade bonds should be the core portfolio (Liability Beta portfolio) but *not* be actively managed vs. *generic* bond market indexes. Instead investment grade bonds should be managed passively as the liability-matching portfolio. This rearrangement of investment grade bonds from active to passive management will also save fees and eliminate tracking deviations versus liabilities.

Alpha is also redefined as the excess return above the liability growth rate (return) measured by the CLI. For example, if an equity manager outperforms the S&P 500 but loses to liability growth... the pension plan loses (no Alpha)! The allocation between the Beta and Alpha assets is based on the Funded Ratio. The lower the Funded Ratio the more is allocated to the Alpha assets (and vice versa). A 70% Funded Ratio with a 10-year duration CLI should require a high Alpha allocation (i.e. 75%). If the Alpha assets can outgrow liabilities by 4.29% per year then a 75% allocation to the Alpha assets reaches full funding in 10 years. With liabilities yielding 2.72% (based on 10-year Treasury STRIPS) this suggests an Alpha average growth rate of 6.99% is required. However, if interest rates go up, then for every 1% of reduced liability growth (every 10 bps increase in rates) then the Alpha assets can work 1% less in growth. Note the allocation to the Beta assets (bonds) is the reciprocal (25%) from this asset allocation process.

6. Measure Total Asset Growth vs. Total Liability Growth

In the end it's the Funded Ratio that counts. It decides on the deficit that is to be amortized which is the base of the Contribution calculation. The Funded Ratio also plays a role in the credit rating process especially now under GASB 67/68. Traditionally, much time and expense is spent analyzing the performance of each asset portfolio vs. its market index benchmark. Seldom is total assets measured vs. total liabilities or is the progress of the Funded Ratio and Funded Status monitored.

Since asset allocation is the critical asset decision it should be monitored and measured. The best way is to simply compare total asset growth vs. total liability growth (as measured by the CLI) to see if the Funded Ratio and Funded Status (surplus/deficit in \$) are on track to being enhanced such that contribution costs will go down consistently. There should be no investment review meeting without liabilities and the Funded Ratio being reviewed. Given annual actuarial reports, months delinquent, is the reason for the absence of liabilities at the investment meetings. The CLI cures this problem.

Both Beta and Alpha require a CLI to be managed and measured. Traditionally, performance measurement has been entirely focused on the risk/reward behavior of assets vs. *generic market indexes*. Pension plan sponsors need to know the risk/reward behavior of their assets vs. their liabilities (especially the Alpha assets) and the resulting Funded Ratio. Unfortunately,

⁴ Source: Morningstar

liabilities are usually missing in action at every pension investment review meeting. Given a CLI... asset allocation, asset management, performance measurement, benefit and contribution decisions are all now in harmony with the liability objective and focused on the Funded Ratio.

Given the wrong index objective... you will get the wrong risk/reward!

Ronald J. Ryan, CFA: Awards and Recognition



*William F. Sharpe
Index Lifetime Achievement Award
and ETF Product of the Year Award*



Lifetime Achievement Award



*Bernstein Fabozzi/Jacobs Levy Award
Research Paper of the Year*



Most Innovative ETF of the Year Award