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The Ryan ALM Pension Letter™

March 31, 2016

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Index	Returns YTD 2016	Weights
Pension Liabilities:		
Market (Tsy STRIPS)	8.05%	100 %
ASC 715 (FAS 158)	7.45	
PPA (MAP 21 = 3 Segments)	1.82	
PPA (Spot Rates)	2.99	
GASB /ASOP (8% ROA)	1.94	
Pension Assets:		
Ryan Cash	0.20 %	5 %
Barclay (Lehman) Aggregate	3.03	30
S&P 500	1.34	60
MSCI EAFE Int'l	-2.86	5
Asset Allocation Model	1.66 %	100 %
Pension Assets – Liabilities:		
Market	-6.39%	
ASC 715 (FAS 158)	-5.79	
PPA (MAP 21 = 3 Segments)	-0.16	
PPA (Spot Rates)	-1.33	
GASB/ASOP (8% ROA)	-0.28	

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



Using the Asset Allocation above, the difference in pension asset growth vs. liabilities in 2016 was: **-6.39%** (market valuation STRIPS), **-5.79%** (ASC 715), **-0.16%** (PPA 3 segment rates), **-1.33%** (PPA-Spot Rates) and **-0.28%** (GASB/ ASOP). Such valuations show the significant difference in not using *market* valuations. Most pension funds enjoyed a funded ratio surplus in 1999 but **pension asset growth has underperformed liability growth since by an estimated -199.79%** on a compounded index basis starting at 100 on 12/31/99!

		Total Returns (Market Values)											
		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	-77.50	-181.53	-106.9		
		2010	2011	2012	2013	2014	2015	2016					
Assets		11.89	3.27	11.79	19.04	9.74	1.22	1.66					
Liabilities		10.13	33.77	4.46	-12.59	24.35	-0.49	8.05					
Difference:													
Annual		1.76	-30.50	7.33	31.63	-14.61	1.71	-6.39					
Cumulative		-115.67	-195.73	-194.30	-120.74	-177.14	-172.78	-199.79					

2016 Pension Liability Growth is Very High

Based on economic valuations of pension liabilities, liability growth was sensational in the first quarter of 2016. Liability growth was **8.05%** using Treasury STRIPS as the discount rates and **7.45%** using AA corporates (ASC 715). According to our Asset Allocation model on page 1, asset growth was good at **1.66%** (**7.60%** annualized). As a result, assets underperformed liability growth by **-6.39%** (vs STRIPS) and **-5.79%** (vs. AA corporates) accordingly. Please notice the difference between the Barclay's Aggregate bond index growth of 3.03% and liability growth of 7.45% using AA corporates (ASC 715). This shows clearly the interest rate sensitivity difference due to the Ryan Liability Index Master having a duration of about 3x longer than the Barclay's Aggregate.

Cash Flow Matching... Best Way to De-Risk a Pension

De-risking has become a major pension trend. Duration matching and insurance buyout annuities dominate the pension industry but both are inferior strategies to *cash flow matching*. The **mission or quest of a pension should be to fund liabilities in a cost effective manner**. The Ryan ALM cash flow matching product (**Liability Beta Portfolio™**) is a cost optimization model that searches the bond universe (over 10,000 bonds) to put together the most synergistic portfolio that funds every liability payment at the lowest cost to the plan. Using investment grade bonds our Liability Beta Portfolio™ (LBP) shows a consistent cost savings of about 10% vs. ASC 715 discount rates. Using high yield bonds the cost savings improve to over 20%. Our LBP should be the core portfolio of any pension replacing active bond management. With our LBP in place it buys time for the Alpha assets (performance or risky assets) to perform. Indeed performance histories suggest that equities and other risky assets perform best over 10 year horizons. For info on our LBP contact us at Contact@RyanALM.com or at 561-656-2014.

Duration Matching = Hedging Strategies... NOT De-risking Strategies

Duration matching is designed to match the growth rate of liabilities. Since the duration of most liabilities are not provided by the actuary, most duration matching strategies use *generic* bond indexes as a proxy for liabilities. This is not an accurate or effective way to match liabilities. Liabilities are like snowflakes... you will never find two alike. Only through a Custom Liability Index (CLI) could you ever know the duration profile of liabilities which is quite interest rate sensitive. Since coupon bonds durations peak out at around 16 years, any liabilities longer than 16 years must be duration matched with high cost Treasury STRIPS. Moreover, buying a 5-year duration bond to match a 5-year duration liability, a 10-year duration bond to match a 10-year duration liability, etc. is much more costly than *cash flow matching*. Cash flow matching uses longer bonds (interest income) to fund the shorter liabilities. Bond math is clear that the longer the maturity the lower the cost (purchase price) given the same yield. Moreover, the yield curve is usually positive sloping such that the longer bonds have higher yields which results in more cost savings. Please read my research paper "*How To De-Risk A Pension*" located in the research section of our web site www.RyanALM.com. **Futures, derivatives and interest rate swaps are certainly not de-risking strategies** since there are no funds to match and pay the liability benefit payment schedule. The objective of a pension should not be return oriented (especially the ROA). The 1990s should be a constant reminder of what happens when your focus is on a target return instead of the funded ratio and funded status. Had pension's cash flow matched liabilities in the 1990s when they had surpluses, there would be no pension crisis today!

Insurance Buyout Annuities (IBA)... Most Costly Way to De-risk

IBA have won over \$100 billion of business in recent years. The big attraction here is the transfer of the pension to the insurance company and the removal of this liability from the balance sheet and the pension expense from the income statement. Such IBA come at great cost with most using a 3% discount rate, or less, as the cost of assets to be transferred. This is in sharp contrast to the ASC 715 discount rates of 3.80% and our LBP average YTM of 5.50% (as of 12/31/15). This translates into our LBP product is 26% less costly than IBA!

“The U.S. Pension Crisis” Book Wins IPPY Gold Award for Finance

My new book on The U.S. Pension Crisis was just honored with the top IPPY award for an independent publisher on finance. The IPPY awards were launched in 1996 as the first awards program exclusively for independents. This year’s competition had 5,240 entries. If you are interested in purchasing, please email us at Contact@RyanALM.com or visit our web site for purchase info www.RyanALM.com.

Public Pension WATCH:

California: According to the Orange County Register, preliminary calculations from a forthcoming SIEPR study tally the unfunded pension deficit for CA state and local government employees at \$1.2 trillion! This is broken down as approximately \$950 million in unfunded pensions and \$300 billion in OPEB (other post-employment benefits). CA pension debt is close to 60% of the state’s GDP.

Chicago: Has more retired police and firefighters than working.

Illinois: Has one of the highest property taxes in the nation due to funding out of control pension benefits. In many cities, over 90% of the property tax levy goes to pensions.

Kentucky: The public retirement pensions have a total underfunded pension liability of about \$38 billion. This is weighing heavily on the proposed budget of the Commonwealth which totals about \$21 billion.

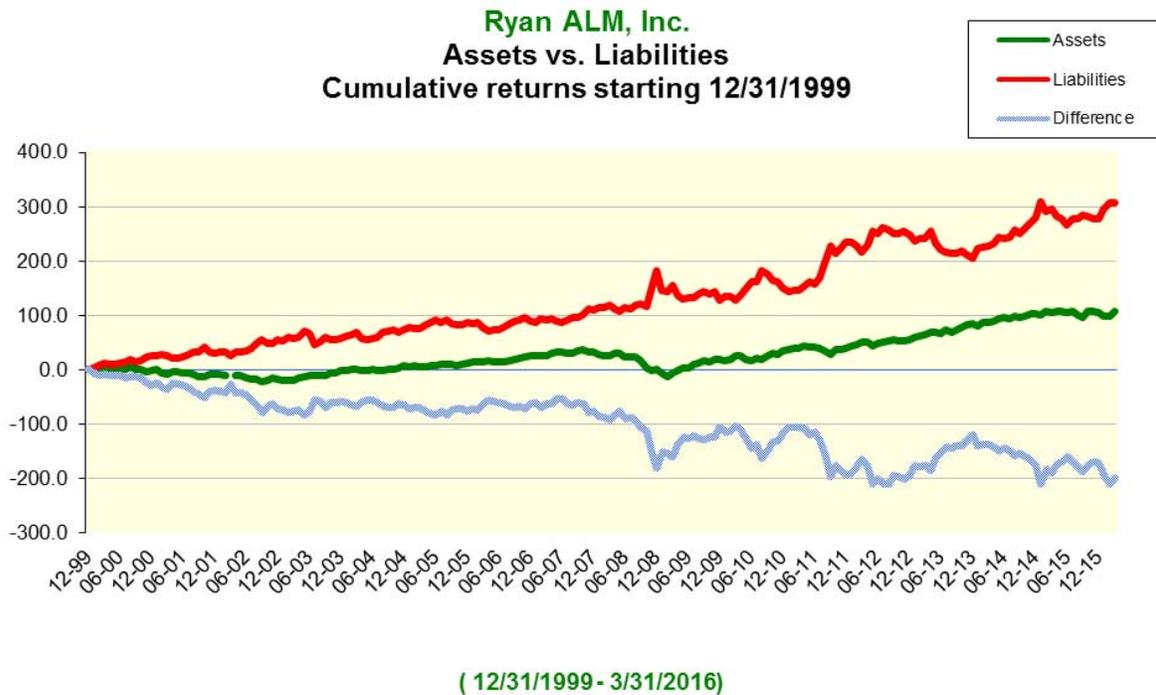
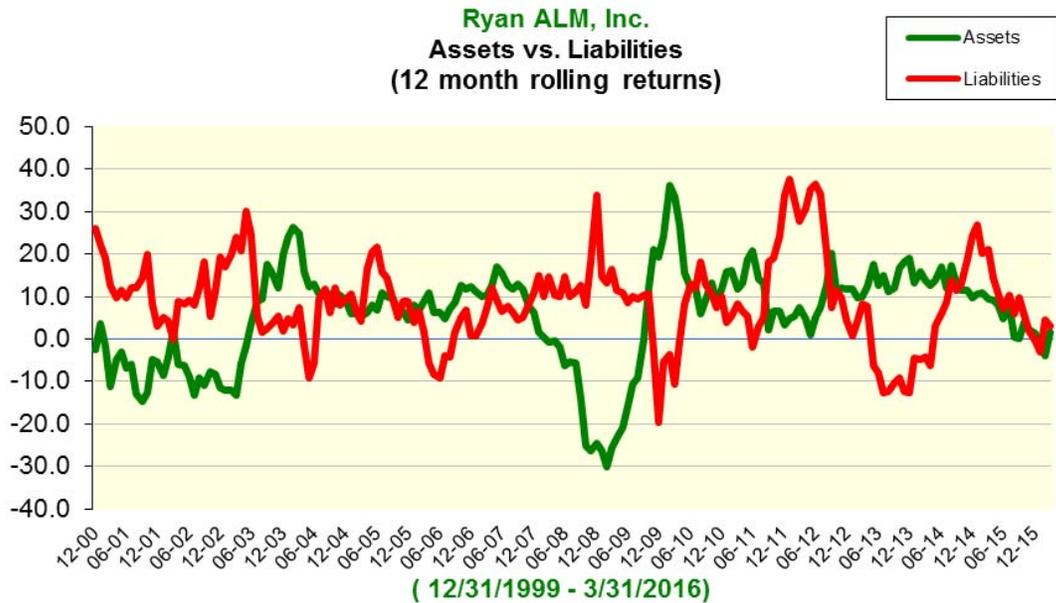
Louisiana: The state is faced with a \$20 billion pension shortfall but legislators want to increase pension benefit COLAs. The current bill of Senator Barrow Peacock would increase benefits by 1.5% to 2%. The funds would come from a state “Experience Account” that collects excess investment dollars. Such funds can only be used to pay down the debt of the state retirement system or pay COLAs. I would think debt reduction is the more prudent and fiduciary correct decision.

New York City: Has projected OPEB liabilities of over \$85 billion plus a pension deficit of \$52 billion! The annual OPEB cost is more than \$3 billion surpassing the budget costs of most city departments. Mayor de Blasio wants to increase reserves to fund health care. The NYC health care plan is quite more generous than private plans. If employees retire before 65, when Medicare begins, retirees remain on the existing plan and pay zero premiums. After 65, the city enhances Medicare coverage with supplemental insurance.

San Bernardino: Pension obligation bondholders (POB) will get 40% of what they are owed.... a reduction of about \$45 million based on recent settlement with creditors.

Ryan ALM Pension Scoreboard

The graphs below show asset vs. liability rolling 12 month and cumulative growth since 1999. Ryan ALM Benchmark Liability Index = **308.44%** growth while pension assets = **108.66%** growth for a difference of **-199.79%** suggesting any pension **Funded Ratio below 195.75% in 1999 has a deficit today on a market weighted basis. The Ryan ALM Pension Funded Ratio = 51.09%.**



The World of Ryan Indexes

Custom Liability Indexes ... (Patent Pending)

The best way to price (discount rate) and understand the interest rate sensitivity of liabilities is the **Ryan Treasury STRIPS yield curve indexes** as a **LIABILITY INDEX BENCHMARK**. In March 1985, when STRIPS were born, the Ryan Financial Strategy Group (RFSG) created the **1st STRIPS Index**. Based upon these Ryan STRIPS indexes we created the **1st Liability Index** as the proper Liability Benchmark for liability driven objectives. The Ryan team has developed hundreds of Custom Liability Indexes (CLI). Similar to snowflakes, no two pension funds are alike with unique benefit payment schedules due to different labor forces, mortality and plan amendments. Until a CLI is installed as the benchmark, the asset side is in jeopardy of managing vs. the wrong objective (market indexes). **If you outperform generic market indexes, but lose to the CLI ... the plan loses!**

Ryan Treasury Yield Curve Indexes (Constant Maturity / Duration series)

In March 1983, the Ryan Financial Strategy Group (RFSG) created the **1st Daily bond Indexes (the Ryan Index)** as a *Treasury Yield Curve constant maturity* index series for each **auCTION** maturity series (from Bills to Bonds). In March 1985, the day after Treasury STRIPS were born RFSG created the **1st Treasury STRIPS indexes** as a *Treasury Yield Curve constant duration* series of 1-30 year maturities (30 distinct constant duration indexes + composite). The best way to measure interest rate risk is to use the Ryan Treasury Yield Curve Index series.

RAFI Fundamental Weighted High Yield Index Series + RAFI Investment Grade Index Series

(PowerShares ETFs = PHB + PFIG)

In January 2010, Research Affiliates announced the creation of a series of bond indexes based on the RAFI fundamental weights. These include a short, intermediate long and composite Investment grade series and a short and intermediate High Yield series. Ryan ALM was honored and chosen as the index designer and calculation agent. In August 2010 the RAFI 1-10 year High Yield Index was launched as a **PowerShares ETF (PHB)**. There is also a Canadian hedged version (**PFH_CN**). In September 2011 the RAFI 1-10 year Investment Grade index was launched as a PowerShares ETF (**PFIG**). For more info on these ETFs and index, please go to:

www.Powershares.com (click on fixed income portfolios)

Ryan/Nasdaq 1-30 year Treasury Maturity Ladder (PowerShares ETF = PLW)

On October 11, 2007 PowerShares launched a fixed income ETF (**PLW**) based upon the Ryan/Nasdaq 1-30 year Treasury Maturity Ladder index. This index is an equal-weighted diversified portfolio of 30 distinct maturities. For more info on this ETF and index, please go to:

www.Powershares.com (click on fixed income portfolios)

Ryan ASC 715 (formerly FAS 158) Discount Rates

In 2006, Ryan ALM designed the FAS 158 yield curve index that prices any private pension liabilities in conformity to FAS 158 standards. We provide four distinct yield curves of AA corporate zero-coupon bonds in conformity to ASC 715.

Given the Wrong Index ... you will get the Wrong Risk/Reward!

To view all Ryan Indexes data go to: www.RyanIndex.com

Ryan Index is a Registered Trademark of Ryan ALM, Inc.

In October 2005, Ron Ryan terminated his license agreement with Ryan Labs to distribute and calculate the Ryan Indexes and Ryan STRIPS Indexes. Ron Ryan and Ryan ALM have no affiliation with Ryan Labs. Any use of the formulas, methodologies and data of any of the Ryan Indexes without Ron Ryan's written permission is prohibited.

Pension Solutions: **Custom Liability Index and Liability Beta Portfolio™** *(Patent Pending)*

Ryan ALM offers a turnkey system of CLI + Liability Beta portfolio as a pension solution:

Custom Liability Index (Patent pending) - The first step in prudent pension management is to measure and monitor the liability objective frequently and accurately. Until liabilities are packaged as a **Custom Liability Index (CLI)** the asset side is in jeopardy of managing to the wrong objectives (i.e. market indexes). Only a CLI best represents the unique liability schedule of pensions. Just like snowflakes, no two pension liability schedules are alike due to different labor forces, salaries, mortality and plan amendments. How could a *generic market index* ever properly represent such a diverse array of pension liabilities? Once the CLI is installed the pension will now know the true **economic Funded Ratio** which should dictate the appropriate Asset Allocation, Asset Management and Performance Measurement. Ryan ALM is a leader in CLI as Ron Ryan was the inventor of the *first Liability Index* in 1991. In 2006, Ron won the *William F. Sharpe Index Lifetime Achievement Award!*

Liability Beta Portfolio (Patent Pending) – The value added in bonds is small as every performance ranking study proves (1st quartile vs. median difference). **The best value in bonds is to match and fund liabilities** as Dedication, Immunization and Defeasance have proven for decades. Since liabilities are dynamic calculations they need a CLI to monitor their risk/reward behavior. The *core* or Beta portfolio for a pension should be in high quality bonds that match and fund liabilities. A Beta portfolio is defined as the portfolio that matches the objective. If the true objective is liability driven then, by definition, the proper beta portfolio for any liability objective must be ... a **Liability Index Fund or Liability Beta Portfolio**. This requires a Custom Liability Index in order to be executed.

The Ryan ALM Beta portfolio system will invest only in high quality securities that match the CLI. This provides our clients with the **lowest cost and lowest risk portfolio**. It is the lowest risk portfolio since it has:

No Interest Rate Risk (matches CLI)
No Liquidity Risk
No Credit Risk
No Event Risk
No Prepay Risk

The Ryan ALM Beta portfolio is the lowest cost portfolio since we will always out yield liabilities by more than our low fee thereby guarantying each client **No Net Fee** to maturity (liability benefit payment dates). Moreover, the Beta portfolio is a matching liability portfolio that fully funds liabilities thereby reducing the cost and volatility of contributions.