

Ronald Ryan, CEO, CFA

# The Ryan ALM Pension Letter™

December 31, 2016

(Copyright Ryan ALM, Inc. 2016 ...All Rights Reserved)

Index	Returns YTD 2016	Weights
<b>Pension Liabilities:</b>		
<b>Market (Tsy STRIPS)</b>	<b>1.92%</b>	<b>100 %</b>
<b>ASC 715 (FAS 158)</b>	<b>6.58</b>	
<b>PPA (MAP 21 = 3 Segments)</b>	<b>6.83</b>	
<b>PPA (Spot Rates)</b>	<b>10.72</b>	
<b>GASB /ASOP (8% ROA)</b>	<b>8.00</b>	
<b>Pension Assets:</b>		
<b>Ryan Cash</b>	<b>0.59 %</b>	<b>5 %</b>
<b>Bloomberg Barclay Aggregate</b>	<b>2.65</b>	<b>30</b>
<b>S&amp;P 500</b>	<b>11.93</b>	<b>60</b>
<b>MSCI EAFE Int'l</b>	<b>1.56</b>	<b>5</b>
<b>Asset Allocation Model</b>	<b>8.12 %</b>	<b>100 %</b>
<b>Pension Assets – Liabilities:</b>		
<b>Market</b>	<b>6.20</b>	
<b>ASC 715 (FAS 158)</b>	<b>1.54</b>	
<b>PPA (MAP 21 = 3 Segments)</b>	<b>1.29</b>	
<b>PPA (Spot Rates)</b>	<b>-2.60</b>	
<b>GASB/ASOP (8% ROA)</b>	<b>0.12</b>	

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 return above, the difference in pension asset growth vs. liabilities in 2016 was: **6.20%** (market valuation STRIPS), **1.54%** (ASC 715), **1.29%** (PPA 3 segment rates), **-2.60%** (PPA-Spot Rates) and **0.12%** (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 -163.26%** 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	8.12					
Liabilities	10.13	33.77	4.46	-12.59	24.35	-0.49	1.92					
Difference:												
Annual	1.76	-30.50	7.33	31.63	-14.61	1.71	6.20					
Cumulative	-115.67	-195.73	-194.30	-120.74	-177.14	-172.78	-163.36					

### **2016 = Marginal Good Year for Pensions!**

Based on the Ryan ALM data and calculations on the first page, pensions should have outperformed their liability benchmarks slightly for 2016. Our asset allocation model shows asset growth = **8.12%**. Our series of liability benchmarks shows:

Private Sector vs. Liability Growth Rate of 6.58% (ASC 715) = **1.54% Alpha**  
Public Sector vs. Liability Growth Rate of 8.00% (ROA) = **0.12% Alpha**

Unfortunately, most pensions are still greatly underfunded. We show a funded status deterioration of **42.40%** since 12/31/99. This is mainly due to inappropriate asset allocation decisions. Most pensions had a surplus by 1999. Instead of immunizing and matching assets to liabilities with a surplus portfolio leftover, most pensions were heavily skewed to risky assets. When the equity correction hit in 2000 thru 2002, it destroyed pension surpluses. According to Ryan ALM calculations, the S&P 500 underperformed our Liability Index benchmark by 76% in those three years. This dropped funded ratios into a deep deficit position which most pensions have not recovered from yet.

Ryan ALM recommends that the first step in solving the pension crisis is to install a Custom Liability Index (CLI) that measures and monitors liabilities accurately and frequently. We calculate the present value of liabilities based on all discount rates that our clients (and their actuaries and consultants) feel are relevant. We also include the market value of liabilities at both the AA corporate rates (ASC 715) and Treasury STRIPS yield curve. With a CLI installed, pensions will now know the true economics of their plan: MV present value, growth rate of liabilities, interest rate sensitivity and statistical summary (YTM, Duration, etc.). Pensions will know their true economic funded ratio and funded status every quarter. Without a CLI, it would be difficult for the asset side to function effectively on asset allocation, asset management and performance measurement.

### **PBGC's Contradictory Trends in 2016**

The PBGC deficit for single-employers was **\$20.6 billion in FY 2016**, \$3.5 billion less than the FY 2015 deficit of \$24.1 billion... a **14.52% decrease!** However, the PBGC's multiemployer program's deficit grew by \$6.5 billion to **\$58.8 billion in FY 2016** from FY 2015 \$52.3 billion... a **12.4 increase!** The PBGC provided \$113 million in financial assistance to 65 insolvent multiemployer plans in 2016.

### **Moody's Study Shows 50 Largest Pensions of US Cities Grew 192% since 2005**

A November release of a study by Moody's Investors Services showed that the 50 largest pensions of US cities grew by 192% since 2005 thru fiscal 2015. Of the 50 cities, 32 had greater net pension liabilities than net direct debt. The ratio of median adjusted net pension liability to all governmental revenues was 147% in 2015 compared to 70% in 2005. This led to an increase in pension contributions which totaled \$17.6 billion for these 50 municipalities up from \$7.4 billion in 2005. The cities with the highest ratios were:

<b>Chicago</b>	<b>719%</b>
<b>Dallas</b>	<b>549%</b>
<b>Phoenix</b>	<b>434%</b>
<b>Houston</b>	<b>414%</b>
<b>Los Angeles</b>	<b>407%</b>

### Fastest Growing States and Shrinking States

The demographics always play a role in the economics of any state. The US Census Bureau just released its population estimates for each of the 50 states and Washington DC for the period from July 1, 2015 to July 1, 2016. Here are the top 8 winners and losers:

Population Growth Rates			
Utah	2.03%	West Virginia	-0.54%
Nevada	1.95%	Illinois	-0.29%
Florida	1.82%	Vermont	-0.24%
Idaho	1.83%	Connecticut	-0.23%
Washington	1.78%	Wyoming	-0.18%
Oregon	1.71%	Pennsylvania	-0.06%
Arizona	1.66%	Mississippi	-0.02%
Wash. DC	1.61%	New York	-0.01%

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

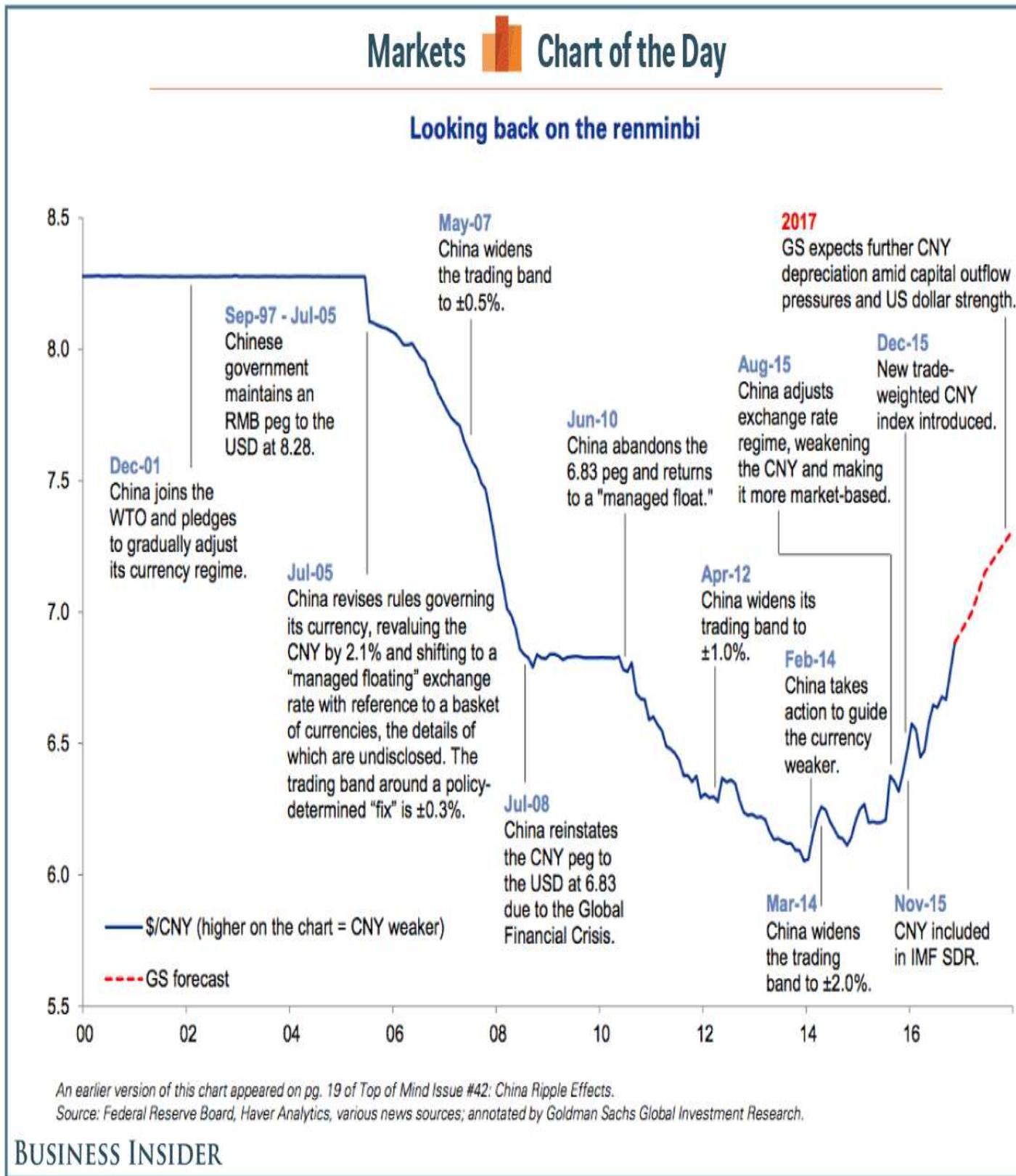
Duration matching is designed to match the growth rate of liabilities. Since the duration of most liabilities are not provided by the actuary, most duration matching strategies use *generic* bond indexes as a proxy for liabilities. This is not an accurate or effective way to match liabilities. Liabilities 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](http://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 \$500 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 + PBGC expense from the income statement. Such IBA come at great cost with most using a U.S. Treasury discount rate – 20 bps. (@ 2.80% as of 12/31/16) as the discount rate cost of assets to be transferred. This is in sharp contrast to the ASC 715 discount rates of 3.71% and our LBP average YTM of 4.69% (as of 12/31/16). This translates into our LBP product is 26% to 30% less costly than IBA!

## China Currency Debacle

The Chinese yuan has been in a controlled decline since 2014, falling by 15% to 6.96 per US dollar. The graph below shows the last 16 year history of the renminbi vs. the US dollar.



## Ryan ALM Pension Scoreboard

The graphs below show asset vs. liability rolling 12 month and cumulative growth since 1999. Ryan ALM Benchmark Liability Index = **285.28%** growth while pension assets = **121.91%** growth for a difference of **-163.36%** suggesting any pension **Funded Ratio below 173.62%** in 1999 has a deficit today on a *market weighted* basis.

**The Ryan ALM Pension Funded Ratio = 57.60% (starting at 100.00 on 12/31/99)**



## 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](http://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](http://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](http://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 (1<sup>st</sup> 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.