

Ronald Ryan, CEO, CFA

The Ryan ALM Pension Letter™

March 31, 2019

(Copyright Ryan ALM, Inc. 2019 ...All Rights Reserved)

Index	Returns YTD 2019	Weights
Pension Liabilities:		
Market (Tsy STRIPS)	4.22%	100 %
ASC 715 (FAS 158)	8.30	
PPA (MAP 21 = 3 Segments)	1.71	
PPA (Spot Rates)	6.79	
GASB /ASOP (7.50% ROA)	1.87	
Pension Assets:		
Ryan Cash	0.72 %	5 %
Bloomberg Barclay Aggregate	2.94	30
S&P 500	13.65	60
MSCI EAFE Int'l	10.15	5
Asset Allocation Model	9.55 %	100 %
Pension Assets – Liabilities:		
Market	5.33	
ASC 715 (FAS 158)	1.25	
PPA (MAP 21 = 3 Segments)	7.84	
PPA (Spot Rates)	2.76	
GASB/ASOP (7.50% ROA)	7.68	

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

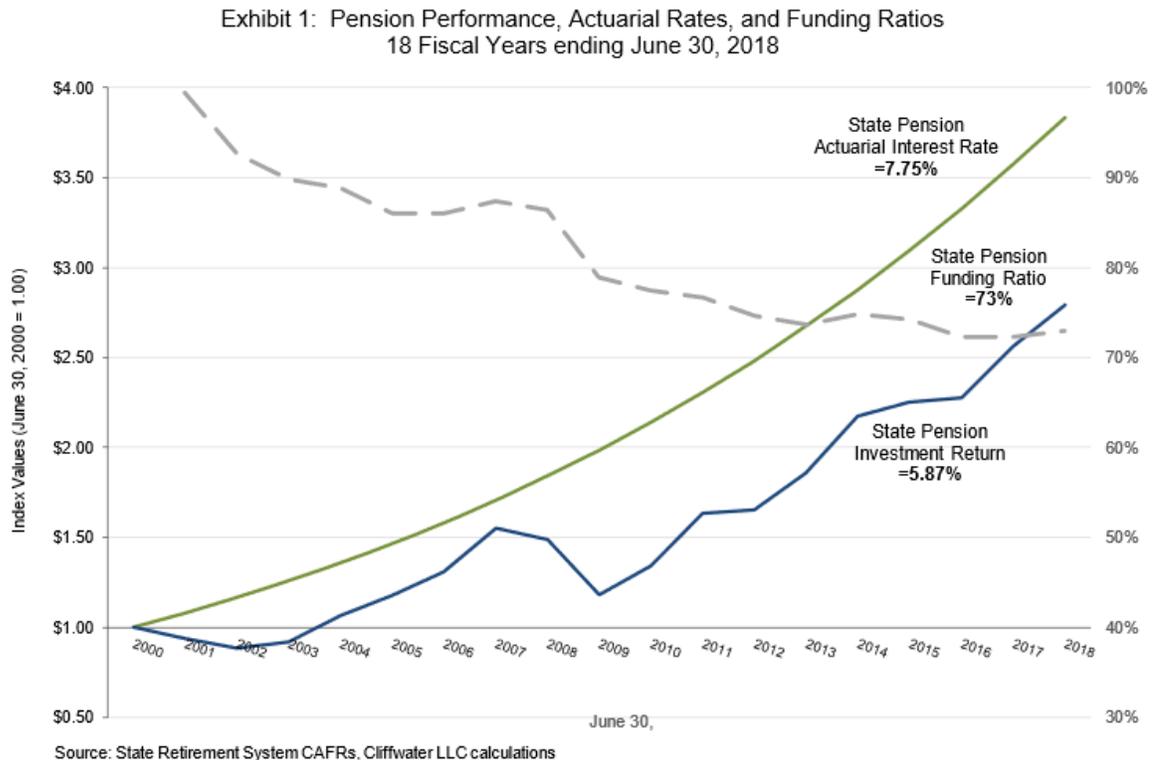


Using the Asset Allocation return above, the difference in pension asset growth vs. liabilities in 2019 was: **5.33%** (market valuation STRIPS), **1.25%** (ASC 715), **7.84%** (PPA 3-segment rates), **2.76%** (PPA-Spot Rates) and **7.68%** (GASB/ ASOP). Such valuations show the significant difference 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 -156.30%** on a compounded index basis starting at 100 on 12/31/99!

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	28.95
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	2017	2018	2019
Assets	11.89	3.27	11.79	19.04	9.74	1.22	8.12	15.15	-2.96	9.55
Liabilities	10.13	33.77	4.46	-12.59	24.35	-0.49	1.92	7.94	-1.26	4.22
Difference:										
Annual	1.76	-30.50	7.33	31.63	-14.61	1.71	6.20	7.21	-1.70	5.33
Cumulative	-115.67	-195.73	-194.30	-120.74	-177.14	-172.78	-163.36	-160.34	-162.68	-156.30

2019 Cliffwater Report: U.S. State Pension Funds Underperform ROA

According to Cliffwater, LLC researchers, the 66 state pension funds with fiscal years ending June 30 collectively earned an average return of 5.87% between fiscal year 2000 and 2018. This badly underperformed the average actuarial ROA of 7.75% which led to a decline in funding ratios from 100% funded to 73% today. Worst is the fact that most returns are before fees so actual returns are lower. Cliffwater said that the failure of actuaries to properly assess long-term asset returns (i.e. ROA) is clearly the primary factor in pension underfunding.



Pension Discount Rate is Deeply Flawed

Richard Keevey, former New Jersey budget director and comptroller, feels that the ROA (Return On Asset assumption) used as the discount rate for pension liabilities is a deeply flawed approach. It violates finance theory, which points that a proper discount rate should reflect the riskiness of the liability and not the riskiness of the asset. It also contrasts significantly with how private firms and other countries value pensions. He continues to say that because pensions are generally protected by law and are likely to be paid even if poorly funded, the discount rate should reflect market rates for low-risk assets, such as T-Bills. All state and local governments should be required to use a risk-free discount rate to determine liabilities. We applaud Mr. Keevey keen insights and add that the proper discount rate(s) should be the risk-free rate that settles liabilities. It must be a rate(s) that you can buy to defease or settle liabilities. If you cannot buy the discount rate it is of no use or a financial lie. By definition, the **only appropriate discount rate that settles liabilities is the U.S. Treasury STRIPS yield curve.**

Rehabilitation for Multiemployer Pensions Act (H.R. 397)

In the Letter to the Editor section of the March 18 Pensions & Investments (P&I), the authors (David Blitzstein, Jeffrey Cohen, Gene Kalwarski and Judy Xanthopoulos) explain the benefits of this proposed legislation. The essence of such legislation is a low interest rate federal loan

program that would be administered by the Pension Rehabilitation Administration (PRA), a new government agency within the Treasury, to multiemployer plans classified as Critical and Declining (plans with funded ratios < 65% + estimated to be insolvent within the next 14 years). Loan proceeds must solely be used to pay benefits to retired workers (Retired Lives). Pension plans here must use these proceeds in a defeasement type strategy with low risk investment grade bonds (cash flow matching or duration matching) or annuities. This will restore financial solvency with much less need of help from the PBGC, which is already in a solvency dilemma of its own. The legislation also tightens withdrawal provisions making it more expensive for employers to withdraw thereby reducing the risk of loan defaults. On March 7, 24 members of the United Steelworkers (USW) union attended a U.S. House subcommittee hearing on this crisis and urged Congress to pass H.R. 397. The USW represents 850,000 workers.

Cash Flow Matching vs. Duration Matching

Cash flow matching is the only accurate way to defease a liability. If it is done with U.S. Treasury STRIPS it is accepted by accounting rules as a defeased liability that can be removed from the books (i.e. pre-funding municipal bonds). Since U.S. Treasury STRIPS tend to be low yielding securities they are also high cost. Cash flow matching with investment grade bonds can achieve a high degree of liability funding certainty at a much lower cost (@ 10% to 15%). In the 1960s through the 1980s cash flow matching with investment grade bonds was in vogue and called "Dedication". 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 not cost effective. 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 (i.e. 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!

Student Loan Debt Reaches \$1.56 trillion

Student loan debt in America is greater than credit-card debt. Less than half of the 44.7 million loan holders are even paying back their loans. So, who are paying the loans...the American taxpayer! The Dept. of Education holds 92% of the loans = \$4,380 for every person in the USA. Worst is the fact that the student debt is growing. It has doubled in the last 10 years with another \$72.3 billion added in the past year. Another outrageous trend is the cost of tuition. It has far outgrown inflation and 8x faster than wage growth.

U.S. Treasury Yield Curve Goes INVERSE

On March 22, the 10-year Treasury fell below the 3-month T-Bill for the first time since 2007. Many feel that this is a sign of a recession warning. PIMCO says otherwise suggesting that investors have become overly anxious about such recession signals and that they are ignoring that the domestic economy remains sound with the second largest expansion since World War II. PIMCO believes that a combination of technical factors including demand for long Treasuries because of a sharp uptick in mortgage refinancing may have amplified a recent bond market rally.



Public Pension Watch List

Congress – The annual salary of a Congressman is \$174,000. Once they have spent just five years in Congress, they are vested at 80% of their salary or \$139,200. Such pensions are secured by tax dollars.

Illinois – IL is considering ditching its flat income tax for a graduated income tax (i.e. like Federal taxes). IL faces a \$3.2 billion budget deficit, the worst credit rating of any state, a \$133 to \$250 billion pension deficit and \$8 billion of outstanding bills.

Rhode Island – Providence city officials made a persuasive argument to enhance the ailing pension system by selling or monetizing the state primary water system (Scituate Reservoir). Mayor Jorge Elorza said it has an estimated value of \$400 million. There was overwhelming opposition by those in attendance.

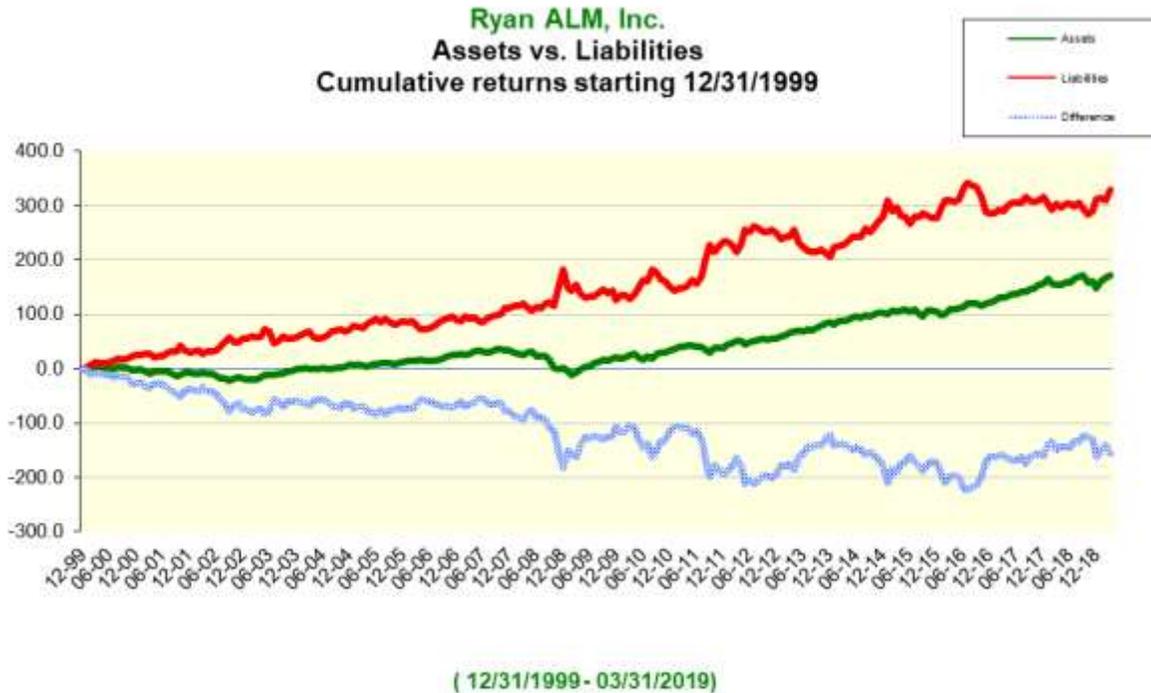
San Diego – The U.S. Supreme Court dealt a blow to San Diego's 2012 pension reform when it declined to hear the city's appeal of a lower court decision. The CA Supreme Court had ruled last year that the city erred in the way the pension cuts for new employees were placed on the ballot as Proposition B back in 2012. This means that that state courts will have to resolve the case whether to financially compensate 4,000 employees who don't have pensions because of the voter-approved measure. The legality of Proposition B has been challenged by city labor unions.

Texas – On March 8, the Texas Supreme Court affirmed the Fifth Court of Appeals and upheld the Dallas Police and Fire Pension System's decision to cut the future interest rate on deferred retirement option plan (DROP). The court held that the term "benefits" as used in Article XVI, Section 66 of the Texas Constitution did not apply to future benefits so the future interest calculated under the DROP was not a protected benefit.

Ryan ALM Pension Scoreboard

The graphs below show asset vs. liability rolling 12 month and cumulative growth since 1999. Ryan ALM Benchmark Liability Index = **327.954%** growth while pension assets = **171.650%** growth for a difference of **-156.304%** suggesting any pension **Funded Ratio below 157.54%** in 1999 has a deficit today on a *market weighted* basis.

The Ryan ALM Pension Funded Ratio = 63.476% (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 (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 (LBP) – The value added in bonds is small as every performance ranking study proves (1st quartile vs. median difference). **The best value in bonds is its cash flow 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 Liability 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 Liability Beta portfolio is the lowest cost portfolio since we will always out yield liabilities by more than our very low fee thereby guarantying each client **No Net Fee**. Moreover, the Liability Beta portfolio is a cash flow matching liability portfolio that fully funds liabilities thereby reducing the cost and volatility of contributions.

Disclaimer

The material herewith is for informational purposes only, and does not contend to address the financial objectives, situation, or specific needs of any individual investor. Any information is for illustrative and educational purposes only and is not intended to serve as investment advice since the availability and effectiveness of any strategy is dependent upon your individual facts and circumstances. Results will vary, and no suggestion is made here about how any specific solution or strategy will perform in reality.