Ryan ALM
Asset/Liability Management

RYAN ALM QUARTERLY

3Q 2023

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Pension Performance Monitor (Total Returns %)

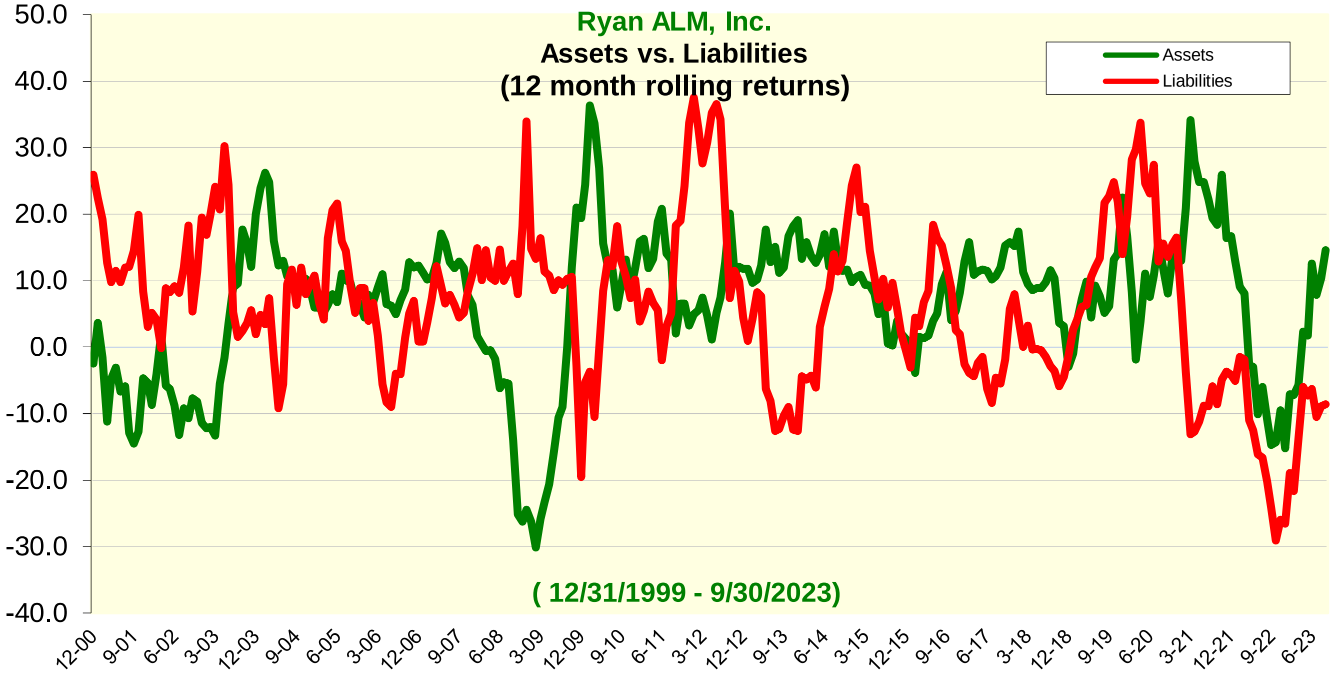
Pension Liabilities	YTD '23 (%)
Market (Treasury STRIPS)	-7.7
ASC 715 (FAS 158)	-2.0
PPA (MAP 21 = 3 Segments)	7.1
PPA (Spot Rates)	4.9
GASB /ASOP (7.25% ROA)	5.6

Pension Assets	
Cash (Ryan Cash Index)	3.7
Bloomberg Barclay Aggregate	-1.2
S&P 500	13.0
MSCI EAFE International	7.6
Asset Allocation Model[1]	7.9

Pension Assets Minus Liabilities	
Market (Treasury STRIPS)	15.6
ASC 715 (FAS 158)	11.9
PPA (MAP 21 = 3 Segments)	0.8
PPA (Spot Rates)	3.0
GASB/ASOP (7.50% ROA)	2.3

Based on the weights of the Ryan ALM Asset Allocation Model*, the difference in pension asset growth versus liability growth for YTD '23 reveals a positive comparison of pension assets minus pension liabilities no matter how pension liabilities are calculated. Corporate plans showed more robust funding gains versus their liability benchmarks, while Public and Multiemployer plans using the ROA as the discount rate had more modest outperformance versus their liability growth rates. Strong asset growth from both equities, both domestic and international, continue to have a positive impact on the relationship of plan assets to liabilities.

* Model weights are: 5% Ryan Cash, 30% Bloomberg Barclay Aggregate, 60% S&P 500, and 5% MSCI EAFE International



Last quarter we asked if the capital markets were at an inflection point or is the current risk on trade a bull market head-fake in a bear market environment? Well, equities had a challenging third quarter, but the S&P 500 remains up 13% through the first nine months. Most of the gain is attributable to just a handful of names, but the overall gains are certainly stronger than what most investors expected. With regard to bonds, significantly rising rates in the third quarter led to a decline in the BB Aggregate Index for both the quarter and YTD. The big question now on the minds of many investors involves the Fed and at what level of interest rates will they soon stop. The FFR – now at 5.25%-5.50% - may be increased again this year before the Fed completes this incredible tightening cycle. The Fed doesn't seem ready to declare victory over inflation, nor should they, while the US labor markets remain historically strong. According to the Atlanta Fed's GDPNow model, they are currently forecasting a real annual GDP growth rate of 5.1% (as of 10/10/23). This would be an incredible outcome given the tightening to date and may signal that more is needed to be done.

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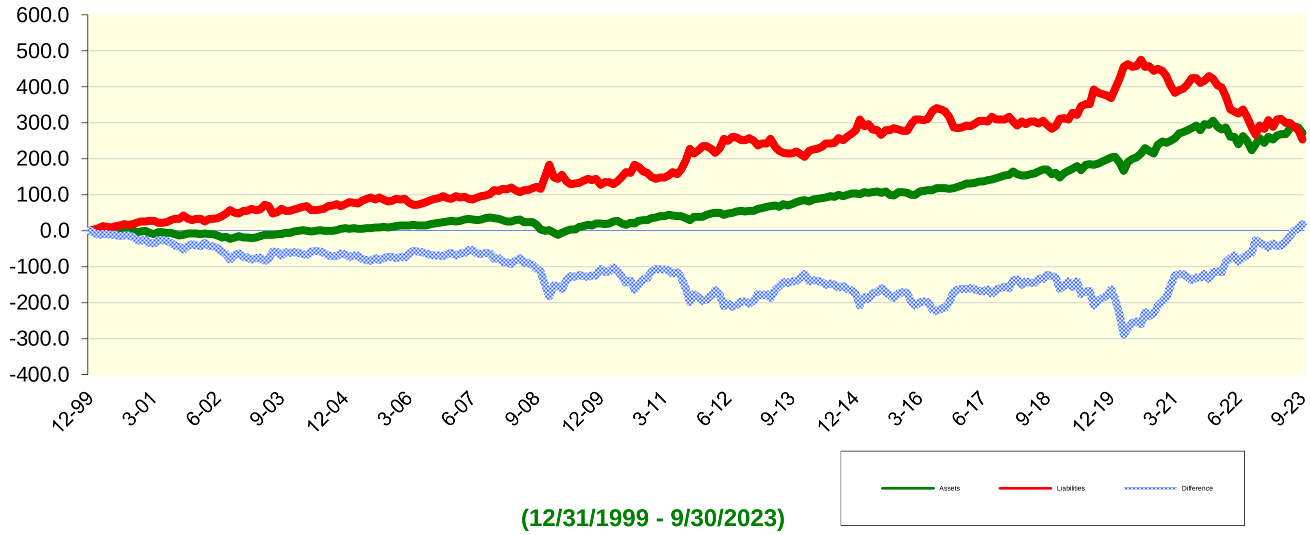
Assets vs. Liabilities
Cumulative returns starting 12/31/1999



Most pension funds enjoyed a funded ratio surplus in 1999, but pension asset growth has underperformed liability growth (based on the Ryan ALM Treasury STRIPS discount rate) fairly consistently for much of the past two decades. Pleased to report that the deficit has recently been eliminated as a result of the Fed’s tightening campaign. The current level of performance is actually +17.9% on a compound index basis starting at 100 on 12/31/99. Starting at a funded ratio of 100 on 12/31/99, the estimated funded ratio today would be 105.1%, which is based on the Ryan ALM liability calculations and hypothetical asset allocation. Relatively strong market returns during the first 3/4s of ’23 and rising US interest rates have combined to support the funded ratio for the various types of DB plans which have improved from the end of 2022. Continuing Federal Reserve rate increases will have an impact on liabilities, as the present value of those obligations will fall. It is anyone’s guess what might happen to pension assets, too.

US interest rates have continued to rise since the dramatic fall earlier this year brought about by fear of a broadening banking crisis. Fortunately, it seems as if that crisis has not led to greater contagion. US rates are once again reflecting the current economic environment which would suggest a higher level before year-end and no likely pivot from the FOMC due to a very strong labor market and economic activity that doesn’t seem to have been thwarted by the elevated rates.

Cumulative returns of assets versus liabilities (%)

	Assets	Liabilities	Difference	Cumulative Difference	Funded Ratio
2000	-2.5	26.0	-28.5	-28.5	77.4
2001	-5.4	3.1	-8.5	-37.6	71.0
2002	-11.4	19.5	-30.9	-73.4	52.7
2003	20.0	2.0	18.1	-60.1	62.0
2004	8.9	9.4	-0.4	-66.1	61.8
2005	4.4	8.9	-4.4	-76.8	59.2
2006	12.3	0.8	11.4	-64.6	66.0
2007	6.4	11.0	-4.6	-77.5	63.2
2008	-24.5	33.9	-58.4	-181.6	35.7
2009	15.7	-19.5	35.3	-106.9	52.9
2010	11.9	10.1	1.8	-115.7	53.8
2011	3.3	33.8	-30.5	-195.7	41.5
2012	11.8	4.5	7.3	-194.3	44.4
2013	19.0	-12.6	31.6	-120.7	60.5
2014	9.7	24.4	-14.6	-177.1	53.4
2015	1.2	-0.5	1.7	-172.8	54.3
2016	8.1	1.9	6.2	-163.4	57.6
2017	15.2	7.9	7.2	-160.3	60.9
2018	-3.0	-1.3	-1.7	-162.7	60.4
2019	22.8	13.9	8.9	-163.9	65.0
2020	14.4	16.5	-2.1	-197.1	63.8
2021	17.4	-4.2	21.6	-116.1	77.8
2022	-15.2	-26.6	11.4	-39.0	89.8
09/30/23	7.9	-7.7	15.6	**+17.9**	105.1

Source: Ryan ALM, Inc.

Economic Snapshot as of September 30, 2023

	2022	YTD '23
U.S. GDP	2.2%	Est. 5.1%*
US Debt	$30.9 T	$33.5 T
CPI - U	6.5%	3.7%
Unemployment Rate	3.5%	3.8%
30-Year Treasury Yield	3.97%	4.70%
10-Year Treasury Yield	3.88%	4.57%
2-Year Treasury Yield	4.42%	5.04%
3 Mo. T-Bills Yield	4.42%	5.45%
S&P 500	3,831.87	4,288.05
Nasdaq 100	10,939.76	13,219.32
R2000	1,761.25	1,785.10
Gold	1,866.13	1,848.10
Oil	$80.26	$90.79
Existing Single Family sales	4.1 M	4.04M**

*GDPNow forecast as of October 10, 2023 and **as of August 2023

Year-to-date change in the Treasury Yield Curve

	Curve Id	1M	2M	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y	20Y	30Y
11)	I25 09/30/23	5.345	5.434	5.446	5.541	5.448	5.044	4.799	4.609	4.614	4.571	4.897	4.699
12)	I25 12/31/22	3.976	4.325	4.343	4.753	4.687	4.426	4.224	4.004	3.965	3.875	4.144	3.963
13)	I25 (09/30/23-...	136.8	110.9	110.3	78.8	76.2	61.8	57.5	60.5	64.9	69.6	75.4	73.6

Sharing Perspective

[Pension Doctor: Generalist or Specialist?]

Most people go to a doctor who is a specialist or expert on the subject they are looking for treatment. The same should be true in business, especially for a pension. Since pensions are liability driven, you would think that plan sponsors would want to hire liability driven specialists.

The Ryan ALM YTD '23 Pension Monitor

Pension plan liabilities need to be measured and monitored regularly. Without knowledge of plan liabilities, the allocation of plan assets cannot be done efficiently or appropriately.

A Risk Management Tool Like No Other

… I want to focus my attention on the subject of de-risking a pension plan, as DB plans need to be ***protected and preserved*** through a risk mitigation technique.

ARPA Update as of September 29, 2023

I don't know if the historic rainfall registered on the east coast last week had anything to do with activity levels at the PBGC, but we witnessed very little tangible output as it related to the implementation of ARPA and the Special Financial Assistance (SFA).

It is All About Cash Flows

The last 18 or so months have played havoc with total return-seeking fixed income strategies as US interest rates have risen precipitously from the depths of Covid-19-induced lows. In fact, there is the chance (likelihood) that the Aggregate Index may suffer losses for the third consecutive year.

You've Won – Don't Keep Your Chin Extended

I've never been a boxer, but I can certainly appreciate the instructions to stay away from your opponent in the last or later rounds when you have the match won on points even though Jimmy Braddock didn't adhere to that strategy in the movie classic, "Cinderella Man".

LATEST THINKING

We are thrilled that the American Rescue Plan Act (ARPA) was passed as part of the $1.9 trillion stimulus package. This legislation has many of the elements of the Butch Lewis Act which we were instrumental in providing the defeasance language. Importantly, any Special Financial Assistance (SFA) received must be kept separate and managed conservatively to ensure that the funds received and earmarked to pay the promised benefits (through 2051) are actually available. The PBGC has approved the SFA applications for 65 multiemployer plans through September 30, 2023, totaling just about $53.5 billion (including supplemental filings and interest) in government grants. The PBGC provided the "Final, Final Rules" related to the implementation of this legislation in Jul 2022. Several items within the original Interim Final Rules have been altered, including permissible investments for the SFA assets. We disagreed with some of these elements, particularly the allowance for 33% of the SFA to be invested in return-seeking assets (RSA), which would include investment grade bonds that aren't used to defease a plan's liabilities (benefits and expenses). Given the Fed's aggressive action to tackle inflation and the resultant higher interest rates, it makes little since to take on equity market risk at this time.

We are very committed to educating plan sponsors and their advisors about the impact of rising interest rates and the impact that has on the ability to de-risk DB pensions through Cash Flow Matching (CFM). The US Federal Reserve is determined to conquer inflation and the multiple rounds of Fed Funds Rate increases has the rate at 5.25%-5.50% with an expectation that we could see at another 0.25% before year-end. The data below is a representative client. The projected cost savings through defeasing the plan's liabilities are incredible. Note the YTM.

LBP Summary

	ASC 715	LBP Model	Cost Savings ($ and %) *	
Future Value	$652,599,365	$652,599,365		
Present Value	$333,423,063	$324,209,425	$328,389,940	50.32%
YTM	5.59%	6.05%		
Discount Rate	5.83%	6.14%		
MDuration	9.15	8.74		
LBP Model Efficiency		100.00%		
Total Assets		$324,211,856		

One critical way to limit the impact on your fund from these potential episodic events is to maximize the efficiency of the asset allocation by extending the investment horizon ("Buy-Time") for your growth assets by bifurcating the asset allocation into 2 buckets – liquidity and Growth. We'd be happy to share with you our insights on this subject.

Ryan ALM's mission is to solve liability driven problems through low cost, low risk solutions.

About Ryan ALM, Inc.

Ryan ALM was founded by Ronald J. Ryan, CFA on June 15, 2004 as an Asset/Liability Management firm. The firm has built a turnkey system of proprietary synergistic products designed to measure liabilities as a Custom Liability Index (CLI) and manage assets to the CLI as Liability Beta Portfolios.

Ryan ALM is unique in having its own proprietary Index company named ALM Research Solutions, LLC. This company builds both custom and generic bond indexes. Such indexes range from Custom Liability Indexes to ETF Indexes.

Our Liability Beta Portfolio™ is our proprietary cost optimization model that "cash flow matches" clients projected liability benefit payment schedules at the least cost using investment grade bonds. In this higher interest rate environment, our portfolios are producing cost savings of >2%/year. Our LBP best represents the core portfolio (or liquidity bucket) of a pension plan.

FASB requires corporations and nonprofit organizations to price their liabilities at certain discount rates. Importantly, Ryan ALM provides these discount rates in conformity to ASC 842: Lease Accounting and ASC 715: Pensions. For more info: Read here

Our team has been recognized for our expertise and results including Ron Ryan having won the William F. Sharpe Index Lifetime Achievement Award.

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