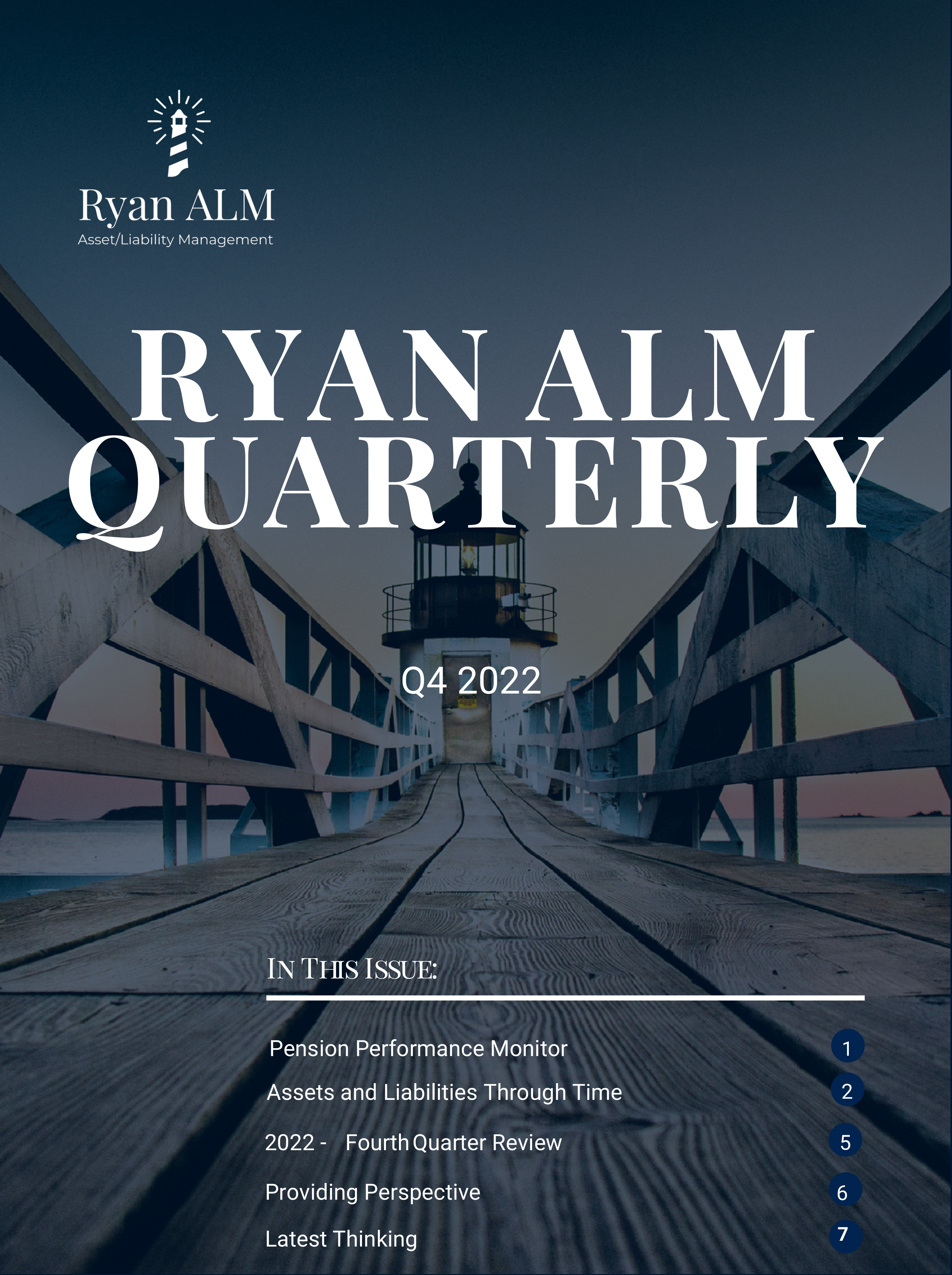

Ryan ALM
Asset/Liability Management

RYAN ALM QUARTERLY

Q4 2022

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Pension Performance Monitor (Total Returns %)

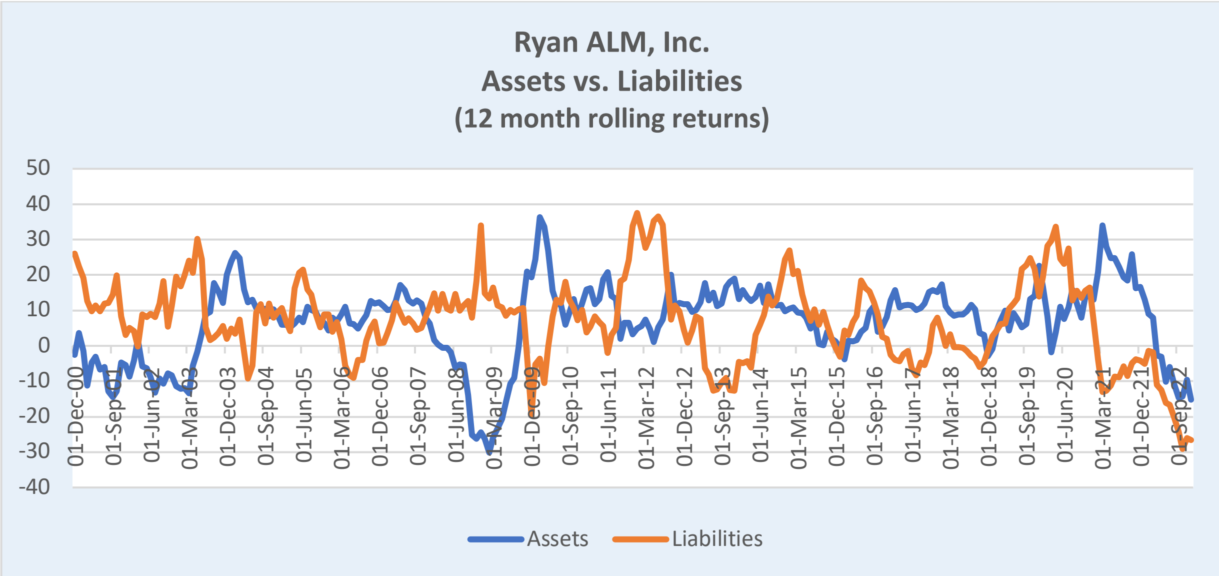
Pension Liabilities	2022 (%)
Market (Treasury STRIPS)	-26.6
ASC 715 (FAS 158)	-26.9
PPA (MAP 21 = 3 Segments)	-1.1
PPA (Spot Rates)	-28.5
GASB /ASOP (7.00% ROA)	7.0

Pension Assets	
Cash (Ryan Cash Index)	1.1
Bloomberg Barclay Aggregate	-13.0
S&P 500	-18.1
MSCI EAFE International	-13.9
Asset Allocation Model[1]	-15.2

Pension Assets Minus Liabilities	
Market (Treasury STRIPS)	11.4
ASC 715 (FAS 158)	11.7
PPA (MAP 21 = 3 Segments)	-14.1
PPA (Spot Rates)	13.3
GASB/ASOP (7.50% ROA)	-22.2

Based on the weights of the Ryan ALM Asset Allocation Model*, the difference in pension asset growth versus liability growth for YTD '22 reveals mixed results very much dependent on how pension liabilities are calculated. Corporate plans showed outperformance versus their liability benchmarks, while Public and multiemployer plans using the ROA as the discount rate significantly underperformed their liability growth rates. Rising interest rates had a positive impact on the present value of corporate pension liabilities and offset the poor asset performance experienced across most asset classes.

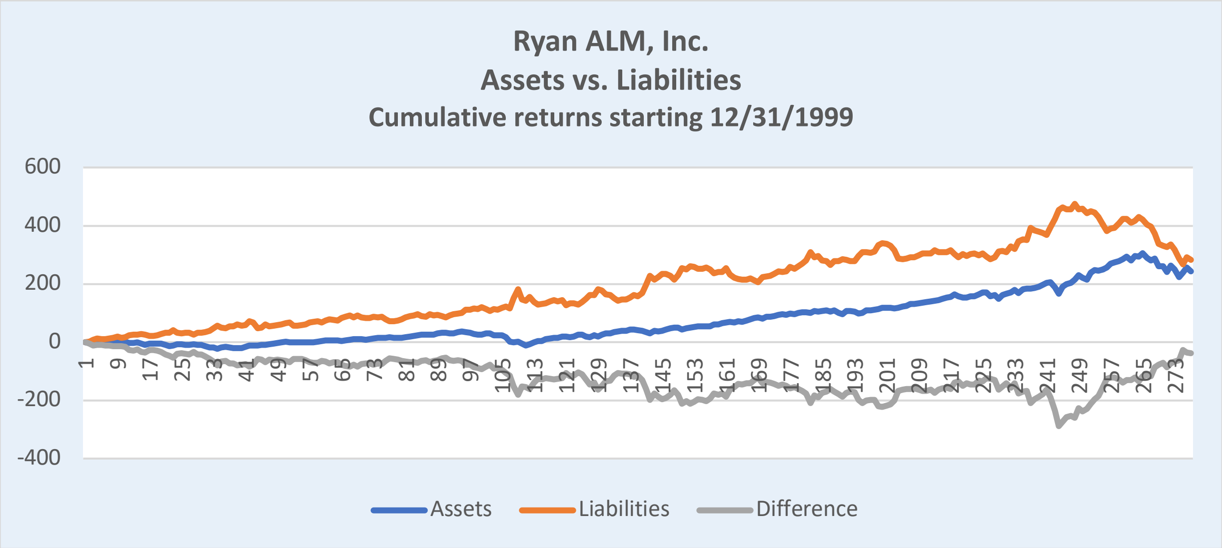
* Model weights are: 5% Ryan Cash, 30% Bloomberg Barclay Aggregate, 60% S&P 500, and 5% MSCI EAFE International



The bull markets for both equities and bonds that helped to close the gap between assets and liabilities ended in 2022. US fixed income has historically underperformed as the US Federal Reserve has elevated rates by 400 bps in an attempt to combat significant inflationary pressures. Most market participants have not worked in our industry during a rising rate environment coupled with significant inflationary pressures. It is a new day that demands new thinking. Failure to manage plan assets relative to plan liabilities may lead to significant volatility in both contribution costs and the plan's funded ratio. A Cash Flow Matching strategy addresses those concerns.

Benefits of Cash Flow Matching:

- Improve Liquidity
- Reduce Volatility (risk)
- Outyield Index Benchmark and bond ROA
- Create CORE portfolio as anchor to earning ROA
- Reduce costs to fund Benefits + Expenses (B + E)
- Buy TIME for performance assets to grow unencumbered



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. The current level of underperformance is -39.0% 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 89.8%. **Despite very weak market returns, the funded ratio for corporate plans has improved from the beginning of 2022 as pension liabilities continue to underperform pension assets as FASB accounting rules require that ASC 715 discount rates are used to value plan liabilities.**

Cumulative returns of assets versus liabilities (%)

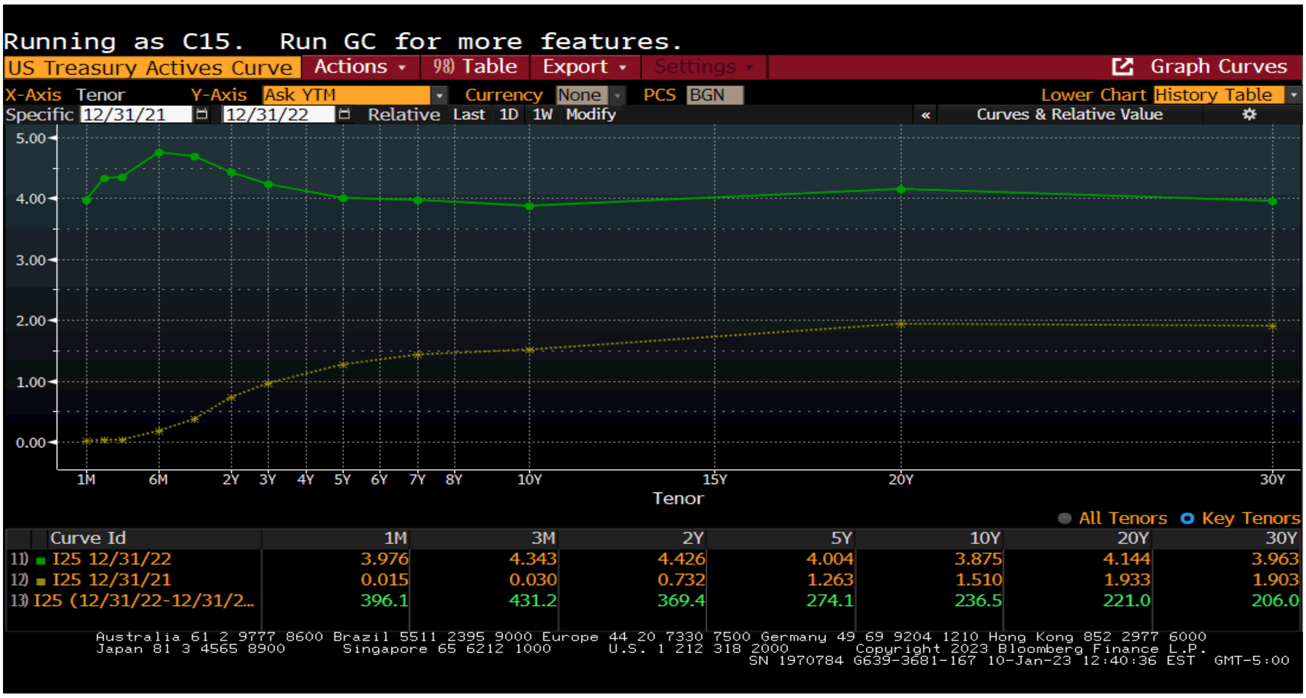
	Assets	Liabilities	Difference	Cumulative Difference	Funded Ratio
2000	-2.5	26.0	-28.5	-28.5	77.4
2001	-5.4	3.1	-8.5	-37.6	71.0
2002	-11.4	19.5	-30.9	-73.4	52.7
2003	20.0	2.0	18.1	-60.1	62.0
2004	8.9	9.4	-0.4	-66.1	61.8
2005	4.4	8.9	-4.4	-76.8	59.2
2006	12.3	0.8	11.4	-64.6	66.0
2007	6.4	11.0	-4.6	-77.5	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

Source: Ryan ALM, Inc.

Economic Snapshot as of December 31, 2022

	2021	4Q'22
U.S. GDP	$22.9 T	Est. 3.9%
US Debt	$29.6 T	$30.9 T
CPI - U	6.8%	6.5%
Unemployment Rate	3.9%	3.5%
30-Year Treasury Yield	1.90%	3.97%
10-Year Treasury Yield	1.52%	3.88%
2-Year Treasury Yield	0.73%	4.42%
3 Mo. T-Bills Yield	***0.06%***	***4.42%***
S&P 500	4,796.56	3,831.87
Nasdaq 100	15,832.80	10,939.76
R2000	2,245.31	1,761.25
Gold	1,794.25	1,866.13
Oil	$75.21	$80.26
Existing Single Family sales	5.4 M	4.1 M

Year-to-date change in the Treasury Yield Curve



PROVIDING PERSPECTIVE

Why High Interest Rates are good for Pensions

After a 40-year trend towards lower interest rates, 2022 has seen a significant shift to higher rates. Is this a secular trend? Time will tell but most economists see high inflation and a Fed making it clear that they will raise the Fed Funds rate several times in 2022.

The Ryan ALM 4Q’22 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.

Rising Rates are Humbling for Bond Funds and Their Managers!

There were 198 funds that were identified and from that universe, it was determined that only two – T. Rowe Price Dynamic Global Bond Fund and the JPMorgan Strategic Income Opportunities Fund (3.4% and 0.3%, respectively).

There Seems to be a Disconnect!

Maybe things have changed during the last 40 years (my hair color certainly has), but there seems to be a major disconnect between the market’s (Fed’s) reaction to the early 1980s inflationary environment compared to the one that we are currently experiencing.

CFM – INTEREST RATE NEUTRAL

Fortunately, CFM strategies are not interest rate sensitive. How’s that? The matching of asset cash flows (interest and principal) against liability cash flows focuses on their future values.

A Less Secure Future

When applying the “4%” rule, a target percentage for withdrawals that would “ensure” that the participant didn’t exhaust their account balance in retirement, the annual amount to safely withdraw was a whopping $3,560/year. Oh, my.

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 some of the elements of the Butch Lewis Act. Importantly, any Special Financial Assistance (SFA) received must be kept separate and managed conservatively to ensure that the funds necessary to pay the promised benefits (through 2051) are actually available. The PBGC has approved the SFA applications for 39 multiemployer plans through December 31, 2022, totaling just about $45.6 billion 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 disagree with some of these elements, particularly the allowance for 33% of the SFA to be invested in return-seeking assets (RSA). There is still much work to do!

SFA Application Status								
Priority Group	1	2	3	4	5	6	None	Total
Total Applications Expected	30	27	1	N/A	15	14	218	304
Approved	23	15	1		0	0	0	39
Under Review	3	10	0		12	0	0	24
Withdrawn	1	2	0		0	0	0	3
Denied	0	0	0		0	0	0	0
Expected Future Applications	3	0	0		3	14	218	238

We are very committed to educating plan sponsors and their advisors about the impact of rising interest rates on traditional fixed income products, which continue to dominate pension portfolios. The end of an unprecedented bull market is here following a 39-year bond market rally. The US Federal Reserve is determined to conquer the significant inflation through multiple rounds of Fed Funds Rate increases. To date the Fed has increased rates by 4.0% with an expectation that we could see at least another 1.0%, if not more, by year-end 2023. Even if inflation moderates from current levels, "sticky" inflation suggests that 4% is not out of the question. Historic "Real" rates of return would suggest long bonds with yields of 5-6% or higher. The investing environment will remain a challenging environment. Are you prepared?

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. It is back-tested since 2009 showing a consistent cost savings of >1%/year. Our LBP best represents the core portfolio of a pension plan.

FASB requires corporations and nonprofit organizations to price their liabilities at certain discount rates. 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.

Ryan ALM
Asset/Liability Management

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