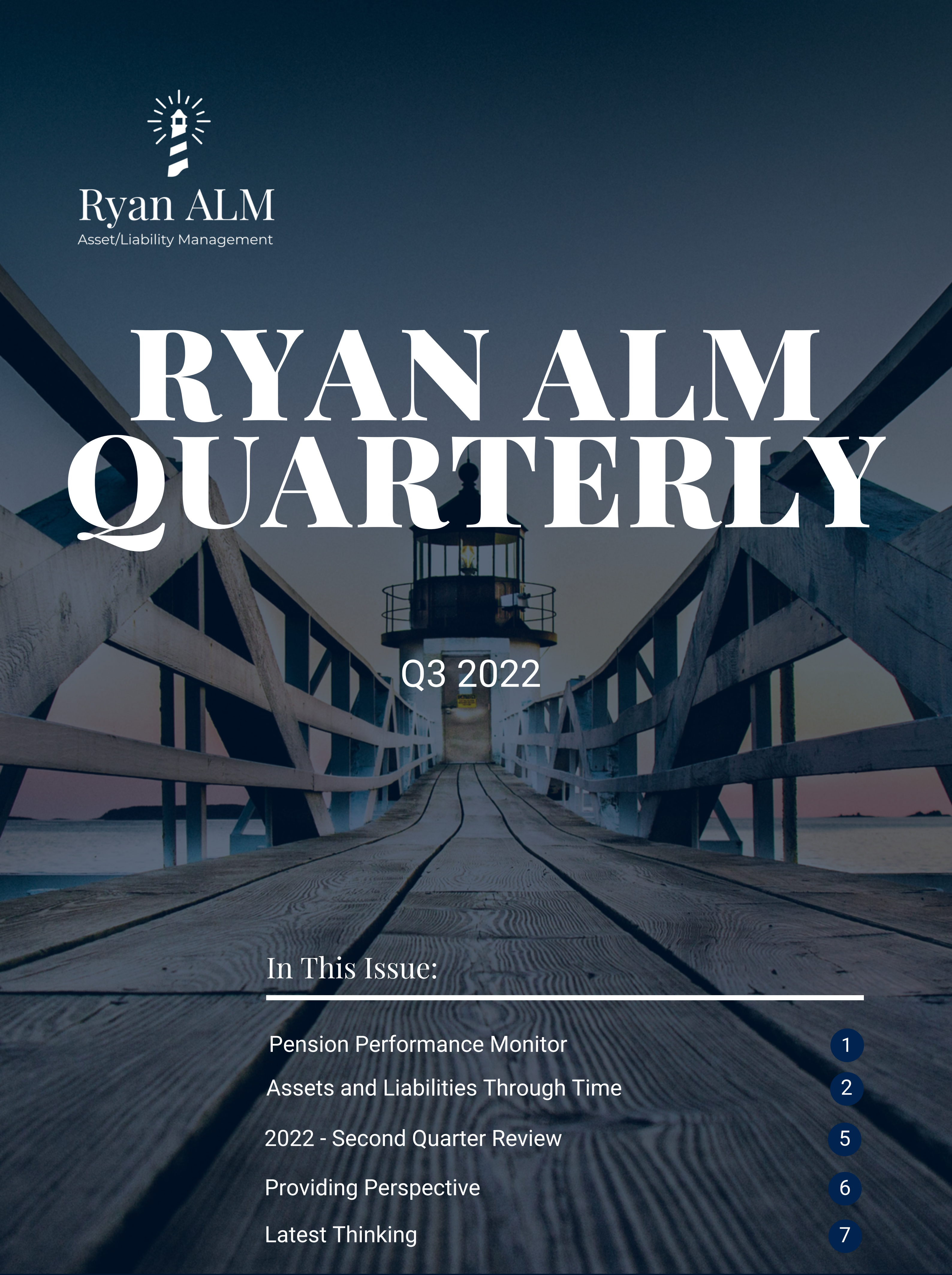

Ryan ALM
Asset/Liability Management

RYAN ALM QUARTERLY

Q3 2022

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Pension Performance Monitor

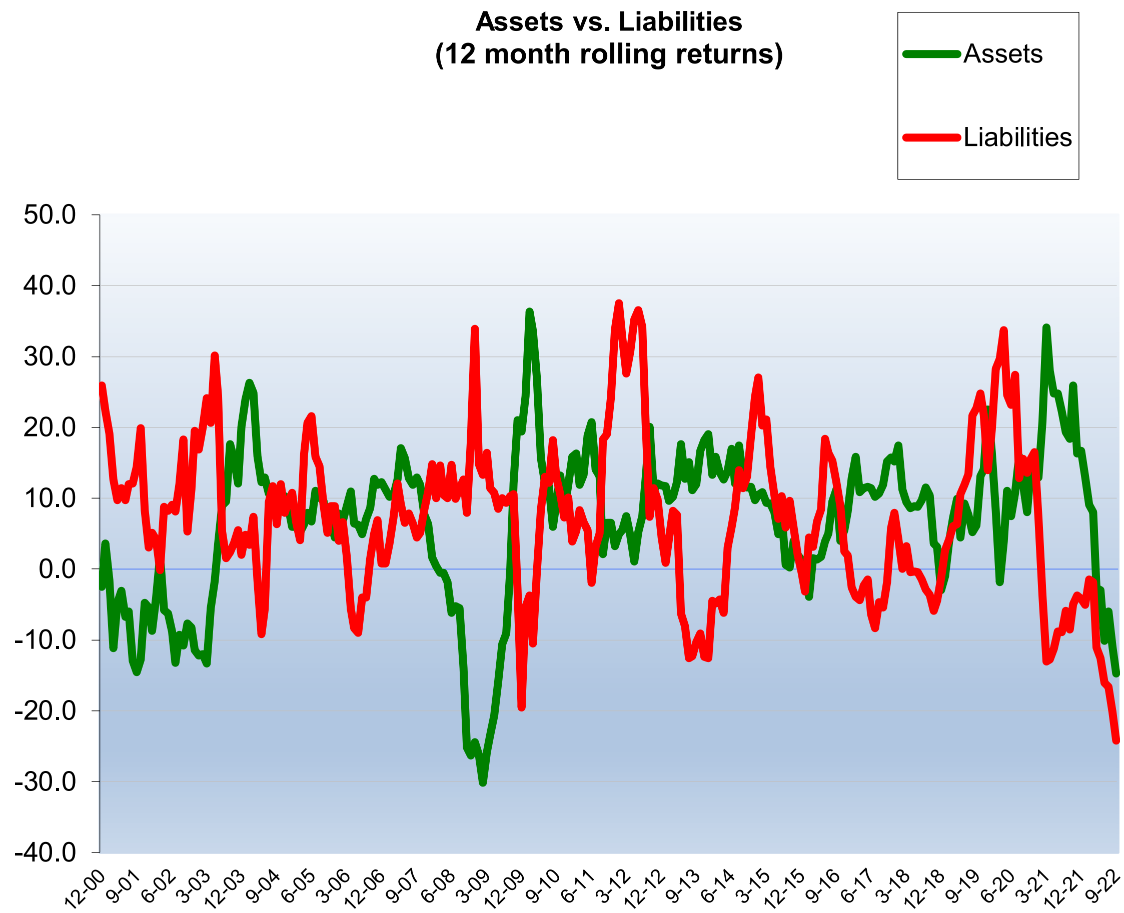
Pension Liabilities	YTD '22 (%)
Market (Treasury STRIPS)	-25.9
ASC 715 (FAS 158)	-29.9
PPA (MAP 21 = 3 Segments)	-2.3
PPA (Spot Rates)	-20.2
GASB /ASOP (7.50% ROA)	5.6

Pension Assets	
Cash (Ryan Cash Index)	0.2
Bloomberg Barclay Aggregate	-14.6
S&P 500	-23.9
MSCI EAFE International	-26.7
Asset Allocation Model[1]	-20.1

Pension Assets Minus Liabilities	
Market (Treasury STRIPS)	5.8
ASC 715 (FAS 158)	9.8
PPA (MAP 21 = 3 Segments)	-17.8
PPA (Spot Rates)	0.1
GASB/ASOP (7.50% ROA)	-25.7

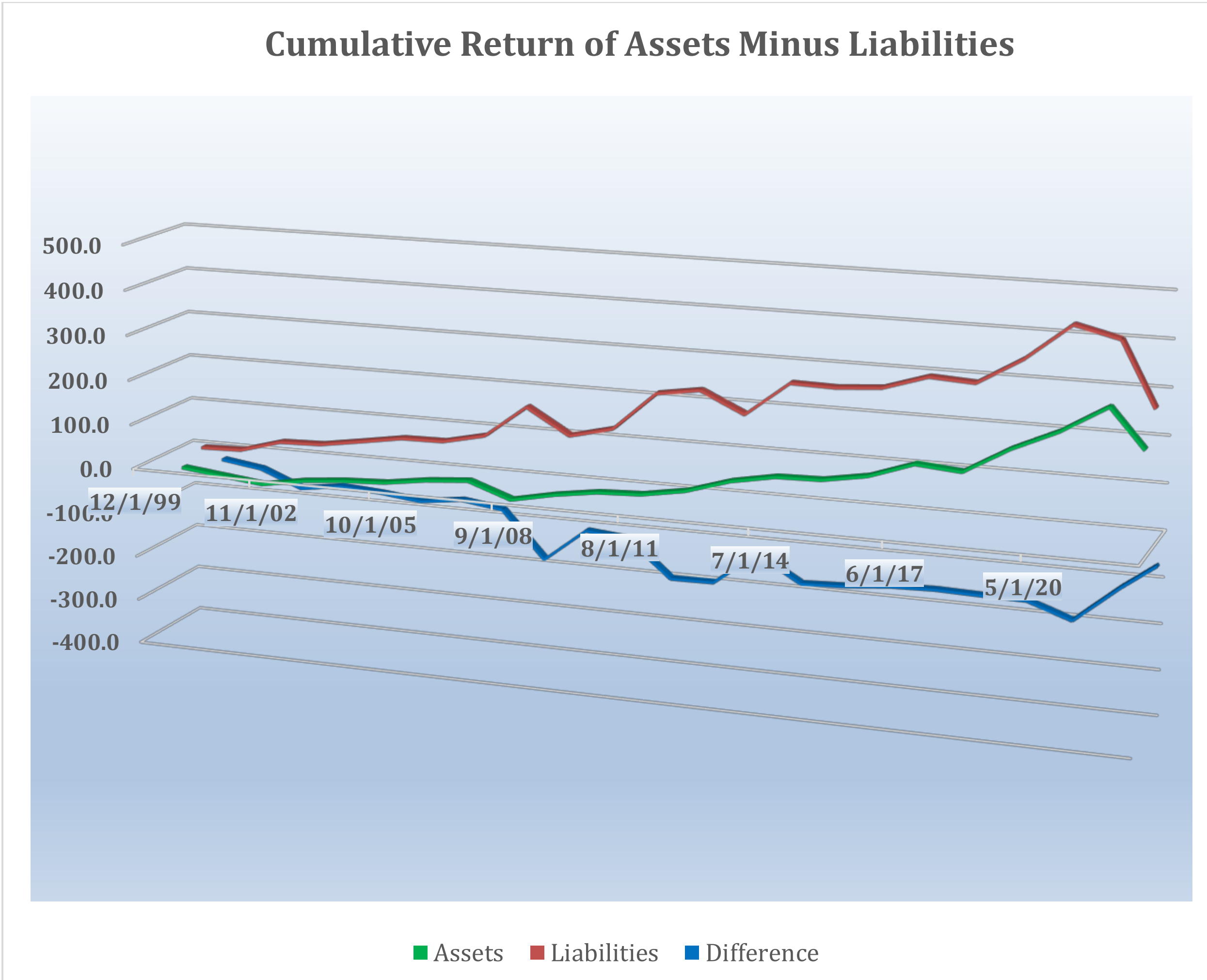
Based on the weights of the Ryan ALM Asset Allocation Model[1], the difference in pension asset growth versus liability growth for YTD '22 reveals mixed results very much dependent on how pension liabilities are calculated. Corporate plans showed outperformance versus their liability benchmarks, while 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.

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



12/31/1999 - 9/30/202)

The bull markets for both equities and bonds that helped to close the gap between assets and liabilities have ended. US fixed income has dramatically underperformed as the US Federal Reserve has elevated rates by 300 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 a new strategy. Failure to manage plan assets relative to plan liabilities lead to significant volatility in both contribution costs and the funded ratio. Get off the asset allocation rollercoaster.



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 -62.5 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 83.8. **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 (%)

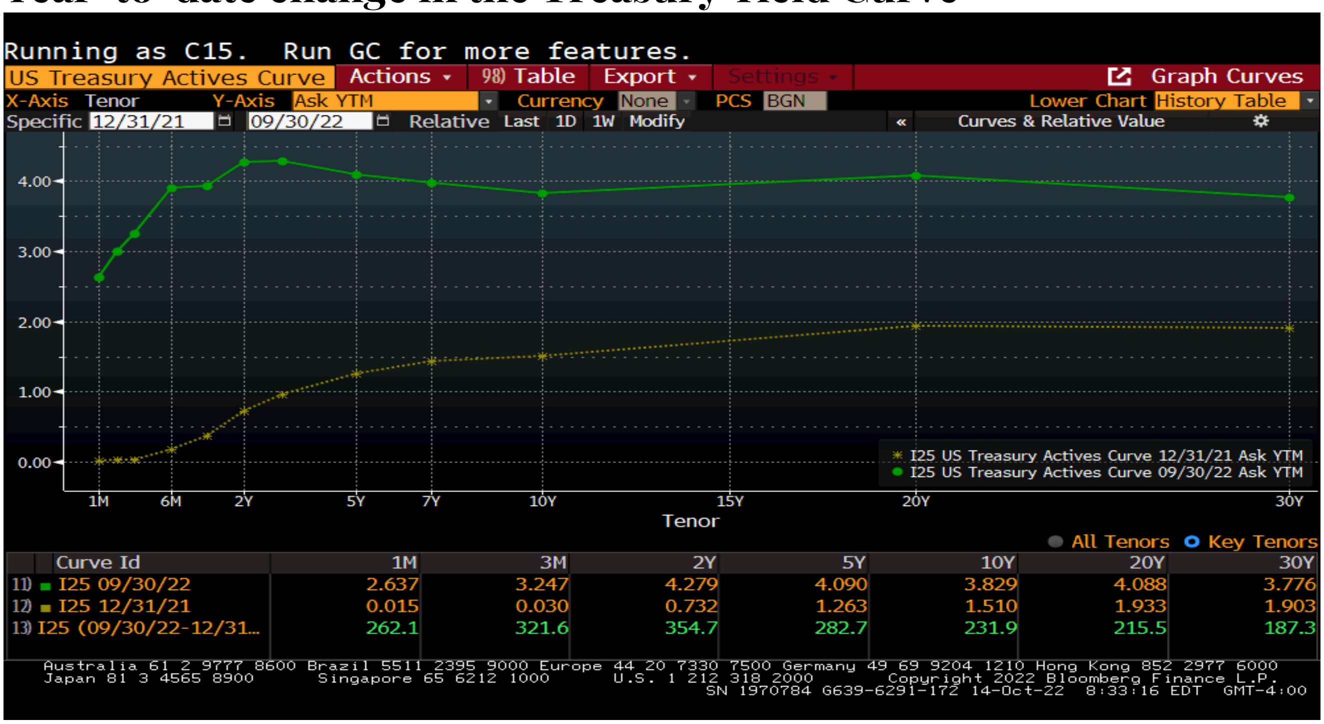
	Assets	Liabilities	Difference	Cumulative Difference	Funded Ratio
2000	-2.5	26.0	-28.5	-28.5	77.4
2001	-5.4	3.1	-8.5	-37.6	71.0
2002	-11.4	19.5	-30.9	-73.4	52.7
2003	20.0	2.0	18.1	-60.1	62.0
2004	8.9	9.4	-0.4	-66.1	61.8
2005	4.4	8.9	-4.4	-76.8	59.2
2006	12.3	0.8	11.4	-64.6	66.0
2007	6.4	11.0	-4.6	-77.5	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
YTD'22	-20.1	-25.9	5.8	-62.5	83.8

Source: Ryan ALM, Inc.

Economic Snapshot as of September 30, 2022

	2021	3Q'22
U.S. GDP	$22.9 T	Est. 2.9%
US Debt	$29.6 T	$31.1 T
CPI - U	6.8%	8.2%
Unemployment Rate	3.9%	3.5%
30-Year Treasury Yield	1.90%	3.77%
10-Year Treasury Yield	1.52%	3.80%
2-Year Treasury Yield	0.73%	4.22%
3 Mo. T-Bills Yield	**0.06%**	**3.22%**
S&P 500	4,796.56	3,612.72
Nasdaq 100	15,832.80	10,974.55
R2000	2,245.31	1,664.72
Gold	1,794.25	1,672.00
Oil	$75.21	$79.49
Existing Single Family sales	5.4 M	4.3 M

Year-to-date change in the Treasury Yield Curve



Providing Perspective

The Greatest Asset of a Pension…TIME

Ryan ALM believes that the best way to buy time is to cash flow match a pension plan's liabilities chronologically. Almost any performance return study on asset classes shows that given time most, if not all, asset classes perform in line with their return and risk expectations.

The Ryan ALM 3Q'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.

LDI – aka Leverage Did It!

The Bank of England certainly got a bunch of investors excited yesterday. They announced their intent of significant buying of long-dated Gilts.

Worst Year on Record

For multiemployer plans that have filed applications with the PBGC to receive Special Financial Assistance (SFA) through the ARPA legislation, investing that grant money comes with restrictions.

Place Your Bets!

There are few things that provide fairly certain outcomes within financial markets, especially during this period of high inflation and rising rates. In fact, there is only one asset class (bonds) that has a certain cash flow of income + principal (terminal value) that is known.

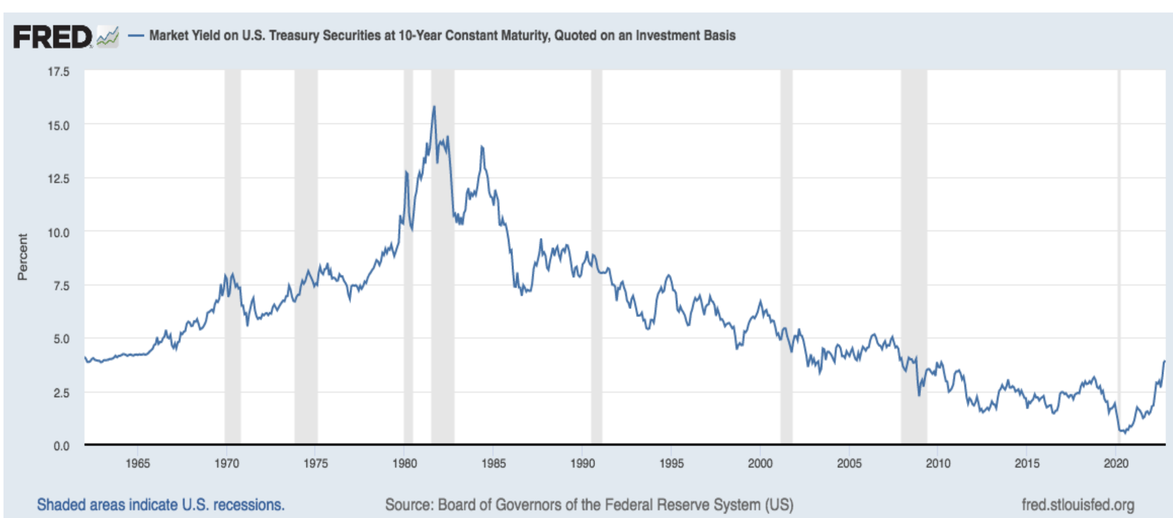
Can Inflation Be Contained at an FFR of 2.25%?

We've been saying all along that the US Federal Reserve needs to tighten interest rates to a significantly greater extent in order to finally control inflation.

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 32 multiemployer plans through September 30, 2022, totaling just about $7.8 billion in government grants. The PBGC has just provide the "Final, Final Rules" related to the implementation of this legislation. 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) but believe that recent PBGC actions will more than likely protect the promised benefits until 2051, as called for in the legislation.

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 3.0% with an expectation that we could see at least another 1.5%, if not more, by year-end. Even if inflation moderates from current levels, "sticky" inflation suggests that 4% is not out of the question. Real rates of return would suggest long bonds with yields of 6% or higher. It will remain a challenging environment.



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 July 12, 2004 as an Asset/Liability Management firm. The firm builds 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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