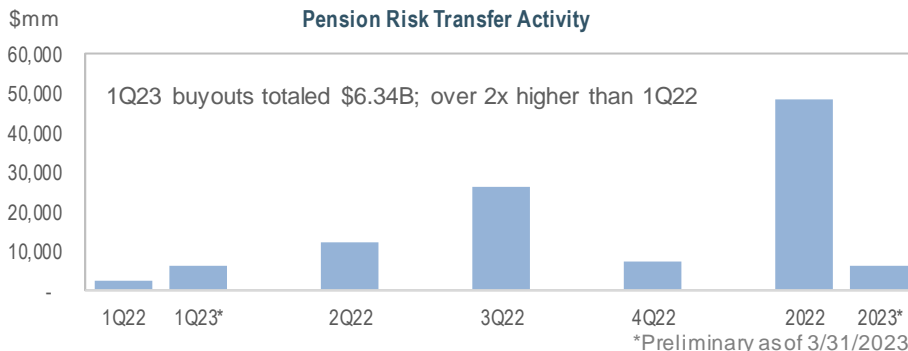
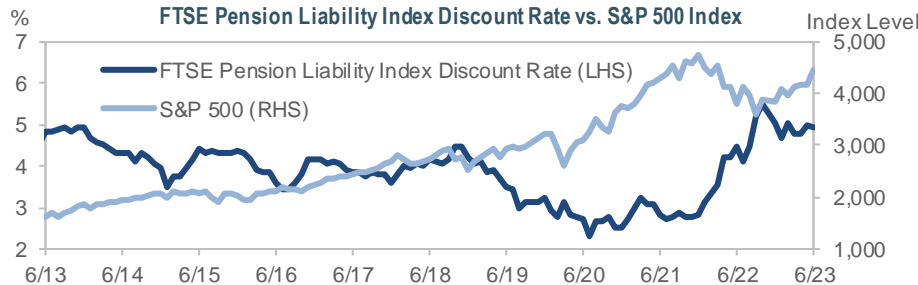


LDI Market Updates

- The discount rate¹ remained unchanged at 4.83%.
- Growth assets performed well in June amid continued strength in the economy as the S&P500 rose by 6.5%; the Bloomberg Long Corporate index yield fell 7bps and ended the month at 5.45%.
- Activity in the investment-grade primary market was healthy in June, with \$91 billion priced. However, the long end underwhelmed with just \$2.3 billion of new issue – the lowest figure since December 2022.

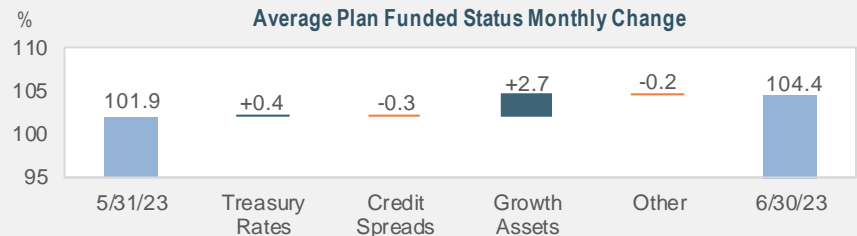
Rates Monitor	06/23	05/23	MoM Change	12/22	YTD Change
IR+M Average Plan Discount Rate (%)	4.83	4.83	0.00	4.89	(0.06)
Bloomberg Long Corp Yield (%)	5.45	5.52	(0.07)	5.60	(0.15)
Bloomberg Long Corp A+ Yield (%)	5.14	5.19	(0.05)	5.26	(0.12)
Bloomberg Long Corp BBB Yield (%)	5.79	5.89	(0.10)	5.95	(0.16)
Long Corp Spreads (bps)	150	163	(13)	158	(8)
Curve (Long Corp - Int Corp) (bps)	41	38	3	42	(1)



IR+M Funded Status Monitor

- Our sample Average Plan funded status increased by 2.5% during June, closing at 104.4% driven by a rally in growth assets.

Funded Status (%)	06/23	05/23	MoM Change	12/22	YTD Change
Average Plan	104.4	101.9	2.5	100.4	4.0
End Stage Plan	107.4	106.3	1.1	105.2	2.2
Young Plan	95.3	92.8	2.5	92.1	3.2



Other includes contributions, expenses, benefit accruals, and liability profile changes.

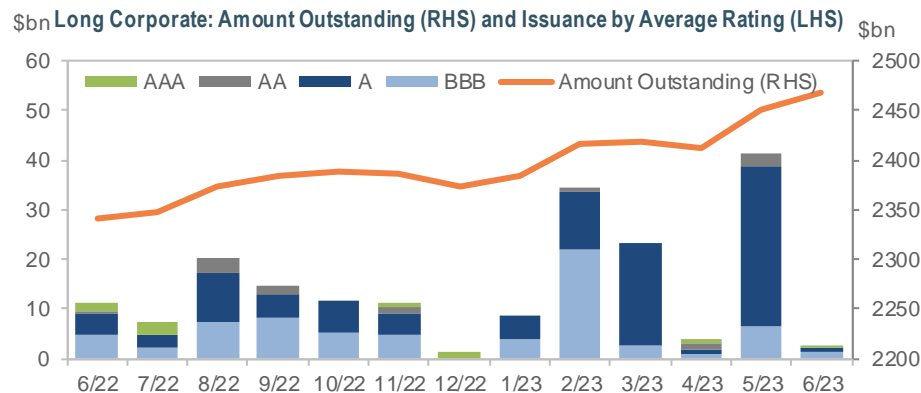
IR+M LDI Corner – To BBB or Not to BBB

- Plan liabilities are typically discounted based upon a AA corporate bond curve, but the narrow universe may not provide sufficient depth to construct a diversified portfolio. The Long AA Index² only has 91 issuers with the top 10 tickers making up 67%. The Intermediate AA Index² is further concentrated with 38 issuers and the top 10 tickers comprising 73%.
- Active management to include A- and BBB-rated bonds may promote diversification, liquidity, and higher yields while keeping a high-quality portfolio:
 - A- and BBB-rated issues make up over 85% of the Long² and Intermediate² Indices, and the risk profile of BBBs is very broad with significant overlap between A- and BBB-rated securities.
 - Expanding beyond AA bonds could mitigate the need to invest in less liquid names (e.g., taxable municipals and small cap AA bonds).
- The Long Index² outyields the Long AA Index² at 5.45% compared to 4.81%; the Intermediate Index² is 5.50% versus 4.79% for Intermediate AA Index².
- However, expanding into the broader investment-grade universe requires diligent bottom-up security selection to avoid credits that are likely to be downgraded or default. Current market volatility, including the recent banking crisis, has prompted heightened credit migration. In 1H23, S&P downgraded 13 issuers from investment grade to high yield, compared to 5 in 1H22.

¹The single effective discount rate for the IR+M Average Sample Plan, calculated from the FTSE Pension Discount Curve. Pension Risk Transfer data sourced from LIMRA. Long corporate issuance sourced from Bloomberg. Long issuance figures exclude 10-year bonds. Totals may not sum due to rounding. ²Each of the indices refer to the respective Bloomberg US Corporate Indices.

Second Quarter 2023 Corporate Issuance

- Long issuance in the second quarter totaled \$52 billion, with over 80% of the issuance in May.
 - This was below the figure from the first quarter but in line with the amount issued in the second quarter of 2022.
 - Long end issuance in May was bolstered by mega deals in the Health Care sector. The \$31 billion Pfizer deal was the fourth-largest corporate bond deal ever in the US investment-grade primary market with \$13 billion priced in the long-end. The Health Care sector accounted for 15% of the total investment grade issuance in Q2.
- The yield premium for extending out the curve in corporate bonds has declined significantly. The Bloomberg Long Corporate Index yield of 5.45% is 5bps below the yield of the Bloomberg Intermediate Corporate Index of 5.50%.
- Demand remained steady with captive pensions and insurance buyers. Long spreads were relatively stable for most of the quarter.



Trailing 12 Month Long Corporate New Issuance (bn)

AAA	AA	A	BBB	Total
\$5.8	\$11.3	\$98.1	\$65.4	\$180.5

Largest Long-Dated USD Investment Grade Deals

Ticker	Issuer Name	Maturity (yrs)	Issue Date	Average Rating	Amount Issued (\$bn)	Yield at Issue (%)	Spread at Issue (bps)	Concession to Outstanding (bps)	Order Book (\$bn)	Oversubscription Level (times)
PFE	Pfizer Investment Enterprises Pte Ltd	20	5/16/2023	A2	3.0	5.27	130	20	8.8	2.9
		30	5/16/2023	A2	6.0	5.31	145	20	18.4	3.1
		40	5/16/2023	A2	4.0	5.46	160	20	10.5	2.6
META	Meta Platforms Inc	30	5/1/2023	A1	2.5	5.62	177	12	8.0	3.2
		40	5/1/2023	A1	1.8	5.77	192	12	7.0	4.0
CMCSA	Comcast Corp	30	5/1/2023	A3	1.6	5.38	155	5	4.4	2.8
		41	5/1/2023	A3	1.4	5.53	170	5	3.7	2.6
MRK	Merck & Co Inc	30	5/8/2023	A1	1.5	5.03	120	3	5.1	3.4
		40	5/8/2023	A1	1.0	5.18	135	3	4.6	4.6
BNSF	Burlington Northern Santa Fe LLC	30	6/5/2023	A2	1.6	5.20	130	5	4.3	2.7
WMT	Walmart Inc	30	4/12/2023	AA2	1.5	4.52	90	3	6.2	4.1
ISPIM	Intesa Sanpaolo SpA	30	6/12/2023	BAA3	1.5	7.81	390	0	4.5	3.0
AAPL	Apple Inc	30	5/8/2023	AA1	1.3	4.88	108	6	2.0	1.6
CVS	CVS Health Corp	30	5/30/2023	BAA2	1.3	5.91	200	3	6.5	5.2
TMUS	T-Mobile USA Inc	30	5/8/2023	BAA2	1.3	5.78	195	3	3.4	2.7

IR+M DISCLOSURE STATEMENT

Disclosures:

Sources: Moody's PFaroe, FTSE Russell (formerly Citigroup), LIMRA, and Bloomberg. All data in the above commentary is as of 06/30/2023. Yields are represented as of the aforementioned date and are subject to change. The views contained in this report are those of Income Research & Management ("IR+M") and are based on information obtained by IR+M from sources that are believed to be reliable but IR+M makes no guarantee as to the accuracy or completeness of the underlying third-party data used to form IR+M's views and opinions. This report is for informational purposes only and is not intended to provide specific advice, recommendations, or projected returns for any particular IR+M product. Investing in securities involves risk of loss that clients should be prepared to bear. More specifically, investing in the bond market is subject to certain risks including but not limited to market, interest rate, credit, call or prepayment, extension, issuer, and inflation risk. "Bloomberg®" and Bloomberg Indices are service marks of Bloomberg Finance L.P. and its affiliates, including Bloomberg Index Services Limited ("BISL"), the administrator of the index (collectively, "Bloomberg") and have been licensed for use for certain purposes by IR+M. Bloomberg is not affiliated with IR+M, and Bloomberg does not approve, endorse, review, or recommend the products described herein. Bloomberg does not guarantee the timeliness, accurateness, or completeness of any data or information relating to any IR+M product. Moody's Analytics PFaroe® product used by IR+M includes market data and other information sourced from third parties under license. Certain licensors require Moody's Analytics to make disclosures to, or to obtain acknowledgements or agreements from, IR+M and parties receiving the information from IR+M, which is effected by the disclosures and disclaimers available at <https://static.pfaroe.com/DisclosuresAndDisclaimers/index.html>.

IR+M Funded Status Monitor Assumptions:

Detailed methodology and assumptions for the IR+M Funded Status Monitor can be found at:

<https://www.incomeresearch.com/wp-content/uploads/2023/02/IRM-Funded-Status-Monitor-Whitepaper-2023.pdf>

	End Stage	Average	Young
Target Liability Duration (Years)	7-9	10-12	13-15
Funded Ratio at Inception (i.e., 12/31/2019)	100.0%	89.8%	80.0%
Asset Allocations	End Stage	Average	Young
US All Cap Equity	8%	27%	38%
International Equity	2%	17%	22%
US REITS	0%	2%	5%
Private Equity	0%	4%	5%
Growth Assets Allocation	10%	50%	70%
Long Government Fixed Income	5%	10%	15%
Long Credit Fixed Income	30%	25%	15%
Intermediate Government Fixed Income	5%	5%	0%
Intermediate Credit Fixed Income	50%	10%	0%
Fixed Income Allocation	90%	50%	30%