IR+M INCOME RESEARCH + MANAGEMENT

LDI MONITOR

December 31, 2020

2020 LDI Environment Review

Our Average Plan funded status increased by 2% to 91.8% during 2020 – Historically low discount rates drove a meaningful increase in liabilities, but growth asset returns had a strong recovery after March lows.

Discount rates steadily decreased over the course of the year – Our Average Plan discount rate fell by 78bps, to end the year at 2.22%.

- Long corporate yields began 2020 at 3.60%, before falling to the lowest level on record of 2.73%, and closing the year at 2.78%.

Long corporate spreads widened by 4bps, from 136bps to 140bps – Long corporate spreads eventually reverted to pre-pandemic levels driven by supportive technicals, strong investor demand, and optimism for an economic recovery.

- Credit curves widened 6bps on a year-over-year basis, despite the continued search for yield.

Long corporate issuance totaled over $555 billion, ahead of 2019's total of $300 billion – The long-end comprised about 35% of the total, usurping 2019's share to become the highest portion of total corporate issuance since 2000.

- Issuers took advantage of low all-in yields to term out debt; net supply of long bonds was $550 billion versus negative $30 billion for bonds maturing in less than 5 years.

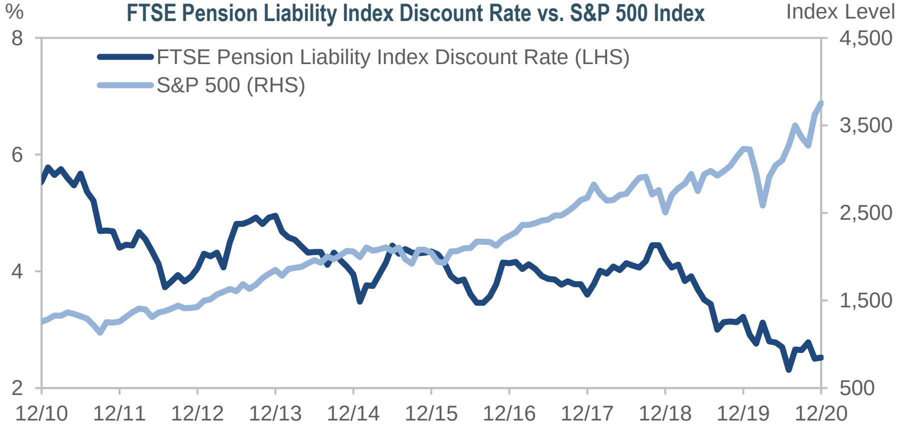
Strong equity returns were a tailwind to funded status improvement – After falling into bear market territory in March, domestic and global equities rallied, with the S&P 500 Index and the MSCI ACWI returning 16% and 14%, respectively.

- The onslaught of the coronavirus caused global central banks to repurpose their tool-kits used in the 2008 financial crisis; investors cheered positive vaccine news in hopes that a return to normalcy could be on the horizon.

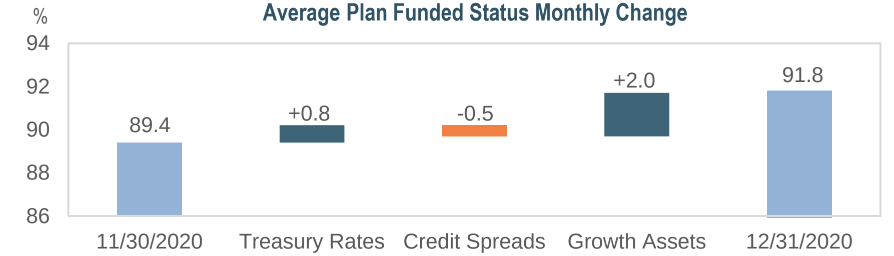
Rates Monitor	12/20	11/20	MoM Change	12/19	YTD Change
IR+M Average Plan Discount Rate (%)	2.22	2.20	0.02	3.00	(0.78)
Bloom Barc Long Corp Yield (%)	2.78	2.79	(0.01)	3.60	(0.82)
Bloom Barc Long Corp A+ Yield (%)	2.49	2.47	0.02	3.25	(0.76)
Bloom Barc Long Corp BBB Yield (%)	3.07	3.10	(0.03)	3.94	(0.87)
Long Corp Spreads (bps)	140	148	(8)	136	4
Curve (Long Corp - Int Corp) (bps)	72	72	0	66	6

Funded Status (%)	12/20	11/20	MoM Change	12/19	YTD Change
Average Plan	91.8	89.4	2.4	89.8	2.0
End Stage Plan	102.8	101.5	1.3	100.0	2.8
Young Plan	80	77.5	2.5	80.0	0.0

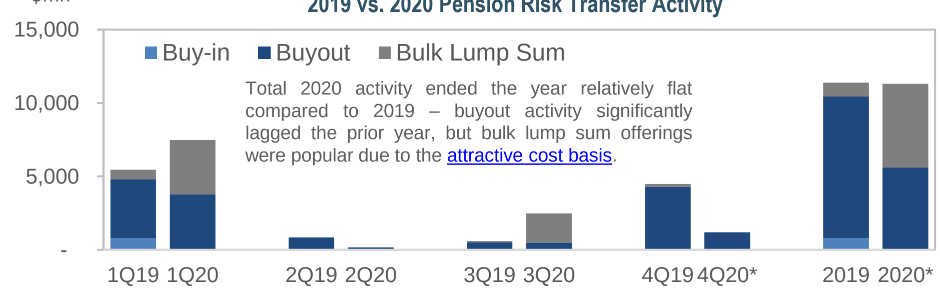
FTSE Pension Liability Index Discount Rate vs. S&P 500 Index



Average Plan Funded Status Monthly Change



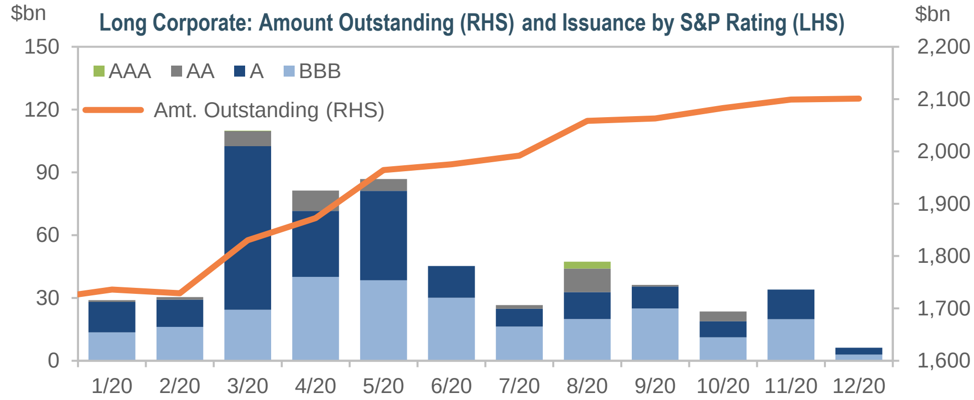
2019 vs. 2020 Pension Risk Transfer Activity



*Preliminary as of 12/31/2020

Fourth-Quarter 2020 Corporate Issuance: Largest Long-Dated USD Investment Grade Deals

- Long corporate issuance slowed down in Q4 with $64 billion, capping off a record year of supply at $556 billion.
    - Strong demand from foreign buyers and investors reaching for yield, coupled with the lighter supply, created a seller's market in Q4.
    - 144a issuance was elevated in the long end, driven by foreign issuers who had lower quality ratings.
- In March, during the post-pandemic rush, a pattern emerged of issuers exchanging and tendering bonds to meaningfully reduce coupons and extend maturities.
- Verizon priced their 20-year bond against the 20-year Treasury bond, only the second issuer to do so since Bank of America in June 2020.
- The amount outstanding of the Bloomberg Barclay's Long US Corporate Index grew by about 22% during 2020.



Trailing 12 Month Long Corporate New Issuance (bn)

AAA	AA	A	BBB	*Total*
$3.5	$43.0	$252.0	$258.0	$556.4

Ticker	Issuer Name	Maturity	Issue Date	Average Rating	Amount Issued ($bn)	Yield at Issue (%)	Spread at Issue (bps)	Concession to Outstanding (bps)	Order Book ($bn)	Oversubscription Level (times)
VZ	Verizon Communications Inc	20	11/10/2020	BBB+	3.0	2.66	115	10	6.8	2.1
		30	11/10/2020	BBB+	2.8	2.89	115	10	6.1	2.0
		40	11/10/2020	BBB+	2.0	3.04	130	10	5.0	2.3
BAC	Bank of America Corp	11	10/16/2020	A	2.5	1.92	118	3	5.3	2.1
		31	10/16/2020	A	1.0	2.83	130	0	6.5	6.5
JPM	JPMorgan Chase & Co	11	11/12/2020	A	1.4	N/A	90	0	N/A	N/A
		21	11/12/2020	A	1.6	2.53	88	0	N/A	N/A
MS	Morgan Stanley	11	11/9/2020	A-	2.8	1.79	85	0	6.8	2.5
WSTP	Westpac Banking Corp	15	11/9/2020	BBB+	1.5	2.67	175	-10	7.7	5.1
		20	11/9/2020	BBB+	1.0	2.96	125	-15	7.9	7.9
LYB	LYB International Finance III LLC	30	10/6/2020	BBB-	1.0	3.64	210	-10	4.4	5.9
		40	10/6/2020	BBB-	0.5	3.84	230	-5	4.1	4.1
		20	10/6/2020	BBB-	0.8	3.39	185	-5	2.5	5.0
BMY	Bristol-Myers Squibb Co	20	11/9/2020	A	0.8	2.36	65	-15	5.2	6.9
		30	11/9/2020	A	1.5	2.56	85	-15	5.9	3.9

LDI Environment from 2020 into 2021

2020 was the epitome of market volatility as the global pandemic dragged on in the throes of a presidential election year. We saw record low interest rates and high equity levels. Our Average Plan funded status was down over 10% year-to-date in March (the lowest point in 2020), but recovered and ended 2020 2% higher than where it started. Meanwhile, plans that embraced LDI experienced less funded status volatility in 2020. In particular, our End Stage Plan was down 6% year-to-date in March, but closed the year 3% higher compared to 12/31/19. Our ability to successfully execute a number of planned full and partial annuity buyouts for our clients served as another testament to the efficacy of LDI. As we navigated these uncharted waters, we proactively assessed custom benchmarks and utilized our full toolkit, including derivatives.

We anticipate continued uncertainty at the start of 2021 as any additional stimulus and the Georgia run-off elections remain unresolved. 2020 rates unexpectedly fell further, and the Fed's policy indicates rates will be lower for longer. Spreads have tightened from March wides, but there could be room to tighten further as the economy continues its recovery. 2020 was a record-breaking year for supply in the long-end, but the consensus is that supply for 2021 will be much lower. Given this environment, we believe that active LDI management will uncover market dislocations and bottom-up security selection will be important to distinguish the outperformers from the laggards.

Technical Factors

- Overseas demand in the long corporate market may remain strong, especially if the US dollar continues to weaken and global yields remain low.
- Demand for US Treasury STRIPS in the long end declined in November, adding $3B to the $23B year-to-date reconstitution activity.
    - However, given last year's market volatility and recovered funded statuses, increased appetite to de-risk is possible.
- Buyers may seek out long bonds for incremental yield in a low-rate market.

While 2021 IG demand is anticipated to be strong, gross and net supply are estimated to drop by about 31% and 55%, respectively.

Regulatory Environment

- As pension funding relief continues to fade, sponsors who have made only minimum required cash contributions may experience increasing required contributions in 2021 and beyond.
- The CARES Act provided short-term contribution relief, but the possibility remains for additional virus-related stimulus to extend pension relief policies.
- PBGC premiums continue to be a meaningful cost headwind, and there is a risk that premiums can be further raised to balance the Federal budget.

Pension risk transfers and de-risking can combat the higher costs of maintaining plans and mitigate contribution volatility.

Fundamental Factors

- Vaccines will largely be available to the general population in the first half of 2021, paving the path for a return to normalcy by the end of the year.
- The Federal Reserve will remain supportive of the economy, vowing to keep rates low, and continuing their asset purchase program.
- A transition in the White House may bring less geopolitical tensions and a renewed focus on climate change.
- With leverage and cash reserves elevated from historical averages, it remains to be seen if IG corporates will do M&A and/or shareholder-friendly activity.

Estimates are that earnings growth will be strong in the coming year, with the Energy sector leading the way.

Portfolio Positioning For 2020

- From a relative-value basis, we continue to favor spread product over Treasuries, although the magnitude of the advantage has shrunk considerably.
    - We have found value in securitized and taxable municipals.
- Being mindful of the volatility ahead, we have retained ample dry powder that we will deploy if the market weakens, or we will add to our liquidity if spreads continue to tighten briskly.
    - We have contained concentration risk and maintain high-quality holdings across all sectors.

We feel we are well positioned for the upcoming risk-on environment and to take what the market gives us.

As market unpredictability is expected to persist in 2021, we will continue to help our clients hedge their plan liabilities and manage funded status volatility through our practical approach to LDI.

IR+M DISCLOSURE STATEMENT

Disclosures:

Sources: Milliman, FTSE Russell (formerly Citigroup), Bloomberg Barclays, Bloomberg, JPMorgan, FactSet, and Pension & Investments. All data in the above commentary is as of 12/31/20. Yields are represented as of the aforementioned date and are subject to change. The views contained in this report are those of IR+M and are based on information obtained by IR+M from sources that are believed to be reliable. This report is for informational purposes only and is not intended to provide specific advice, recommendations for, or projected returns of any particular IR+M product. No part of this material may be reproduced in any form, or referred to in any other publication, without express written permission from Income Research & Management. BLOOMBERG® is a trademark and service mark of Bloomberg Finance L.P. and its affiliates (collectively "Bloomberg"). BARCLAYS® is a trademark and service mark of Barclays Bank Plc (collectively with its affiliates, "Barclays"), used under license. Bloomberg or Bloomberg's licensors, including Barclays, own all proprietary rights in the Bloomberg Barclays Indices. Neither Bloomberg nor Barclays approves or endorses this material, or guarantees the accuracy or completeness of any information herein, or makes any warranty, express or implied, as to the results to be obtained therefrom and, to the maximum extent allowed by law, neither shall have any liability or responsibility for injury or damages arising in connection therewith.

IR+M Funded Status Monitor Assumptions:

Detailed methodology and assumptions for the IR+M Funded Status Monitor can be found at:
http://www.incomeresearch.com/wp-content/uploads/2020/10/IRM-Funded-Status-Monitor.pdf.

	End Stage	Average	Young
Target Liability Duration (Years)	8-10	12-14	15-17
Funded Ratio at Inception (i.e., 12/31/2019)	100.0%	89.8%	80.0%

Asset Allocations	End Stage	Average	Young
US Equity	15%	27%	38%
International Equity	5%	17%	22%
US REITS	0%	2%	5%
Private Equity	0%	4%	5%
Growth Assets Allocation	20%	50%	70%
Long Government Fixed Income	5%	10%	10%
Long Credit Fixed Income	30%	25%	10%
Intermediate Government Fixed Income	5%	5%	5%
Intermediate Credit Fixed Income	40%	10%	5%
Fixed Income Allocation	80%	50%	30%

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