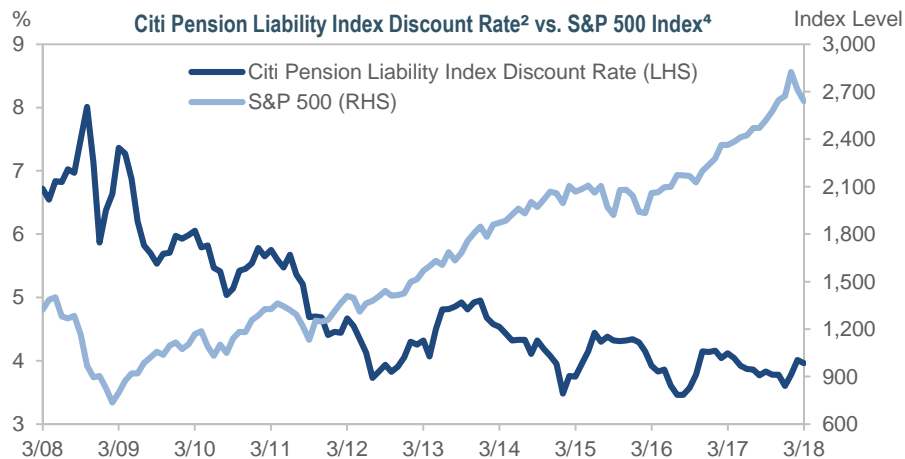


LDI Highlights

- Corporate pension funded status likely declined modestly during March, as both long corporate rates and equities closed lower on the month.
 - Discount rates declined 5bps, as AA-rated corporate yields fell more than lower-rated single-A and triple-B bonds.³
 - The S&P 500 Index declined 2.7% in March, moving the year-to-date return into negative territory.⁴
- After setting new post-crisis tights of 124bps in February, long corporate spreads have steadily moved wider, ending the month at 148bps.³
 - Spreads have moved wider in sympathy with weakness in equity markets and overall heightened market volatility.
- The primary corporate market brought \$34 billion in March, bringing 1Q18 total supply to \$97 billion, 28% ahead of last year's pace.⁵
 - Just 3% of the 1Q18 total was issued by AA or better issuers.

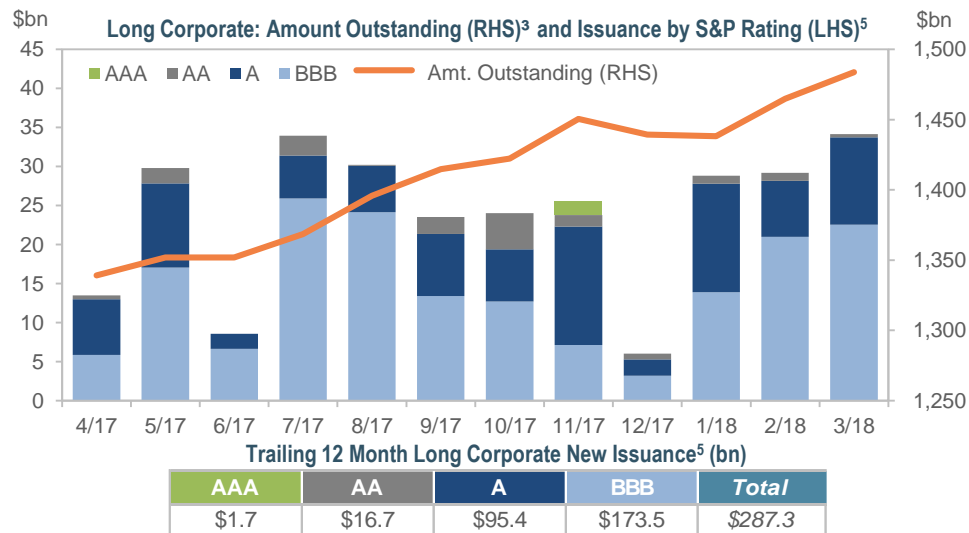
Rates Monitor	3/31/18	2/28/18	12/31/17
Citigroup Pension Discount Rate ² (%)	3.96	4.01	3.60
Bloom Barc Long Corporate Yield ³ (%)	4.40	4.41	4.02
Bloom Barc Long Corporate A+ Yield ³ (%)	4.08	4.12	3.69
Bloom Barc Long BBB Corp Yield ³ (%)	4.72	4.72	4.37
30 Year Swap Spread ⁴ (bps)	-16	-18	-20



IR+M LDI Corner: Teamwork Makes the Hedge Work

- There are many factors that can contribute to a successful LDI program. One of the most vital is also one of the least discussed: the importance of a strong working relationship between the parties involved in implementing the hedge portfolio.
- The need for teamwork stems from stakeholders' differing degrees of familiarity with each stage of the process:
 - The actuary often best understands both the benefit structure and assumptions underlying the liability. For certain plans, the actuary may be the only party able to accurately model more complex liability sensitivities.
 - The manager, from their perspective, is most familiar with market inefficiencies, and therefore some of the practical limitations of a theoretical LDI plan.
 - The sponsor and/or consultant that oversees LDI implementation has a unique top-down view that allows them to implement and monitor broader LDI goals.
- Good information flow across the groups can lead to a more coordinated approach. The latest assumptions can be accurately reflected in the investments, and individual managers can align themselves with the overall goals of sponsor.

Glidepath Monitor	3/31/18	2/28/18	12/31/17	12/31/14
Funded Status ¹ (%)	--*	87.7	84.1	81.5
Long Corporate Spreads ³ (bps)	148	134	137	186
Curve ³ (Long Corp - Int. Corp) (bps)	57	56	64	79



¹Milliman; ²Citigroup; ³Bloomberg Barclays; ⁴Bloomberg; ⁵JP Morgan; *Funded status not available as of 3/31/18 on publish date.

All data in the above commentary is as of 3/31/18. 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.

First Quarter 2018 Corporate Issuance: Top 10 Largest Long-Dated USD Investment Grade Deals

- Issuance composition was skewed towards investor demand, as 20- and 30-year supply was the only part of the curve that experienced a year-over-year increase, rising \$17bn or 22% ahead of last year's pace
 - The strong demand for duration from long-end participants, and a number of large M&A financing deals, were the drivers of long supply
- New issue concessions increased throughout the quarter, as market volatility forced issuers to price deals wider
- Demand remained strong in the face of robust supply, with average oversubscription levels hovering around 3x

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)
CVS	CVS Health Corp	20-year	3/9/18	BBB	5.0	4.94	180	25	18.0	3.6
		30-year	3/9/18	BBB	8.0	5.09	195	20	28.0	3.5
MPLX	MPLX LP	20-year	2/8/18	BBB-	1.8	4.59	155	N/A	5.0	2.8
		30-year	2/8/18	BBB-	1.5	4.74	170	7	4.0	2.9
		40-year	2/8/18	BBB-	0.5	4.94	190	N/A	3.0	5.0
CMCSA	Comcast Corp	20-year	2/8/18	A-	1.2	3.94	90	10	3.0	2.8
		30-year	2/8/18	A-	1.0	4.11	107	7	3.0	3.0
SRE	Sempra Energy	20-year	1/12/18	BBB+	1.0	3.88	98	0	4.0	3.7
		30-year	1/12/18	BBB+	0.8	4.08	118	N/A	4.0	5.3
JPM	JPMorgan Chase & Co	31-year	1/23/18	A-	1.8	3.90	107	5	3.0	1.5
CELG	Celgene Corp	30-year	2/20/18	BBB	1.5	4.59	145	15	3.0	2.1
BRKHEC	Berkshire Hathaway Energy Co	30-year	1/5/18	BBB+	0.8	3.85	103	0	3.0	3.1
		30-year	2/1/18	A+	0.7	3.70	75	0	2.0	2.7
WPZ	Williams Partners LP	30-year	3/5/18	BBB-	0.8	4.88	172	5	3.0	3.8
		30-year	3/15/18	BBB	0.6	4.65	150	15	2.0	3.0
EPD	Enterprise Products Operating LLC	30-year	2/15/18	BBB+	1.3	4.26	125	0	2.0	1.8
AIG	American International Group Inc	30-year	3/26/18	BBB+	1.0	4.79	170	20	2.0	2.3

Source: Bloomberg and JP Morgan

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