LDI MONITOR

December 31, 2017

2017 LDI Environment Review

Risk asset returns drove marginal improvement in funded status – Corporate pension funded status increased by 0.8% to 84.1% during 2017, as strong performance from risk assets, led by equities, outweighed falling discount rates.[1]

Discount rates moved steadily lower over the course of the year – The Citigroup Pension Discount Rate declined by 54bps to 3.60%.[2]

- Long corporate yields touched 4% for only the second time since 1970, matching the low reached during the summer of 2016.[3]

Long corporate spreads tightened by 27bps – Strong inflows from both domestic and foreign buyers caused long-end spreads to grind tighter over the course of the year.[3]

- The 10s30s credit curve remained mostly unchanged year-over-year, as spreads across the entire curve tightened.

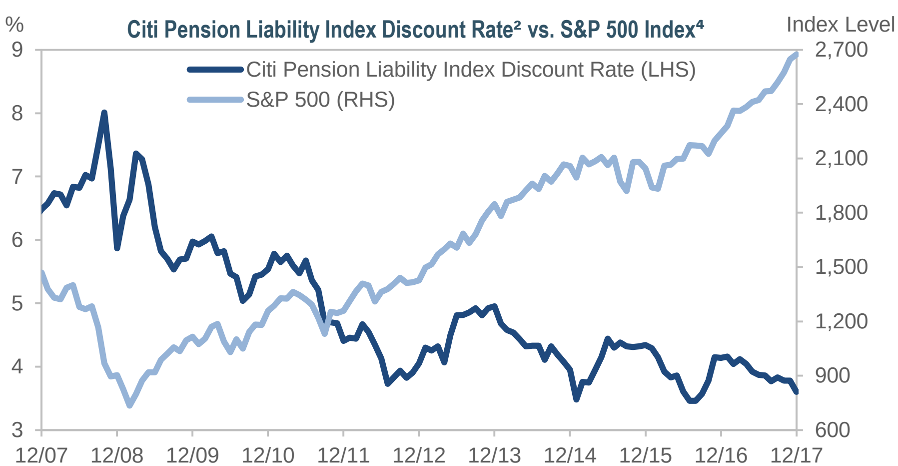
Long corporate issuance broke record – Long-end corporate supply totaled $267 billion (21% of total) during 2017, the highest level of 12-month supply since data began in 2000.[5]

- BBB-rated corporate issuance comprised 60% of total long-end issuance during the past year, while A-rated comprised an additional 30%.

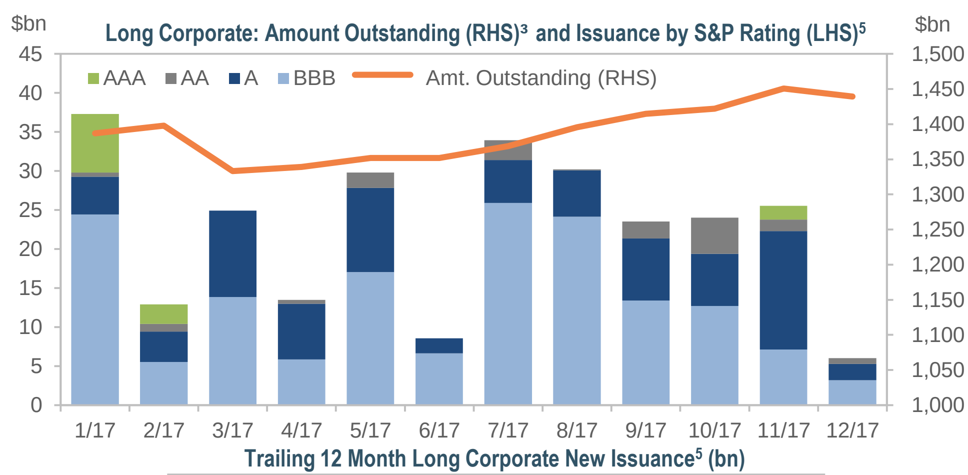
US and global equities provided robust returns – The S&P 500 and MSCI ACWI Indices returned 19% and 21% respectively, capping a strong year for risk assets.[4]

- In the US, economic growth was strong, as GDP came in at or above 3% for three consecutive quarters, with fourth quarter estimates signaling the streak will continue.
- US equities rose materially in 2017 on the back of impressive earnings growth.

Rates Monitor	12/31/17	11/30/17	12/31/16
Citigroup Pension Discount Rate[2] (%)	3.60	3.78	4.14
Bloom Barc Long Corporate Yield[3] (%)	4.02	4.15	4.54
Bloom Barc Long Corporate A+ Yield[3] (%)	3.69	3.81	4.18
Bloom Barc Long BBB Corp Yield[3] (%)	4.37	4.50	4.93
30 Year Swap Spread[4] (bps)	-20	-23	-48



Glidepath Monitor	12/31/17	11/30/17	12/31/16	12/31/14
Funded Status[1] (%)	84.1	85.2	83.3	81.5
Long Corporate Spreads[3] (bps)	137	143	164	186
Curve[3] (Long Corp - Int. Corp) (bps)	64	67	60	79



Trailing 12 Month Long Corporate New Issuance[5] (bn)

AAA	AA	A	BBB	*Total*
$11.8	$15.8	$83.0	$159.8	*$269.5*

[1]Milliman (Historical numbers revised as of 3/31/17); [2]Citigroup; [3]Bloomberg Barclays; [4]Bloomberg; [5]JP Morgan

LDI Environment from 2017 into 2018

In 2017, there was considerable demand for long-corporate bonds, notably from overseas buyers. Domestic demand was significant despite low absolute rates; however, corporate pension plans largely remained on the sidelines until later in the year. As we look ahead to 2018, many plans are focused on reducing PBGC premiums and capitalizing on equity market gains, setting the stage for LDI buyers to be active in the long bond markets, particularly if absolute rates rise.

The act of balancing technical, fundamental and regulatory factors in the long-bond markets remains ever present. We asked our LDI experts for their thoughts on both the corporate market, and how our positioning may help clients navigate the challenges ahead. Their comments are as follows:

Technical Factors

- In 2018, gross and net investment grade supply is estimated to drop by 4% and 12%, respectively, despite an expected increase in M&A issuance due to tax reform.[1]
- US corporate pension plan demand is expected to rise and, despite elevated currency hedging costs, overseas demand is expected to remain high.
- The Fed's balance sheet reduction program could signal a winding down of quantitative easing programs globally, which could ease demand pressures.

Overall – technical factors signal a potential continuation of tighter IG corporate spreads and an anchoring of long-end yields.

Regulatory Environment

- The potential for lower tax rates incentivized an acceleration of contributions at the end of 2017.
- Increasing PBGC premiums prompted additional pension plan funding.
- Variable rate PBGC premiums are likely to rise further in 2018, following the release of new mortality tables by the IRS; some plan sponsors may be able to delay the impact until 2019.

For many sponsors, the potential funding driven by these changes may translate into higher demand for long-duration corporate bonds.

Fundamental Factors

- Continued modest domestic and global growth could support tight credit spreads. Earnings for the S&P 500 are estimated to increase by over 10% in 2018, with top-line growth improving 5-6%.[2]
- Consumer and business confidence is strong, and appears to have been positively impacted by tax reform.
- The current benign inflation environment could be impacted by increased leverage and the potential that dormant wage pressures could awaken.

Fundamentals could continue to drive spreads tighter, while growth and potential inflation pressures could move rates higher.

Portfolio Positioning For 2018

- With corporate spreads approaching post-crisis tights during 2017, we reduced risk exposure across our LDI portfolios. We also increased portfolio diversification to moderate idiosyncratic risks.
- We maintained our underweights to M&A-prone sectors (Technology and Pharmaceuticals), and our overweights in less volatile sectors (Finance, Communication, Transportation and Utilities). These exposures are well-aligned with expected impacts from tax reform.

We have improved liquidity by reducing our positions in off-the-run issues. If volatility returns in 2018, we will deploy this "dry powder" to exploit opportunities as they arise.

In 2017, IR+M worked with our LDI clients to help them better understand and mitigate the interest-rate risk in their pension plans. In a challenging market environment, we continued to help clients hedge their plan liabilities through our practical approach to LDI. We worked with plan sponsors across the LDI spectrum, guiding some through their first steps into liability hedging, and others into the final stages of liability transfer or a full de-risking implementation.

[1]JP Morgan; [2]FactSet