LDI MONITOR

December 31, 2016

2016 Review and Current LDI Environment

Funded status relatively unchanged despite reaching multi-year lows -

Corporate pension funded status fell 6% over the first six months of the year, reaching the lowest level since 2012, before recovering 5% to end the year at 81%.¹

Tale of two halves for discount rates – Discount rates steadily declined by 88bps during the first half of 2016, reaching 3.46% in July, a new multi-year low.²

 The elevated expectations for the Fed's rate hike in December, coupled with uncertainty around the US elections, drove interest rates higher, culminating in a 37bps increase in discount rates during November.

Corporate issuance kept pace with 2015 – IG-rated companies brought \$1.2 billion to market during 2016, matching last year's record total; long-end issuance accounted for 19% of the total, declining year-over-year for the first time in four years.⁶

Equity markets rebound sharply from poor start to 2016 – Equities began the year with a sharp selloff, declining approximately 5% through February, before reversing course with a 16% return over the remainder of the year.⁴

 Weak global economic conditions and lower oil prices drove the poor start for equities. However, strong economic data, a cautious stance from the Fed, and the eventual oil-price rebound fueled the strong finish.

Long credit spreads ground tighter after volatile first quarter – The stabilization in oil prices and a strong US economy improved investor sentiment within the credit market. After moving 48bps wider through February, spreads closed the year 106bps tighter from the wides.³

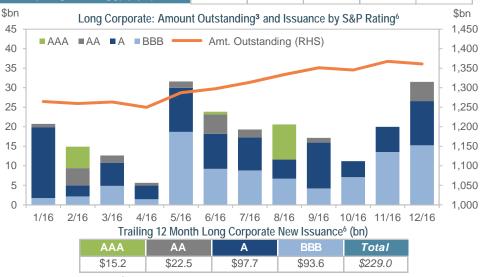
Rates Monitor	12/31/16	11/30/16	12/31/15
Citigroup Pension Discount Rate ² (%)	4.14	4.15	4.34
Bloom Barc Long Credit Yield³ (%)	4.55	4.62	5.02
Bloom Barc Long Corporate Yield³ (%)	4.54	4.62	5.06
Bloom Barc Long BBB Corp Yield³ (%)	4.93	5.04	5.60
30 Year Swap Rate⁴ (%)	2.63	2.43	2.64
Long BBB Corp. Yield³ _ Citi Pension Discount Rate² (bps)	79	89	126

	Citi Ferision Discount Rate-(bps)	
% 9	Citi Pension Liability Index Discount Rate ² vs. S&P 500 Index ⁴	Index Level 7 2,400
Э	Citi Pension Liability Index Discount Rate (LHS)	2,400
8	S&P 500 (RHS)	- 2,000
7		- 1,800
,	~~\\\	- 1,600
6	WY M	- 1,400
5		- 1,200
		- 1,000
4		- 800
2		600

12/07 12/08 12/09 12/10 12/11 12/12 12/13 12/14 12/15 12/16

12/06

Glidepath Monitor	12/31/16	11/30/16	12/31/15	12/31/13	12/31/11
Funded Status¹ (%)	81.0	80.3	81.7	88.3	78.7
Long Credit Rates⁵ (%)	4.55	4.62	5.02	5.23	4.99
Long Credit Spreads⁵ (bps)	167	180	225	158	239
Curve³ (Long Cred - Int. Cred) (bps)	180	191	210	283	201
Curve ³ (Long G/C - Agg) (bps)	134	140	161	226	170



¹Milliman; ²Citigroup; ³Bloomberg Barclays; ⁴Bloomberg; ⁵Long rates and long spreads represented by Bloomberg Barclays Long Credit Index yield and spread; ⁵JP Morgan
All data in the above commentary is as of 12/31/16. 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.



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LDI in 2016

In 2016, the marginal decline in the average corporate pension funded status (from 81.7% to 81.0 %1), coupled with a minimal shift in asset allocation, understates the reality that the year was one of significant change. Over the course of 2016, plan sponsors were subjected to a wild ride in both the Treasury and credit markets, which caused material fluctuations in funding levels. The year was a tale of two halves, with long credit spreads hitting post-crisis highs in February, and then tightening in conjunction with Treasuries' post-election sell-off in November.

While 2017 may appear similar to 2016, we believe that the landscape is decidedly different. The uncertainty surrounding future economic and legislative policies, strong demand for long bonds, and increasingly punitive PBGC premiums may be the catalysts necessary to spark the LDI demand that has been idle in recent years.

To provide a well-rounded perspective on expectations for 2017, we asked our LDI experts from across the firm to share their thoughts on the year ahead. Their comments are as follows.

Corporate Trading Desk

Early in 2016, liquid on-the-run paper was trading at a significant liquidity premium to several off-the-run and non-index eligible deals. The post-election sell-off in rates generated an influx of demand from overseas buyers and insurance companies. With long supply already scarce, a seller's market developed, which caused the liquidity premium to collapse. As a result, less liquid names began to trade in-line with comparable, more liquid, issuers. We expect that this supply/demand imbalance will persist in 2017, especially if more LDI buyers enter the market.

Corporate Portfolio Management

Our clients typically focus on liability benchmarks that are difficult to replicate. As a result, we often look outside of our clients' benchmarks for securities that offer value, but not excessive volatility. In 2017, we believe that it will be increasingly challenging to predict macro trends given the global uncertainty. We will rely on our expertise as bottom-up security selectors to add value for our LDI clients. We have scaled back risk, and are allowing the new administration time to get acclimated. As the year progresses, we will revisit that posture, and look to add risk opportunistically.

Investment Risk

As long-term investors, plan sponsors benefited from the elevated liquidity premiums, and their subsequent closing, in 2016. For 2017, our Investment Risk team is focused on monitoring our risk exposures, and preserving the balance between investing in our best ideas and minimizing unwanted volatility. We believe that liquidity management will remain a key emphasis in 2017.

Client Service

We anticipate that the LDI dialogue will continue with our existing clients, consultants, and prospects in 2017. As funded statuses improve, we expect that plans will explore opportunities to augment their existing fixed income allocations. We strive to be an ever-present resource for our clients, providing in-depth corporate bond market color, rationale on the importance of benchmark selection, and access to our LDI specialists. We believe that our ability to successfully implement complex LDI strategies is one of our core competencies.

In 2016, 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 full de-risking.

¹Source: Milliman