Michael Reid, Vice President
CEM Benchmarking Inc.
372 Bay Street, Suite 1000
Toronto, ON, M5H 2W9
www.cembenchmarking.com

March 2018

U.S. CORPORATE PENSION PLANS – INVESTMENT TRENDS SINCE THE FINANCIAL CRISIS

The financial crisis resulted in severe declines in the funded status of most U.S. corporate pension funds resulting in almost universal pension deficits. These deficits have persisted largely due to declines in interest rates to historical lows. With the dual goals of closing funding shortfalls and reducing risk, plan sponsors have responded by de-risking incrementally and allowing funding status, and in more limited instances, interest rate levels, to guide their de-risking programs.

CEM Benchmarking is a Toronto based provider of investment cost and performance benchmarking for large institutional investors including pension funds (defined benefit and defined contribution), sovereign wealth funds, buffer funds, and others.

CEM Benchmarking

Investment Trends since the Financial Crisis

Michael Reid, Vice President[1]
CEM Benchmarking Inc.
372 Bay Street, Suite 1000, Toronto, ON, M5H 2W9
www.cembenchmarking.com

1 Introduction

The financial crisis plunged many corporate pension plans into deficit forcing many sponsors to reconsider the sustainability of their plans. The subsequent years have proven a difficult environment for plan sponsors who were hoping to reduce funding deficits and pension risk simultaneously. In particular, sponsors have been faced with:

- Periods of unprecedented volatility;
- A prolonged slowdown in global growth; and
- Historically low interest rates.

These events have forced many plans sponsors to make difficult decisions. This paper uses CEM's database to examine the impact of the financial crisis and how U.S. corporate plan sponsors have reacted to these challenges.

2 The Impact of the Financial Crisis on Funded Status

To understand the full impact of the financial crisis on pension plans we looked at the change in funded status of U.S corporate plans over 2008.

For the 69 U.S. corporate sponsors that participated in the CEM database in 2007 and 2008:

- The average decline in funded status over 2008 was 30%;
- A quarter of the plans saw declines in excess of 37%; and
- Fewer than 10% of plans remained fully funded on a U.S. GAAP basis at the end of 2008.

Exhibit 1:CEM Database- U.S. Corporate Plans

Change in funded status for 2007 (n=69)

Percentile	December 31, 2007	December 31, 2008	Change[2]
10th	90%	61%	-43%
25th	97%	69%	-37%
Median	106%	77%	-29%
75th	113%	87%	-23%
90th	133%	98%	-16%

[1] To contact the author please send correspondence to: michael@cembenchmarking.com

[2] For clarity, this column presents the distribution of change in funded status for the 69 plan sponsors and is not intended to be the difference between the percentiles at the respective dates.

3. Changes in Funded Status since the Financial Crisis

Despite the relatively positive returns for many asset classes in recent years, the decline in interest rates has proven to be a large impediment to restoring the funded status of pension plans to pre-crisis levels. Exhibit 2 below shows the change in funded status from the end of 2008 to the end of 2016.

- As shown in the middle columns of Exhibit 2, the funded status of U.S. Corporate plans has barely improved from the end of 2008.
- On a U.S. GAAP basis, market interest rates were approximately 2% lower (absolute basis than the end of 2008).
- The rightmost column shows that funded statuses would have returned to nearly pre-crisis levels if interest rates had returned to 2008 levels at the end of 2016.

Exhibit 2:CEM Database- U.S. Corporate Plans

Change in funded status for 2008-2016 (n=36)

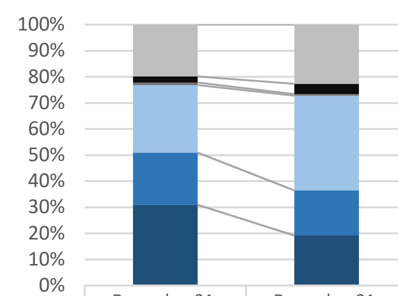
Percentile	December 31, 2008	December 31, 2016	December 31, 2016 adjusted[3]
10th	64%	69%	82%
25th	73%	74%	89%
Median	79%	84%	100%
75th	92%	91%	105%
90th	98%	96%	110%

4 Changes in Investment Policy

Since the financial crisis, the predominant investment theme amongst U.S. corporate plan sponsors has been to risk reduction, both on an asset only basis and also more importantly with reference to their liabilities.

- Consistent with the desire to reduce risk, U.S. corporate plan sponsors have greatly increased their allocations to fixed income securities and reduced their exposure to public equities and in particular U.S. equities (Exhibit 3).
- Exhibit 3 shows a slight increase in allocations to private assets. However this increase is much smaller than that seen among U.S. public sector plans over this same time period.
- While Exhibit 3 compares only U.S. corporate plans that participated in both reference years, including all U.S. corporate plans in CEM's database does not materially change the results.

Exhibit 3: CEM Database - U.S. Corporate plans
Aggregate Asset Allocation (n=36)



	December 31, 2007	December 31, 2016
Real Estate and Other	20%	23%
Cash	2%	4%
Int'l Fixed Income	1%	1%
U.S. Fixed Income	26%	36%
Int'l Equity	20%	17%
U.S. Equity	31%	19%

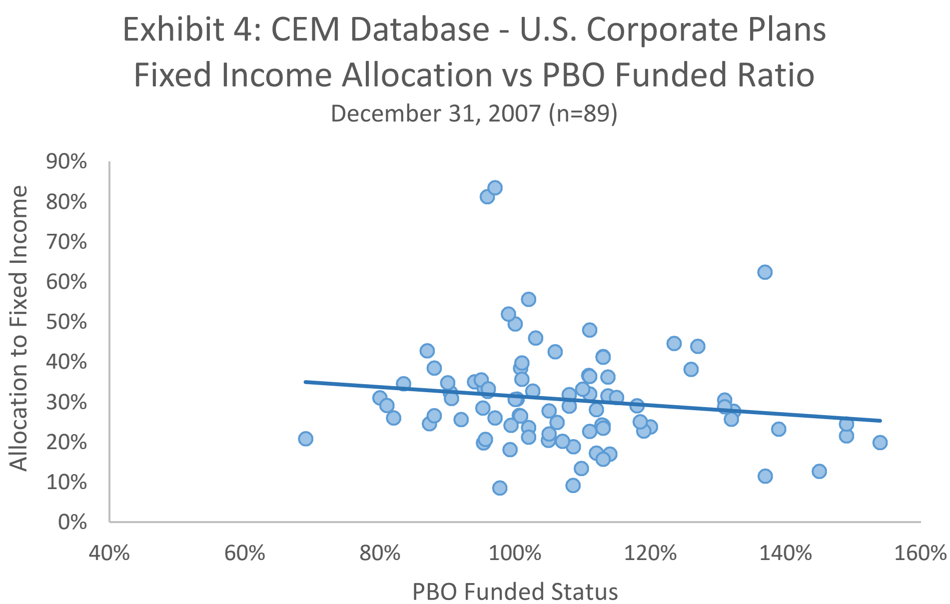
[3] The adjusted funded status at December 31, 2016 has been calculated by adjusting actual liabilities at December 31, 2016 based on reported liability durations and discount rates used for U.S. GAAP purposes at the end of 2007 and 2016. The market value of assets was adjusted using reported fixed income durations and actual fixed income holdings. For plan sponsors that did not report fixed income durations, it was assumed that fixed income duration was equal to the liability duration.

The increases in allocations to U.S. Fixed Income are not surprising given the growing adoption of liability driven investment (LDI) strategies. In fact, the declines in interest rates since the financial crisis have by most accounts held back this transition.

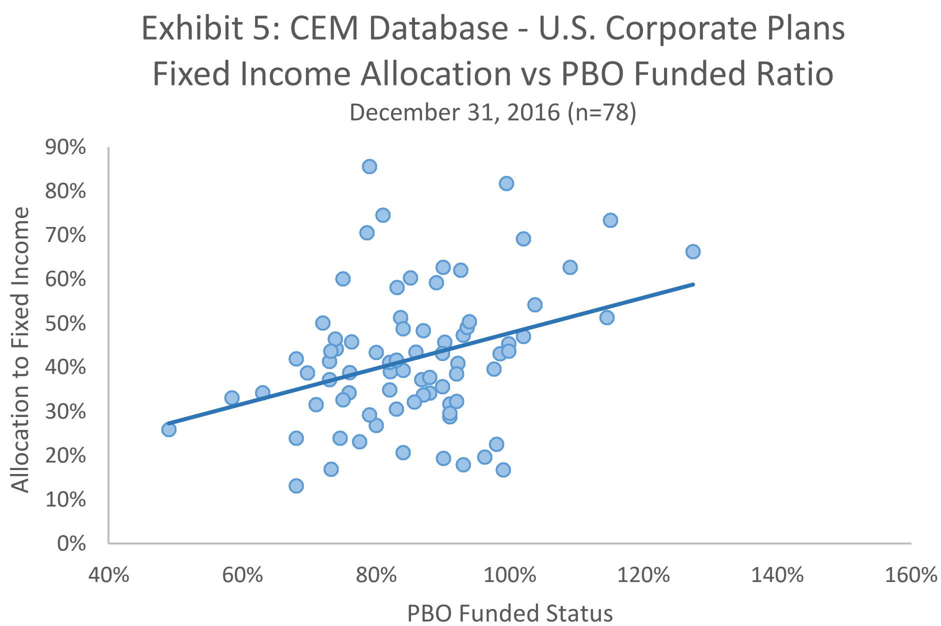
Another factor that has been cited as holding back de-risking strategies is a reluctance by plan sponsors to de-risk plans while in a deficit, often expressed as not wanting to "lock-in" deficits. One investment concept that has gained prominence as a result, is the de-risking glide path, a formulaic evolution of a plan's strategic asset allocation that gradually reduces risk as either funded status improves, interest rates increase or both. Thirty percent of U.S. corporate sponsors in CEM's database stated that they had a formal de-risking glide path in place at the end of 2016. Of these plans, 72% were based on funded status alone with the remainder based on both funded status and interest rates.

The prevalence of funded-status based glide paths should reveal themselves as a correlation between the allocations to fixed income and funded ratio[4]. The charts below show this relationship for CEM's universe of U.S. corporate plan sponsors at both December 31, 2007 and December 31, 2016.

At December 31, 2007, there was almost no relationship, with a very weak negative correlation between fixed income allocation and funded status (Exhibit 4).



[4] Since corporate sponsors report plan funded ratios using more than one basis, we have chosen to use funded status reported under U.S. GAAP based on the sponsor's projected benefit obligation (PBO).



At the end of 2016, there was a much stronger positive correlation (Exhibit 5), consistent with plan sponsors employing a funded-status based glide path. On average, 11% of the variation in fixed income is explained by funded status, and the relationship is significant at the 95% level. A 10% increase in funded status is associated with an additional 4% allocation to fixed income assets.

Admittedly, fixed income allocation is not a perfect proxy for LDI investing as it does not capture the duration of the fixed income investments in relation to liabilities. A better metric is hedge ratio, which we calculate as the dollar duration of a sponsor's fixed income assets divided by the dollar duration of the liabilities[5]. While CEM did not collect the necessary data to calculate hedge ratios in 2007, the information is available for 2016. The theory behind de-risking glide paths would suggest that the correlation between funded ratio and hedge ratio should be stronger than that between funded ratio and fixed income allocation. The data reveals that there is in fact a stronger correlation between funded status and hedge ratio than for fixed income allocation (Exhibit 6).

[5] Dollar duration of the liabilities and fixed income assets are calculated by multiplying the total plan liabilities/the market value of the fixed income assets by the respective duration.

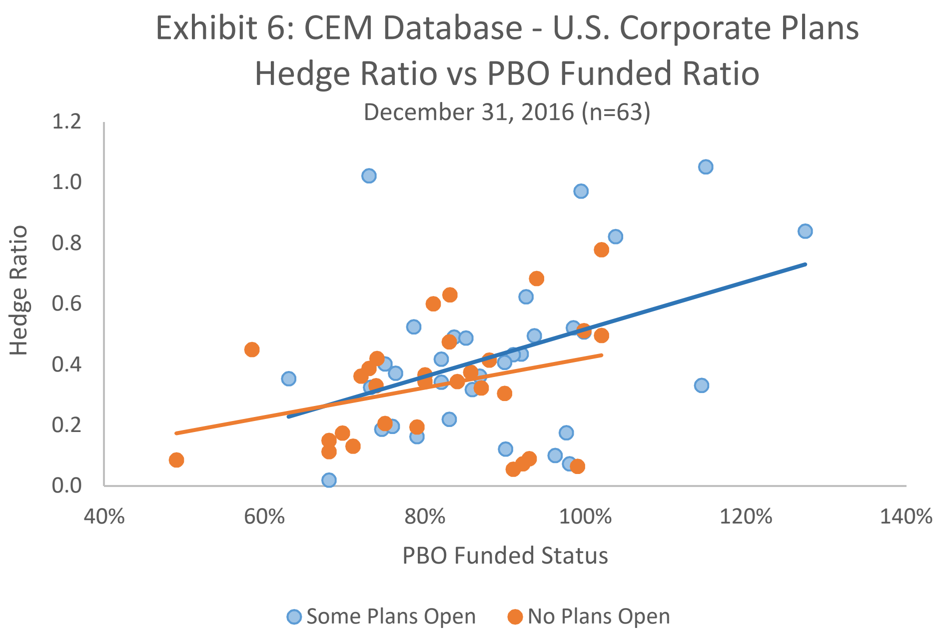


Exhibit 6 also shows the relationship between hedge ratios and PBO funded ratio split between plan sponsors who have open DB plans and those who have only closed and/or frozen DB plans. Surprisingly, plan sponsors with open plans show a higher correlation. One might expect a stronger relationship for sponsors without open DB plans since their benefit from future surpluses would in general be more limited.

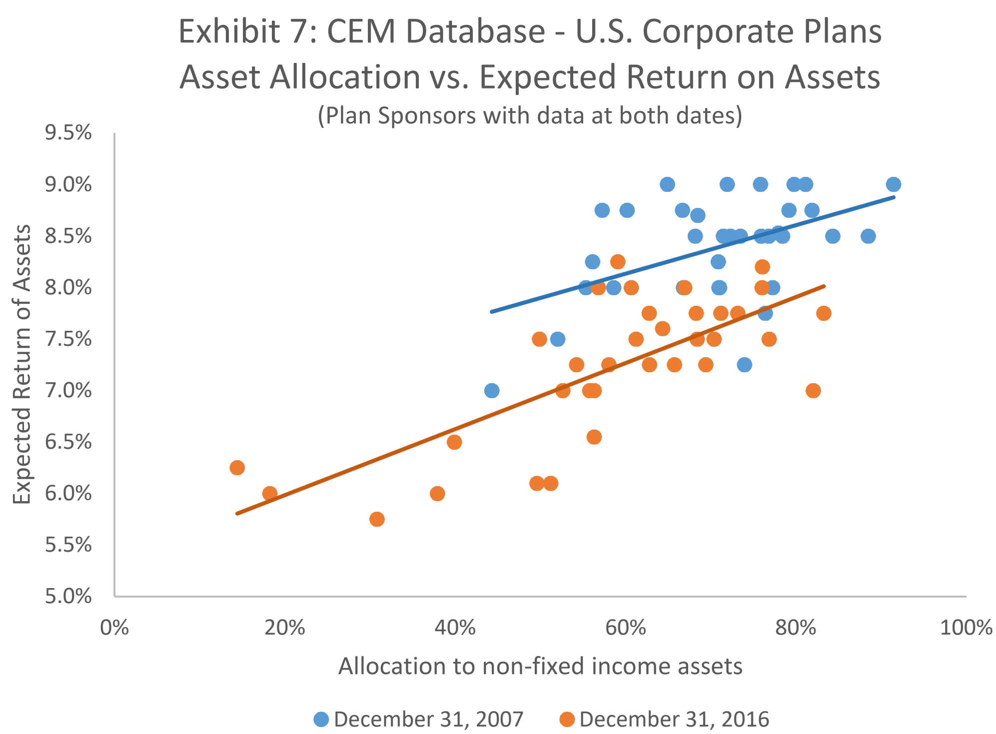
Plan sponsors continue to retain significant interest rate risk. At the end of 2016, the median hedge ratio was 36%.

It is apparent that U.S. corporate plan sponsors have made fairly large changes to their investment policies in the years after the financial crisis, mainly centered on reducing pension plan related risk. Given that many sponsors seem to be utilizing glide paths in their de-risking plans, it is likely that this trend will continue as funded statuses improve, particularly if interest rates begin to rise.

5 Changes in return expectations

To get an idea of how plan sponsors view the impact of changes to their asset policies on expected returns Exhibit 7 and Exhibit 8 show the relationship between plan sponsors' expected return on assets (EROA) assumptions under U.S. GAAP compared to allocations to non-fixed income assets (often referred as return seeking assets in LDI parlance). The relationship between asset allocation and the EROA assumptions is much stronger at the end of 2016 than at the end of 2007. This suggests that plan sponsors views on future returns are converging.

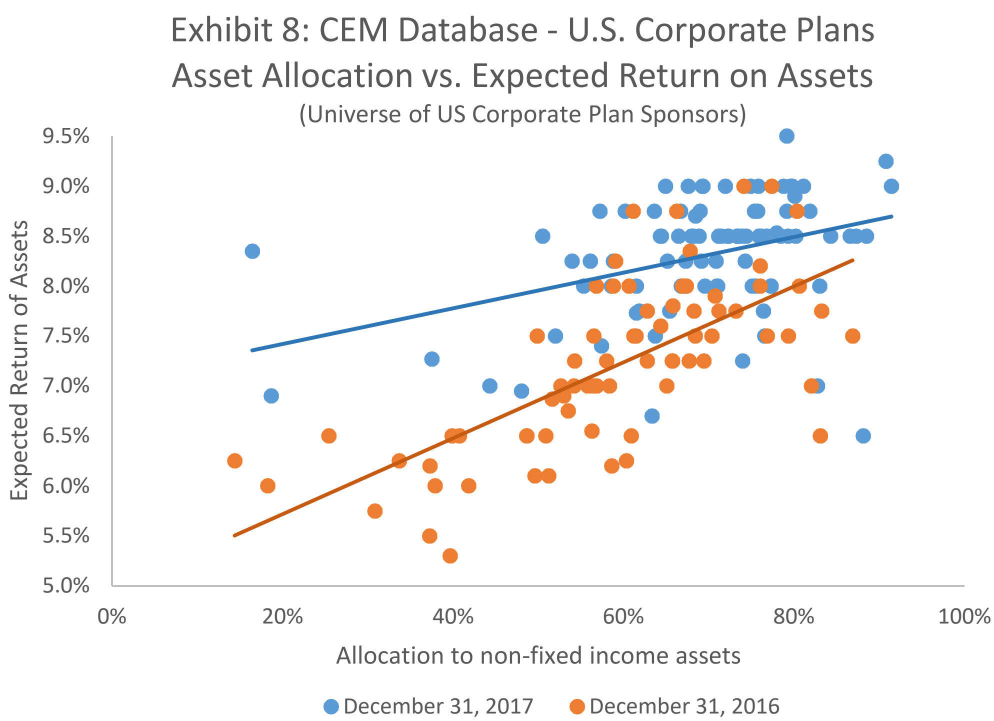
Exhibit 7 shows this relationship for plan sponsors for who we have data at both 2007 and 2016. Exhibit 8 plots the same data for our entire U.S. corporate universe. Both show similar trends.



Plan sponsors have lowered their return expectations on fixed income. The average decline in return expectations is 2.1%, comparable to declines in discount rates. However, assumptions continue to be very aggressive. For the universe, the average expected return was 7.1% at the end of 2007 compared to 5.0% at the end of 2016.

Plan sponsors used significantly higher risk premiums[6] at the end of 2016 than at the end of 2007. Risk premiums at the end of 2007 averaged 1.8% for the universe compared to 3.8% at the end of 2016. The result is that the assumed absolute return on risky assets is essentially unchanged.

[6] As expected, the data shows that return expectations for non-fixed income assets where higher than those for fixed income assets. The term risk premium refers to the additional expected annual return in excess of that assumed on fixed income assets.



It is apparent that U.S. corporate plan sponsors have adjusted their return expectations on fixed income roughly in line with market movements (albeit from a very aggressive base). Plan sponsors have not however assumed lower return for non-fixed income assets, instead choosing to assume that these assets will achieve higher risk premiums in the future. While some may question the wisdom of this assumption, it is perhaps consistent with their decisions to reduce pension risk incrementally.

6 Key takeaways

Pension plan sponsors have faced many challenges in recent years. The financial crisis and the difficult economic environment in the decade since have forced many plan sponsors to reassess the sustainability of their retirement plans. Plan sponsors have responded to these challenges in several ways in order to balance financial risk and human resource issues.

- The financial crisis resulted in severe declines in the funded status of most U.S. corporate pension funds resulting in almost universal pension deficits;

- Pension plan sponsors have struggled to return their plans to previous funding levels, largely due to declines in interest rates to historical lows;

- With the dual goals of closing funding shortfalls and reducing risk, plan sponsors have responded by de-risking incrementally and allowing funding status, and in more limited instances, interest rate levels, to guide their de-risking programs; and

- While plan sponsors seem to accept that lower fixed income yields will lead to lower returns on their fixed income assets going forward, they have been reluctant to reduce return expectations for risky assets.