Quarterly Update on Estimated Solvency Funded Status of Defined Benefit Plans in Ontario

Update as at December 31, 2018

- **The median solvency ratio is 94% (compared to 101% as at September 30, 2018) which is essentially at the same level as that of a year ago;**
- **27.5% of plans had a solvency ratio greater than 100% (down from 52.3% as at September 30, 2018 but still slightly better than the 25.1% as at December 31, 2017);**
- **53.9% of plans had a solvency ratio between 85% and 100%; and**
- **18.6% of plans had a solvency ratio below 85% (up from 8.2% as at September 30, 2018 and slightly worse than the 17.7% as at December 31, 2017).**

Ontario DB plan solvency positions pulled back in the fourth quarter of 2018 mainly due to negative pension fund investment returns as well as increased solvency liabilities resulting from decreased longer-term Canadian bond yields against which solvency liabilities are highly negatively correlated. The 7% decrease in the estimated median solvency ratio since September 30, 2018 is attributable to the following:

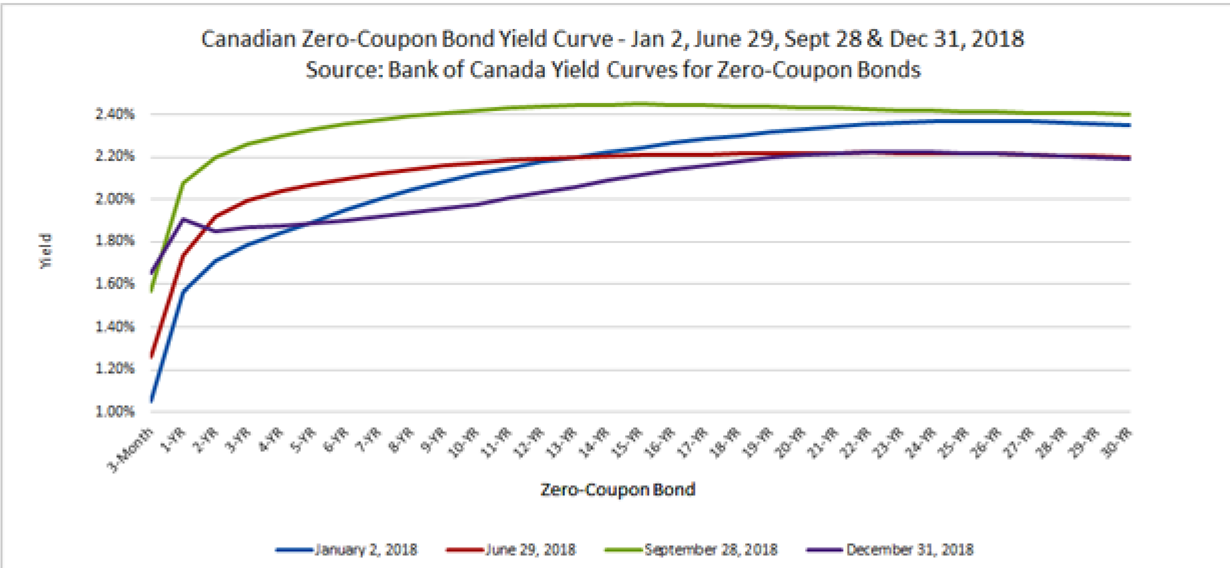
- 5% decrease due to very weak estimated -4.3% after expense Q4 2018 pension fund investment returns; and
- 2% decrease due to -0.3% annuity purchase proxy interest rate decrease.

Partly related to geopolitical uncertainties, the S&P/TSX pulled back in the fourth quarter and recorded a -10.1% loss. Globally, negative U.S. S&P 500 returns combined with weak EAFE markets resulting in MSCI World equities returning -8.5% (Cdn $) in the fourth quarter.

Offsetting these negative equity returns were slight pickups from fixed income assets due mainly to decreases in domestic interest rates across most durations in the fourth quarter. The FTSE TMX Universe was up 1.8% in the fourth quarter while 91-day T-Bills returned 0.5%. TMX Long Term bonds appreciated by 1.9% in the fourth quarter in response to Government of Canada marketable bond yields over 10-years falling to 2.13% from 2.43% at September 28. However, the 20+ basis point (“bps”) decrease in long-term Canadian bond yields led to solvency liability increases.

The resulting median fourth quarter 2018 gross and net after expense asset-weighted index returns were -4.1% and -4.3% respectively. For the entire year, the median gross asset-weighted index return was -1.7% (compared to 8.9% for 2017) and the median net after-expense return was -2.6% (compared to 7.9% for 2017).

Other Funding Matters – Canadian Yield Curves & Geopolitical Uncertainty



View accessible description of Canadian Zero-Coupon Bond Yield Curve Chart

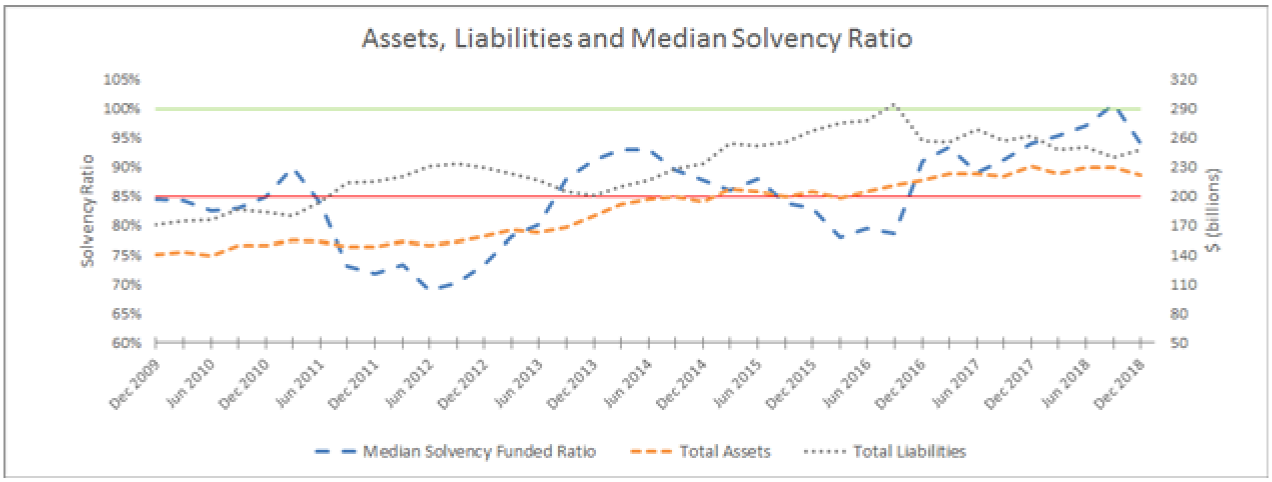
In Q4 2018, most DB plan solvency positions were adversely affected by the 20+ bps reduction in the yield curve. This more than offset any yield pickups since December 31, 2017.

From June 2018, Canada's yield curve has been flat and has remained on the cusp of inversion. The gap between 2-year and 30-year zero-coupon bonds was 64 bps (2.35% - 1.71%) at January 2, 2018 but had shrunk to 28 bps (2.20% - 1.92%) at June 29, 2018, 21 bps (2.40% - 2.19%) at September 28 2018 and was 34 bps (2.19% - 1.85%) at December 31, 2018. The 10-year vs. 30-year spread was inverted (2.42% 10-year yield vs 2.40% 30-year yield) at September 28, 2018 but has since reversed to a slightly positive spread of 21 bps at December 31, 2018 (1.98% 10-year yield vs 2.19% 30-year yield).

While Canada's gross domestic product growth has been strong, Bank of Canada ("BOC") Governor Stephen Poloz noted that "developments in the world economy could cause it (i.e. BOC interest rate targets) to drift up or down because there are a lot of global ingredients to that, not just a purely Canadian phenomenon". These other "global ingredients" could have included any or all of the following about which stock markets around the world had their choice to worry as 2018 ended and 2019 begins:

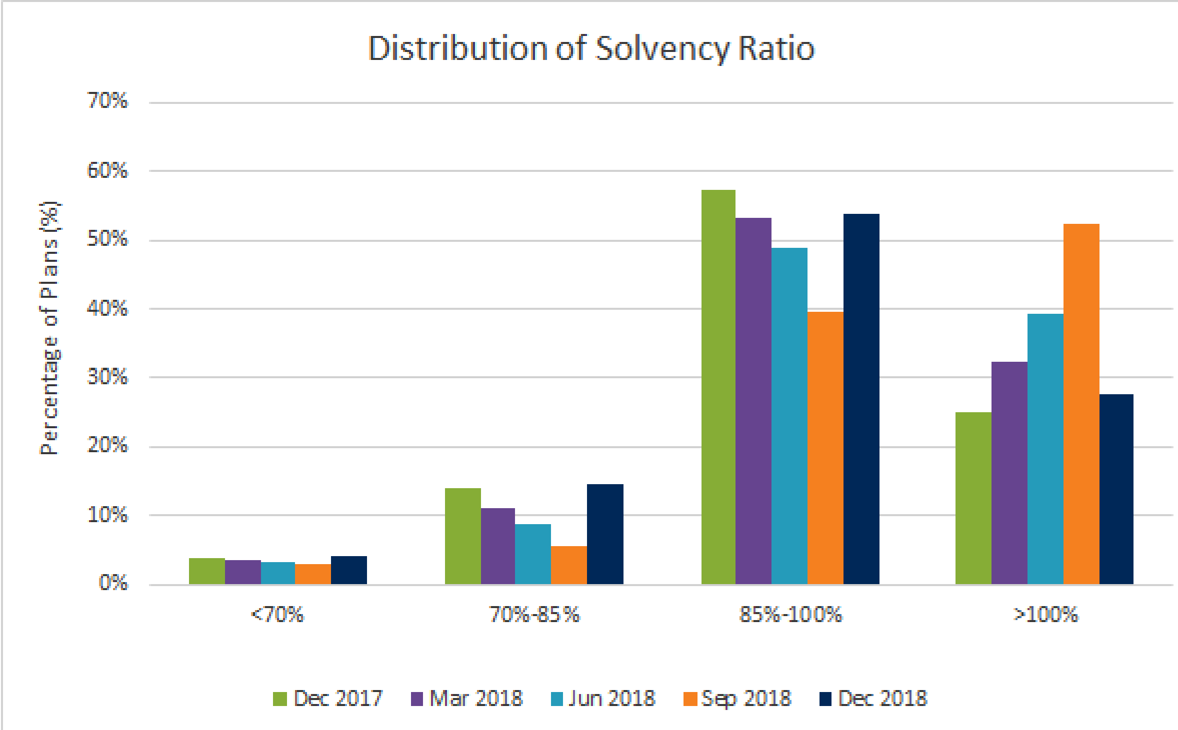
- Continuing stagnation of employment income in western economies;
- US federal government shutdown & political deadlock;
- US-China trade tensions & potential slow down in the Chinese economy;
- Uncertainties over the UK's Brexit agreement with the EU;
- The worst political upheaval in France in 50 years;
- Potential for instability in the Ukraine & Russian political aspirations; and
- Continuing uncertainty in the Middle East.

Assets, Liabilities and Median Solvency Ratio



View accessible description of Assets, Liabilities, and Median Solvency Ratio Line Chart

Distribution of Solvency Ratio



View accessible description of Distribution of Solvency Ratio Bar Chart

Methodology and Assumptions:

1. The results reported in each plan’s last filed actuarial valuation reports (assets and liabilities) were projected to December 31, 2018 based on these assumptions:
   - sponsors would use all available funding excess and prior year credit balance for contribution holidays, subject to any statutory restrictions;
   - sponsors would make normal cost contributions and special payments, if required, at the statutory minimum level;
   - cash outflows equal to pension amounts payable to retired members as reported in the last filed valuation report were assumed. Plan administration costs were not directly reflected in cash outflows, but indirectly through net after expense investment earnings.

2. Each plan’s annual net rates of return for years prior to 2018 are calculated based on individual plan filed IIS information. Rate of return statistics for 2017 and 2016 are summarized as follows:

	5th Percentile	1st Quartile	2nd Quartile	3rd Quartile	95th Percentile
2017 Gross Return:	12.6%	10.0%	8.9%	7.6%	5.0%
2017 Net After Inv. Expense:	12.2%	9.6%	8.4%	7.2%	4.7%

2017 Net After All Expense:	11.6%	9.2%	7.9%	6.6%	3.8%
2016 Gross Return:	11.6%	8.1%	6.4%	4.7%	2.2%
2016 Net After Inv. Expense:	11.1%	7.6%	5.9%	4.3%	1.9%
2016 Net After All Expense:	10.6%	7.2%	5.4%	3.7%	1.0%

3. Each plan's unique quarterly 2018 returns were estimated based on each plan's 2017 filed IIS asset allocation in combination with 2018 market index returns, offset by a 25 basis point quarterly expense charge. Estimated plan gross and net after expense return statistics are as follows:

	5th Percentile	1st Quartile	2nd Quartile	3rd Quartile	95th Percentile
2018 Gross Return:	0.9%	-0.7%	-1.7%	-2.3%	-3.0%
2018 Net After All Expense:	-0.1%	-1.7%	-2.6%	-3.3%	-4.0%
2018 Q4 Gross Return:	0.7%	-2.6%	-4.1%	-4.9%	-6.0%
2018 Q4 Net After All Expense:	0.5%	-2.8%	-4.3%	-5.1%	-6.3%
2018 Q3 Gross Return:	0.7%	0.2%	0.1%	-0.3%	-1.3%
2018 Q3 Net After All Expense:	0.5%	-0.1%	-0.2%	-0.6%	-1.5%
2018 Q2 Gross Return:	4.0%	3.5%	3.2%	2.6%	1.1%
2018 Q2 Net After All Expense:	3.8%	3.2%	2.9%	2.3%	0.8%
2018 Q1 Gross Return:	0.1%	-0.4%	-0.7%	-0.9%	-1.2%
2018 Q1 Net After All Expense:	-0.2%	-0.6%	-0.9%	-1.1%	-1.5%

The following table summarizes 2017 average IIS plan asset allocations by major asset class:

Cash	Canadian Equities	Foreign Equities	Fixed Income1	Real Estate	Other
2.9%	23.7%	23.0%	44.8%	3.0%	2.6%

1 50% FTSE TMX Universe Bonds and 50% FTSE TMX Long Term Bonds.

Market index returns on the major assets classes have been as follows:

	S&P / TSX Total Return Index	MSCI World Total Net Return Index	FTSE TMX Universe Bond Index	FTSE TMX Long Bond Index
Q4 2018	-10.1%	-8.5%	1.8%	1.9%
Q3 2018	-0.6%	3.2%	-1.0%	-2.4%
Q2 2018	6.8%	3.8%	0.5%	0.9%
Q1 2018	-4.5%	1.6%	0.1%	-0.0%

4. Estimated solvency liabilities were calculated based on the Canadian Institute of Actuaries Standards of Practice and the Canadian Institute of Actuaries Educational Notes, with these key assumptions:

Valuation Date	Commuted Value Basis	Annuity Purchase Basis2
December 31, 2018	Interest: 3.20% for 10 years 3.40% thereafter Mortality: CPM2014 generational	Interest: 3.03% Mortality: CPM2014 generational
September 30, 2018	Interest: 3.20% for 10 years, 3.30% thereafter Mortality: CPM2014 generational	Interest: 3.33% Mortality: CPM2014 generational

2 based on a medium duration illustrative block

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