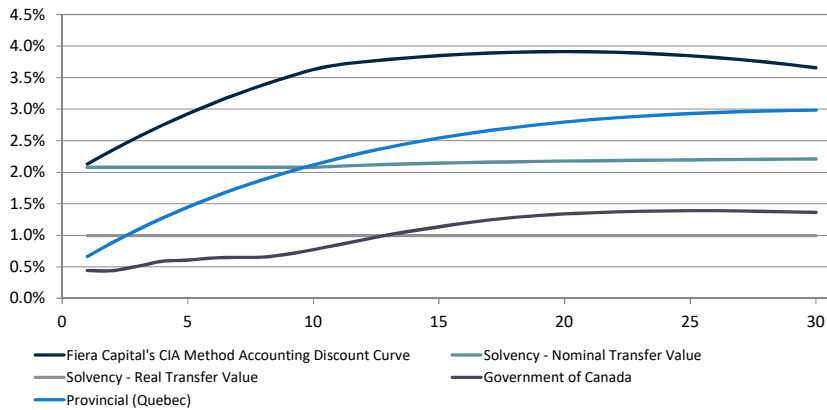
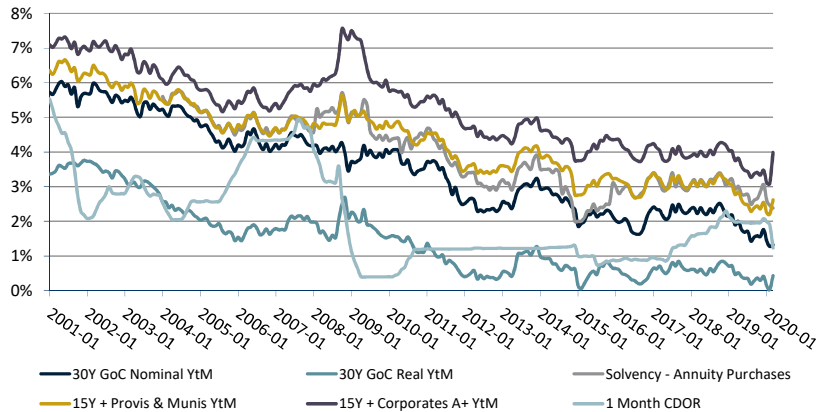


LDI Monitor - March 2020

Canadian Discount Curves as of 2020-03-31 *



Historical Interest Rates in Canada



Monthly LDI Highlights

During the month of March, pension solvency rates marginally decreased and solvency liabilities slightly increased. On the other hand, accounting liabilities decreased sharply over the same period as spreads on long-term corporate bonds (15 yrs+) widened significantly (+90.0 bps). It is worth noting that spreads on long-term provincial bonds (15 yrs+) also increased, by around 40.8 bps. Sample Canadian pension plan asset portfolios posted sharp negative returns ranging from -7.29% to -5.59% in March as equities declined sharply and credit spreads widened.

As of 2020-03-31 Change from 2020-02-28 Change from 2019-12-31

Long-Term Market Interest Rates	(bps)	(bps)	
GoC 7 Year Nominal YtM	0.64%	-43	-104
GoC 30 Year Nominal YtM	1.32%	4	-44
GoC 30 Year Real YtM	0.43%	40	2
30 Year Break-Even Inflation	0.89%	-36	-46
GoC 15 Year + YtM	1.27%	0	-50
Provis 15 Year + YtM	2.62%	41	7
Corporate Rated A and over 15 Year + YtM	3.99%	90	52
Interest Rate Swap 20 Year	1.42%	-31	-91
Interest Rate Swap 30 Year	1.46%	-24	-81
Short Term Financing Rates			
Overnight REPO	0.19%	-156	-159
1 Month CDOR	1.23%	-66	-85
3 Month CDOR	1.24%	-63	-83
Pension Solvency Rates **			
Transfer Value - Nominal 1-10 Year Fwd Rate	2.1%	-10	-30
Transfer Value - Nominal 10 Year + Fwd Rate	2.3%	-10	-20
Transfer Value - Real 1-10 Year Fwd Rate	1.0%	0	-20
Transfer Value - Real 10 Year + Fwd Rate	1.0%	-10	-20
Annuity Purchase Rate	2.4%	-8	-68
CIA's Prescribed Annuity Purchase Spread	1.2%	0	-10
Accounting Discount Rate (Based on the Fiera Capital's CIA Method Accounting Discount Rate Curve) ***			
Young Pension Plan	3.80%	112	65
Steady Pension Plan	3.74%	111	63
Mature Pension Plan	3.69%	114	64

Canadian Pension Plan Performance Matrix ***

Assets	Young		Steady		Mature	
	60% Stocks, 40% Bonds	60% Stocks, 40% Bonds	50% Stocks, 50% Bonds	50% Stocks, 50% Bonds	40% Stocks, 60% Bonds	40% Stocks, 60% Bonds
(March 2020 YTD)						
Accounting Liability @ Fiera Capital's CIA Curve	-17.3% -9.6%	-7.29% -8.95%	-14.5% -7.7%	-6.43% -7.20%	-11.1% -5.7%	-5.59% -5.44%
Solvency Liability @ CIA Curve	2.0% 6.2%		1.6% 6.7%		1.2% 6.3%	
Economic Liability @ GoC Curve	0.5% 10.5%		0.9% 9.7%		1.6% 8.2%	
Accounting Surplus	10.0% 0.7%		8.0% 0.5%		5.5% 0.3%	
Solvency Surplus	-9.3% -15.2%		-8.1% -13.9%		-6.8% -11.7%	
Economic Surplus	-7.8% -19.5%		-7.4% -16.9%		-7.2% -13.7%	

Accounting Liability Performance Attribution ***

Accounting Liability Total Return	Young		Steady		Mature	
	0.7% 9.7%	0.7% 9.7%	1.0% 8.7%	1.0% 8.7%	1.6% 7.4%	1.6% 7.4%
Change in Risk-Free Rates	0.7% 9.7%	0.7% 9.7%	1.0% 8.7%	1.0% 8.7%	1.6% 7.4%	1.6% 7.4%
Change in Credit Spreads	-20.0% -20.1%	-20.0% -20.1%	-17.0% -17.2%	-17.0% -17.2%	-13.8% -13.9%	-13.8% -13.9%
Time Carry	0.3% 0.8%	0.3% 0.8%	0.3% 0.8%	0.3% 0.8%	0.3% 0.8%	0.3% 0.8%
Accounting Liability Total Return	-17.3% -9.6%	-17.3% -9.6%	-14.5% -7.7%	-14.5% -7.7%	-11.1% -5.7%	-11.1% -5.7%

Assumptions & Sources

(*) All discount curves shown are expressed as continuously compounded annual spot interest rates.

(**) Rates are based on the CIA methodology. The annuity purchase rate and the CIA prescribed spread are based on medium duration, liabilities as defined in the most recent CIA solvency valuation guidelines.

(***) The target duration of the accrued liabilities for the young, steady and mature pension plans are fixed to 17, 14 and 11 years respectively. Solvency, accounting and economic liabilities are assumed to discount expected nominal liability cash flows. All surplus return calculations assume a fully funded status at the beginning of the year. Asset allocation in equities is assumed to be evenly allocated amongst the S&P/TSX, S&P500 unhedged in CAD and MSCI-EAFE unhedged in CAD. Bank of America Merrill Lynch Canadian Broad Bond Market Index (CANO) is used as the benchmark for fixed income. Sources: Fiera Capital, Bank of Canada, Bank of America Merrill Lynch, Bloomberg, MSCI-Barra, S&P and the Canadian Institute of Actuaries.