

MONTRÉAL EXCHANGE

**Potential
Strategies:
Long Canadian
Government
Bond Futures
Contracts**



We discuss several use cases for the 30-Year Government of Canada Bond Futures (LGB™) in Canada.

Simplified Liability Driven Investing/Immunitization

Many liability-sensitive investors have eschewed partial or full immunization of their payout obligations in recent years due to extraordinarily low levels of long-term interest rates (Figure 1), especially in the years preceding and following the COVID-19 pandemic. Investors saw little reason to buy bonds which closely matched the duration of their liabilities as doing so would “lock in” an underfunding to those liabilities.

FIGURE 1
Canada 30-year Yield



Source: BMO Capital Markets' Fixed Income Sapphire database

Some of these investors may now be revisiting asset allocations that immunize, or partially immunize, future liabilities as the attainable rate on long term government bonds has risen by about 200 basis points from 2020 lows and more than 100 basis points from the 2018/2019 average. However, years of portfolio construction using sometimes illiquid or difficult to finance assets may constrain such asset managers from quickly shifting away from higher yielding, but lower duration, assets. LGB (30-year) futures contracts can potentially be utilized by investors as a capital efficient, easily tradable, instrument for obtaining duration.

A plan could achieve its longer duration goals without selling off potentially illiquid (but higher expected return) assets by buying 30-year contracts as a liability driven investing overlay where the plan is self-funded via the inherent leverage in futures contracts. The contract would closely mirror long-term government of Canada interest rates so that, if those rates fell again in the near or mid-term, the gains in the overlay program would offset some, or all, of the rising future liabilities. Of course, a similar strategy could be implemented in the cash market for bonds but would require either selling existing assets or an extensive bond funding program with additional costs. The leverage embedded in the LGB futures contract will often be the most efficient leverage available to small and medium-sized investors.

Interest Rate Hedging A (Quasi) Credit Portfolio

Futures contracts can also be effective to transact allocation shifts due to changing interest rate views or policy goals. Figure 2 depicts a hypothetical provincial bond portfolio that an investor may have accumulated by following a regimen of periodic buying for several years. A shift in investment policy to acquire slightly better yields than available on federally issued bonds could have caused this investor to pursue such a strategy.

However, while the investor is still attracted to the additional yield pickup relative to Canada bonds, they disagree with the market consensus prevalent at the end of the first quarter of 2023 and believe long-term interest rates will continue to rise. While the investor could choose to pay elevated transaction costs to sell the portfolio outright, this investor could potentially use the Ten-Year Government of Canada Bond Futures (CGB™) and LGB (30-year) contracts to quickly hedge the interest rate exposure of such a portfolio.

FIGURE 2

| QUANTITY | ISSUER | COUPON | MATURITY | YEARS TO MATURITY | PRICE | YIELD TO MATURITY | MODIFIED DURATION | DV01 | PORTFOLIO DV01 |
|-------------------|--------|--------|-----------|-------------------|---------|-------------------|-------------------|-------------|----------------|
| 6,350,000 | AB | 3.50% | 01-Jun-31 | 8.2 | 99.3766 | 3.588% | 7.00 | 7.03 | 4,462 |
| 8,900,000 | AB | 1.65% | 01-Jun-31 | 8.2 | 86.2491 | 3.601% | 7.48 | 6.49 | 5,773 |
| 7,650,000 | ON | 2.15% | 02-Jun-31 | 8.2 | 89.8131 | 3.594% | 7.34 | 6.64 | 5,076 |
| 6,050,000 | BC | 1.55% | 18-Jun-31 | 8.3 | 85.6320 | 3.577% | 7.56 | 6.50 | 3,932 |
| 5,770,000 | PQ | 1.50% | 01-Sep-31 | 8.5 | 84.8991 | 3.588% | 7.77 | 6.60 | 3,808 |
| 5,390,000 | ON | 2.25% | 02-Dec-31 | 8.7 | 89.8400 | 3.621% | 7.70 | 6.97 | 3,758 |
| 3,630,000 | BC | 3.20% | 18-Jun-44 | 21.3 | 88.1894 | 4.033% | 14.71 | 13.10 | 4,754 |
| 3,940,000 | PQ | 3.50% | 01-Dec-45 | 22.7 | 91.9940 | 4.042% | 15.04 | 13.99 | 5,512 |
| 4,170,000 | AB | 3.30% | 01-Dec-46 | 23.7 | 88.0715 | 4.091% | 15.60 | 13.89 | 5,792 |
| 3,050,000 | ON | 2.90% | 02-Dec-46 | 23.7 | 82.6380 | 4.046% | 16.06 | 13.41 | 4,090 |
| 3,180,000 | BC | 2.80% | 18-Jun-48 | 25.3 | 80.8331 | 4.015% | 16.86 | 13.75 | 4,373 |
| 4,550,000 | AB | 3.05% | 01-Dec-48 | 25.7 | 83.8388 | 4.070% | 16.66 | 14.12 | 6,424 |
| 7,100,000 | ON | 2.90% | 02-Jun-49 | 26.2 | 81.9747 | 4.019% | 17.08 | 14.15 | 10,046 |
| 4,470,000 | AB | 3.10% | 01-Jun-50 | 27.2 | 84.4997 | 4.045% | 17.17 | 14.67 | 6,557 |
| 7,720,000 | BC | 2.95% | 18-Jun-50 | 27.3 | 82.7111 | 3.997% | 17.45 | 14.57 | 11,244 |
| 3,640,000 | PQ | 3.10% | 01-Dec-51 | 28.7 | 85.2412 | 3.966% | 17.78 | 15.32 | 5,575 |
| 7,610,000 | ON | 1.90% | 02-Dec-51 | 28.7 | 64.7848 | 3.966% | 19.77 | 12.92 | 9,831 |
| 5,910,000 | BC | 2.75% | 18-Jun-52 | 29.3 | 79.3892 | 3.944% | 18.49 | 14.81 | 8,753 |
| 99,080,000 | | | | | | 3.844% | 13.2 | 11.1 | 109,761 |

Source: BMO Capital Markets' Fixed Income Sapphire database, Author calculations

Figure 3 shows a DV01 neutral hedge portfolio created in two parts from futures contracts; CGB contracts to hedge the provincial bonds close to a 10-year maturity and LGB contracts to hedge the bonds with more than 20 years to maturity. By selling 10-year contracts and 30-year contracts¹, the investor will create a very good hedge against interest rates moving higher. The transaction could be implemented without excessive costs to liquidate the provincial bond portfolio, and without the borrowing/financing efforts necessary to transact the hedge in cash bonds².

¹ Although the number of LGB contracts is a very significant percentage of all contracts outstanding currently, a market making program in the product and the fact that the LGB contract trades at roughly fair value indicates that liquidity to do sizable trades exists.

² For additional discussion and analysis on using futures contracts as a substitute for cash bonds, refer to "CGB as Substitute for 10y Benchmark Bonds - Strategy Comparison: 2011-2020" published by Montréal Exchange in June 2020.

FIGURE 3
Hedge Provincial Portfolio

| POSITION | INSTRUMENT | CTD/BOND COUPON | CTD/BOND MATURITY | FUTURES CONVERSION FACTOR | SECURITY DV01 | FUTURES TOTAL DV01 | PORTFOLIO DV01 | DIFFERENCE |
|----------|------------|-----------------|-------------------|---------------------------|---------------|--------------------|----------------|------------|
| -278 | CGBM23 | 1.500% | 01-Jun-31 | 0.7174 | 9.6 | -26,781 | 26,810 | 29 |
| -221 | LGBM23 | 2.000% | 01-Dec-51 | 0.4570 | 37.5 | -82,936 | 82,951 | 15 |
| | | | | | | -109,717 | 109,761 | 44 |

Source: Montréal Exchange, Author calculations

Leveraged Curve Trades

Overlay curve trades are often a middle step between cash bond portfolios and leveraged alpha portfolios. Managers who struggle to overlay a curve bias on their portfolios, due to cash or other portfolio restrictions, can easily implement these trades in Two-Year Government of Canada Bond Futures (CGZ™), Five-Year Government of Canada Bond Futures (CGF™), CGB (10-year), or LGB (30-year) contracts with no cash outlay besides initial and maintenance margin.

For example, an investor with a cash portfolio closely managed to a specific corporate benchmark may loathe the idea of selling any of their difficult, and expensive, to acquire portfolio but have a strong view that the 5-30 segment of Canada's yield curve will steepen soon. That slope is currently near historical lows of the past 5 years, as shown below in Figure 4. Trading cash bonds to enter a 5-30 steepening trade could create a significant "benchmark effect" by increasing the assets of the portfolio (buying 5-year bonds and selling far fewer 30-year bonds in a DV01 neutral trade) and may not even be possible if there are no long-term bonds to sell.

FIGURE 4
Canada 5-30 Slope



Source: BMO Capital Markets' Fixed Income Sapphire database

Instead, a manager could simply buy CGF contracts and sell the same DV01 of LGB contracts, as shown in Figure 5, to create a 5-30 steepening overlay that creates almost no change to the cash value of the portfolio and does not require any funding but establishes nearly the identical return profile as the cash trade.

FIGURE 5
Canada 5-30 Slope

| POSITION | TICKER | CTD COUPON | CTD MATURITY | FUTURES CONVERSION FACTOR | DV01/ CONTRACT | TOTAL DV01 |
|----------|--------|------------|--------------|---------------------------|----------------|------------|
| 481 | CGFM22 | 3.500% | 01-Mar-28 | 0.8979 | 5.2 | 24,975 |
| -67 | LGBM22 | 2.000% | 01-Dec-51 | 0.4570 | 37.5 | -25,143 |
| | | | | | | -168 |

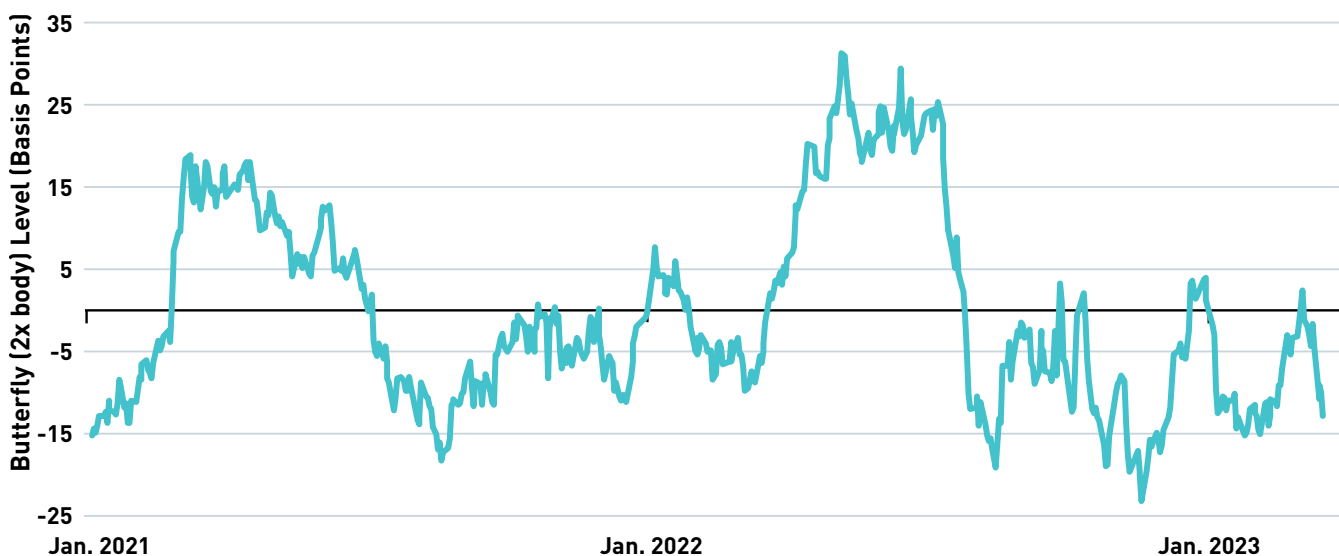
Source: Montréal Exchange, Author calculations

The above structure would require a cash outlay for initial margin of less than 5% of the comparable trade in cash bonds using the most restrictive (zero netting, speculative) margin requirements on Montréal Exchange. The overlay trade is far more liquid and efficient to trade than adjusting cash bond positions and requires no financing of short positions. When the manager's view has been realized in the market, they can simply reverse the futures trade³ and return automatically to the initial portfolio of credit bonds.

Curvature/Big Macroeconomic Trade

Clients can also use futures to create trades that profit from changes in the curvature of the yield curve, rather than just the slope. One typical long-term trade is the shape of the yield curve and the level of the 10-year point relative to the slope of some broad portion of the curve such as 5-30 or even 2-30. Figure 6 depicts the curvature, or 5-10-30 butterfly, of the Canada constant maturity bond curve since the end of 2020, a tumultuous year for the yield curve that is not likely to be repeated⁴.

FIGURE 6
50/50 5-10-30 Butterfly



Source: BMO Capital Markets Fixed Income Sapphire database¹

³ For more on curve trades using futures, refer to "Unpacking a Successful Curve Trade in Canadian Bond Futures" published by Montréal Exchange in May 2021.

⁴ We note that prior to and during the COVID-19 pandemic (i.e., using a longer history for the time series), the butterfly time series sank to much lower levels.

The 50/50 weighted butterfly depicted in the chart could attract investors to “sell the body” of the butterfly trade in a structure such as the one depicted in Figure 7. Sophisticated investors interested in removing all historical direction and slope bias could just as easily choose a regression-weighted structure⁵ such as the one shown in Figure 8 where the relationship between 5-10 and 10-30 in the prior two years has been removed to create a weighting scheme designed to profit only if 10-year yields rise (curvature increases on the chart in Figure 6) relative to the recent behavior of said yields versus the 5-30 curve.

FIGURE 7
50/50 5-10-30 Butterfly

| POSITION | TICKER | CTD COUPON | CTD MATURITY | FUTURES CONVERSION FACTOR | DV01/ CONTRACT | TOTAL DV01 | PPERCENT WEIGHTS |
|----------|--------|------------|--------------|---------------------------|----------------|------------|------------------|
| 179 | CGFH22 | 3.500% | 01-Mar-28 | 0.8979 | 5.6 | 10,030 | -50.1% |
| -188 | CGBH22 | 1.500% | 01-Jun-31 | 0.7174 | 10.7 | -20,027 | 100.0% |
| 21 | LGBH22 | 2.000% | 01-Dec-51 | 0.4570 | 47.4 | 9,946 | -49.7% |
| | | | | | | -51 | 0.3% |

Source: Montréal Exchange, Author calculations

FIGURE 8
Regression Weighted 5-10-30 Butterfly, 2-year

| POSITION | TICKER | CTD COUPON | CTD MATURITY | FUTURES CONVERSION FACTOR | DV01/ CONTRACT | TOTAL DV01 | PERCENT WEIGHTS |
|----------|--------|------------|--------------|---------------------------|----------------|------------|-----------------|
| 177 | CGFM23 | 3.500% | 01-Mar-28 | 0.8979 | 5.2 | 9,190 | 45.9% |
| -208 | CGBM23 | 1.500% | 01-Jun-31 | 0.7174 | 9.6 | -20,038 | -100.1% |
| 29 | LGBM23 | 2.000% | 01-Dec-51 | 0.4570 | 37.5 | 10,883 | 54.3% |
| | | | | | | 36 | 0.2% |

Source: Montréal Exchange, Author calculations

Futures Basis

As with all physical delivery futures contracts, opportunities exist from time to time in pure arbitrage strategies between the futures contract and the cheapest-to-deliver (CTD) bond. These opportunities arise when there is a short-term mismatch between demand for liquidity in the futures contract and demand for liquidity in the cash bond that will be the bond delivered to meet contract obligations.

A manager may notice, for example, that on March 16th, the LGB (30-year) contract was trading at 177.85 while the cheapest-to-deliver bond, the Canada 2% December 2051, was at 80.7602 for a gross basis⁶ of -51.7. Since the price levels cited above imply a 4.98% implied repo rate⁷ to June 21st when equivalent short-term interest rates were just 4.46%, the basis buyer extracts a little over 10 cents of value from the futures basis as it converges to zero on the delivery date.

An example of a futures basis trade is shown in Figure 9 where the manager enters a trade that would seek to capture the 10-11 cents of difference between the actual basis (-51.7) and the fair value of the basis (-41.1) for an arbitrage gain of \$340,000 after all financing costs but before execution costs.

⁵ Readers interested in butterfly strategies can read a more in-depth discussion in “Understanding 2-5-10 Butterfly Trades in Futures” published by Montréal Exchange in May 2021.

⁶ To read more about gross basis and negative gross basis levels, refer to “Forecasting/Understanding Negative Basis in Futures” published by Montréal Exchange in April 2021.

⁷ For more on fair value analysis of futures contracts, please refer to “CGF CGB - Understanding the Implied Repo Rate” published by Montréal Exchange in April 2020.

FIGURE 9
Long Futures Basis

| POSITION | INSTRUMENT | CTD/BOND COUPON | CTD/BOND MATURITY | FUTURES CONVERSION FACTOR | DV01 | TOTAL DV01 |
|------------|------------|-----------------|-------------------|---------------------------|--------|------------|
| -91 | LGBM23 | 2.000% | 01-Dec-51 | 0.4570 | 37.528 | -34,150 |
| 20,000,000 | Canada | 2.000% | 01-Dec-51 | NA | 17.150 | 34,300 |
| | | | | | | 150 |

Source: Montréal Exchange, Author calculations

In the above example, the manager takes no risk if the trade is structured correctly, as they will simply deliver the purchased bond to satisfy the contract requirements on delivery date. In other physical delivery contracts, some risk may remain due to embedded option value, but those options are almost eliminated⁸ in the new LGB contract specifications.

⁸ In the example trade, the hedge tail must be sold at/near the close on the last trading day. The hedge tail is the amount of excess bonds the long (short) basis trade owns (is short) that are not needed to satisfy delivery obligations on the futures contract.



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