

# C | G | B Ten-Year Government of Canada Bond Futures

## Auction, Benchmark, CGB, or Off-the-Run?

Late July brought the first auction of a new 10-year bond in Canada, the 2% Jun28. Which serves as a good catalyst for some empirical analysis on the liquidity discount associated with a new bond; as well as the liquidity premium observed on the benchmark, and CGB contract cheapest-to-deliver (CTD) bonds, during their life cycle.

### Life Cycle of Bonds: The Canada 10-year

Bonds have a well-defined life cycle and, especially for the 2, 5, and 10-year bonds, can be expected to progress through four defined phases.

During the auction period, a 10-year Canada bond is periodically issued for a well-defined period of time - usually about 10 months between the first auction date and the final auction of the bond - before the issuer moves on to another maturity date. Since issuance is periodic and pre-announced, the auction bond is usually “cheap” and is subject to periodic cheapening due to the supply event.

At some point, recently between the end of February and the beginning of May of the year following the first auction, the bond is deemed by dealer swap and bond desks, to be of sufficient size that it is ready to take benchmark status from the previous 10-year bond. As frequent use by dealing desks makes the benchmark bond much higher two-way volume than other bonds, the benchmark bond typically trades “rich” relative to other surrounding bond maturities to reflect this valuable liquidity. The switch to benchmark has recently occurred an average of six weeks prior to the final auction date of the bond that is assuming benchmark status.

After an average of one year as the benchmark bond, the bond is relieved of its benchmark status and enters a period of 30-60 days<sup>1</sup> where it is no longer the official benchmark but has also not yet entered the basket of deliverables for the 10-year futures contract (CGB).

Around five business days before the first day of June, the bond then enters the delivery basket of the active contract, always as the cheapest-to-deliver bond in recent years, and again enjoys the added two-way liquidity associated with dealers hedging futures basis, off-the-run 10-year positions, and/or options positions or market making activity in futures contracts.

One year later, or in the second year after the bond was first auctioned, the bond drops out of the delivery basket for the active futures contract and begins a long period of “off-the-run” less liquid trading where it is generally cheap to the curve. During periods of normal interest rates<sup>2</sup>, old 10-year bonds eventually had similar maturities to 5-year and 2-year bonds but abnormally high coupons so these aging bonds were subject to buybacks and stripping activity.

1. This period is short enough that no reliable richening or cheapening bias has been observed in recent years.

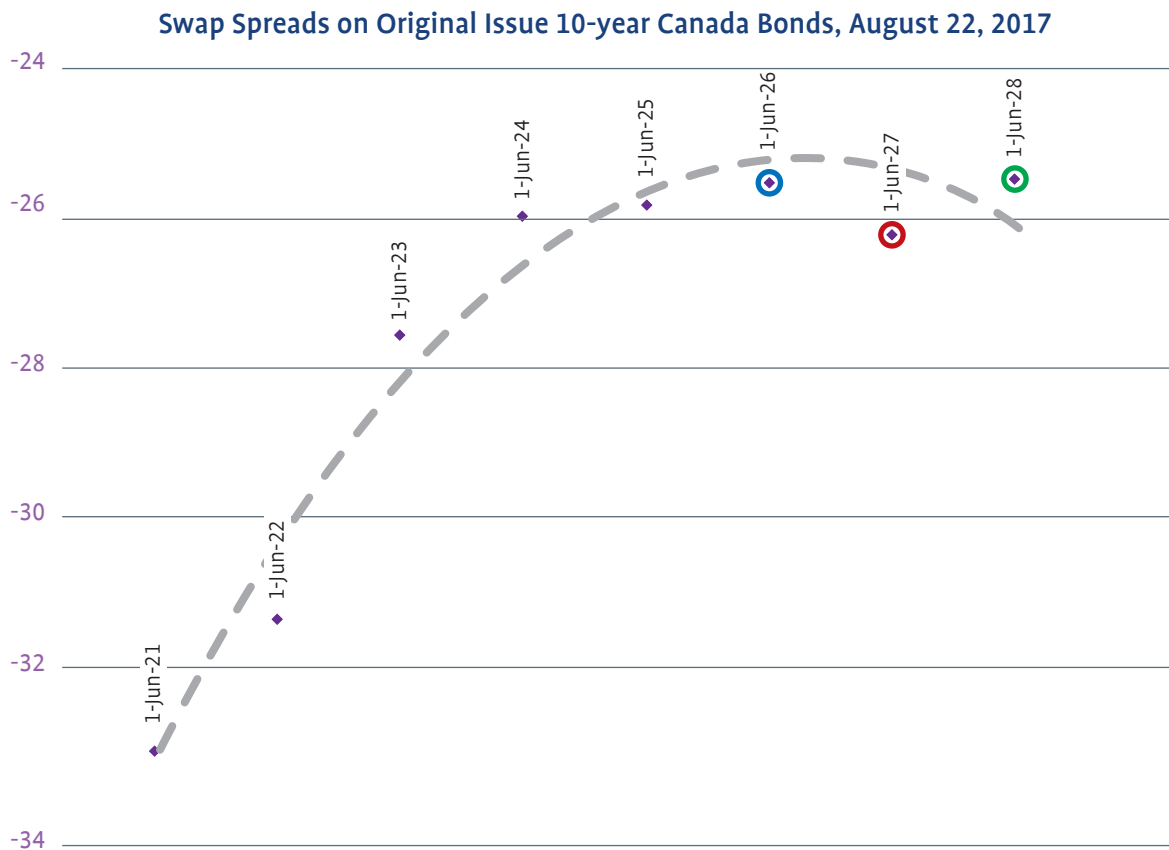
2. Prior to the post 2014 period of very low rates and coupons.

## Relative Valuation Today

We can observe a typical term structure during the life cycle of 10-year bonds by looking at the relative valuation of all original-issue 10-year Canada bonds on August 22, 2017. While there are many different methods<sup>3</sup> to determine relative value, a simple and effective way is to simply examine each bond's spread to the swap curve<sup>4</sup>. Figure 1 utilizes this simple relative valuation method and plots the maturity dates of original issue 10-year bonds on the x-axis with the spread to the swap curve on the y-axis. Shown this way, points higher on the y-axis depict a bond that is relatively cheaper while points lower on the y-axis depict bonds that are richer.

We can see in Figure 1 that the new 2028 (green circle) does appear quite cheap while the benchmark 2027s (red circle) are definitely much richer. The current cheapest-to-deliver (blue circle) is a little richer than the auction bond, but not nearly as much as the benchmark 10s and the older bonds such as 2023s to 2025s are either "fair" or cheap due to declining liquidity as they age.

Figure 1



Source: BMO Capital Markets' Fixed Income Sapphire

3. Near-bond butterflies, theoretical value based on zero curves, and constant maturity benchmark curves, to name just a few.

4. Since swaps are continuous for maturity rather than discrete, as bond issues are, and don't usually have pre-announced supply or demand at specific maturities they exhibit far less maturity-specific rich/cheap phenomena than bonds.

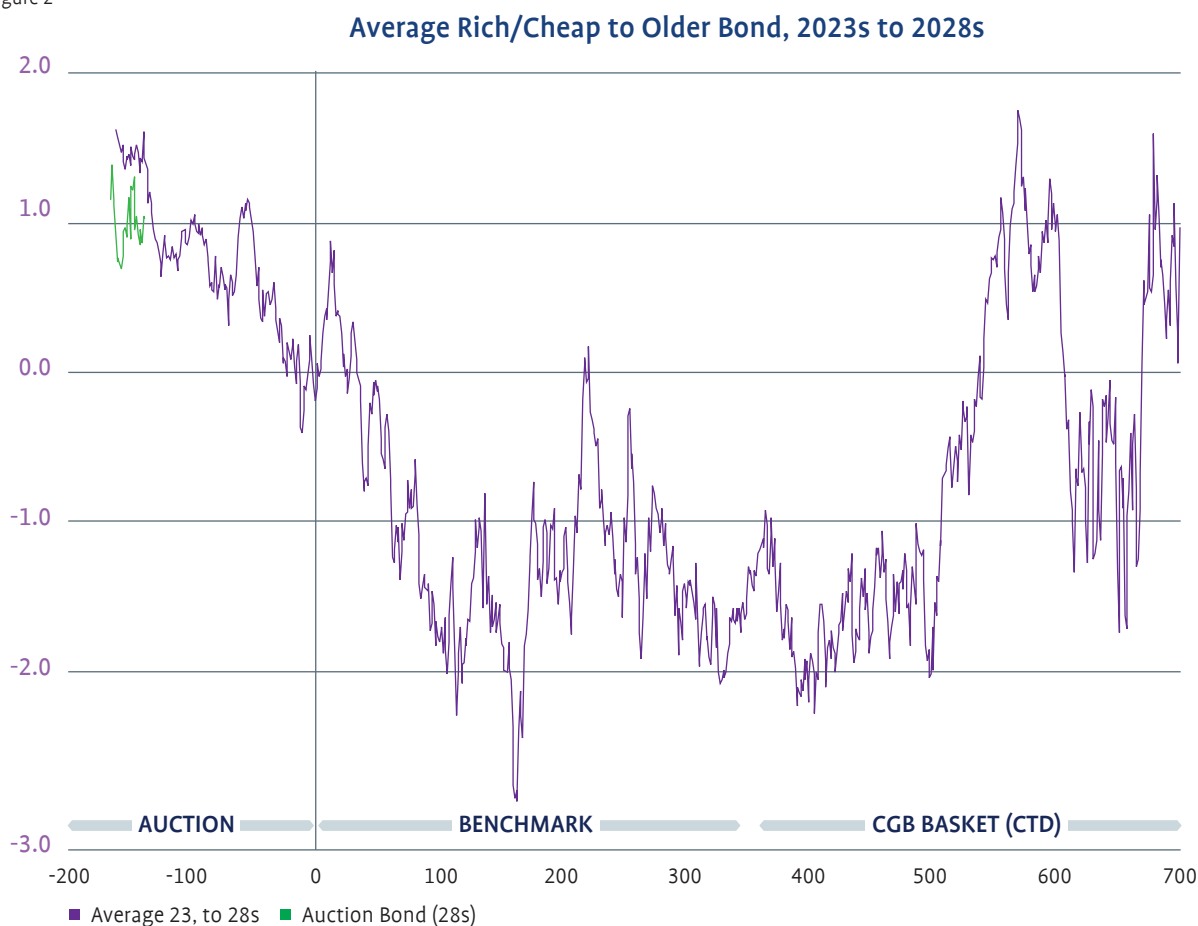
## Empirical Evidence: 2023s to 2028s

While the snapshot in Figure 1 shows a typical day, and can help in quantifying and proving the qualitative predictions of the bond life cycle that was described above, a more interesting approach is to quantify the typical relative valuation of 10-year bonds during each stage of the life cycle, and to make some cursory observations on the potential opportunities at each stage. One can do that by simply comparing the swap spread for each bond to the swap spread of the one-year older bond and re-indexing the dates such that the date the bond is accepted as the benchmark<sup>5</sup> becomes Day 0. Those time series can then be averaged and plotted to show general trends in the relative valuation over the life cycle of each bond.

In Figure 2 we can see that, on average, each bond has been 1-1.5 basis points cheap as it approached benchmark status, then spent its time as benchmark between 0.5-2 basis points rich relative to the previous benchmark. The current auction bond is about 1 basis point cheap by this measure<sup>6</sup>.

The CGB period is a little different and, at least in this recent sample, the benchmark premium disappeared quite quickly after the bond entered the CGB deliverable basket but recurred and disappeared periodically<sup>7</sup>. On average the bond that is the cheapest-to-deliver once it enters the CGB basket is “fair value” but it fluctuates between 1 basis point rich and 1 basis point cheap. This lack of sustained liquidity premium for the cheapest-to-deliver is one of the main reasons Portfolio Managers can utilize the CGB contract in place of the 10-year bond and sustainably outperform<sup>8</sup>.

Figure 2



Source: BMO Capital Markets' Fixed Income Sapphire database

5. We use the benchmark acceptance date here as Day 0 since the period the bond spends as the benchmark is the period for which the relative valuation effect is usually greatest for any given bond. Note, however, that the benchmark acceptance date is not an official event. Some bond and swap desks have been known to move to a new benchmark earlier than others, effectively making the benchmarks bond a matter of opinion. Sometimes a dealing desk will attempt to begin using a new benchmark bond but be forced to switch back to the old bond as the rest of their competitors are not ready to switch yet. The date used here is the date recorded by the Bank of Canada as the first date the bond was used as benchmark.
6. Of course, the date the 2028s will become benchmark is not known at this time but a reasonable assumption has been made for the purposes of plotting the 2028s on this chart.
7. The rich/cheap is driven by the first notice date for CGB contracts which occurs quarterly.
8. Please see recently published paper by the Montréal Exchange: “CGB as a Substitute for 10y Benchmark Bonds.”

If the benchmark bond is usually rich relative to both the CTD and auction bond, it stands to reason that an expected return analysis should indicate a lower expected return from holding the benchmark than either of those other bonds. To determine this, one can conduct an analysis of expected returns expressed in basis points of yield over the next three months arising from pull to par, roll down the curve, and accruals over time, assuming an unchanged yield curve, which is shown in Figure 3.

In the final column of Figure 3 one can see that the expected return in an unchanged term structure is higher for both the CTD (in blue), and the auction bond (in green) than for the current benchmark (in red). Of course, as we discussed initially, the premium associated with the benchmark bond is a premium paid for the additional liquidity embedded in a bond that trades more heavily in both directions each day.

Figure 3

ISSUER	COUPON	MATURITY DATE	PULLTOPAR (BPS)	ROLLODOWN (BPS)	ACCRUALS (BPS)	TOTAL E[R] (BPS)
CDA	2.75%	1-JUN-22	-5.9	2.4	14.5	<b>11.0</b>
CDA	1.50%	1-JUN-23	0.6	2.5	6.9	<b>10.0</b>
CDA	2.50%	1-JUN-24	-2.6	1.9	9.5	<b>8.9</b>
CDA	2.25%	1-JUN-25	-1.3	1.6	7.6	<b>7.9</b>
CDA	1.50%	1-JUN-26	1.0	1.6	4.7	<b>7.3</b>
CDA	1.00%	1-JUN-27	2.2	1.4	2.9	<b>6.6</b>
CDA	2.00%	1-JUN-28	0.0	1.7	5.2	<b>6.9</b>

Source: BMO Capital Markets' Fixed Income Sapphire database

## Conclusions

This analysis of the 10-year bond life cycle leads to a number of conclusions which can be of benefit to asset managers and traders.

First, to the extent possible, overweight exposure to the auction bond and bonds which have already exited the CGB delivery basket. These bonds will exhibit, over time, higher returns than holding the benchmark bond. If a portfolio doesn't truly need the liquidity of the benchmark bond, owning it is akin to paying for something that the portfolio doesn't need.

Second, for portfolios that are able to do so under their mandate, one could construct a portfolio that holds none of the expensive benchmark 10-year bond but uses the CGB contract for any duration needs without paying the liquidity premium that is always embedded in the benchmark but usually missing from the CGB contract. The portion of the portfolio not needed for margin purposes can be held in cash to meet withdrawals, if necessary.

Third, opportunities for active managers arise periodically as bonds age. For instance, an annual trade strategy of accumulating an overweight of the auction bond, waiting for the benchmark change, and then selling after the bond acquires a significant liquidity premium, is a time-tested method of adding a few basis points of outperformance each year. Similarly, active managers using quite simplistic methods of relative value can trade the liquidity premium associated with a loss of benchmark status or the quarterly delivery period of the CGB once the bond enters the basket as the cheapest-to-deliver bond.

Finally, managers with risk tolerance can structure duration-neutral strategies that capitalize on the higher expected returns associated with the auction bond and the older bonds that have already exited the CGB basket. To do so one could overweight<sup>9</sup>, for example, the Canada 2.5% Jun24 and the auction bond while underweighting the benchmark 10-year. Doing so would net a gain of 1.3 bps per quarter using the expected returns in Figure 3 and would experience additional gains or losses only with changes in the curvature or large changes in the slope of the term structure. One could additionally structure this position using short CGB contracts to attain the underweighting, albeit with reduced returns unless the CGB contract is undergoing one of its periodic richening moves around the delivery period. Ideally the manager would take advantage of good entry/exit points as the market prepares to adopt a new benchmark bond.

9. These positions are stated from a cash portfolio point of view. Leveraged managers must take into account the cost of financing the outright positions in the repo/reverse repo market. Repo squeezes can be avoided by using the CGB contract for the underweight/short.

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