

# U20-Z20 Roll Update

August 2020

## Quarterly Roll Summary

For U20 contracts, First Notice day is August 28<sup>th</sup> and the liquid days for the contract roll on both Five-Year and Ten-Yen Government of Canada Bond Futures (CGF and CGB) will probably be August 25<sup>th</sup> and 26<sup>th</sup>. August is typically a less liquid month for bonds but we expect a tranquil roll period given the absence of any factors that would normally inject volatility to the roll.

Given the existing slight cheapness in futures contracts, we expect long positions to attempt to delay rolling and shorts should be inclined to roll as early as possible, assuming front contracts remain cheap and back contracts trade closer to fair value once liquidity in the Z20 contracts picks up.

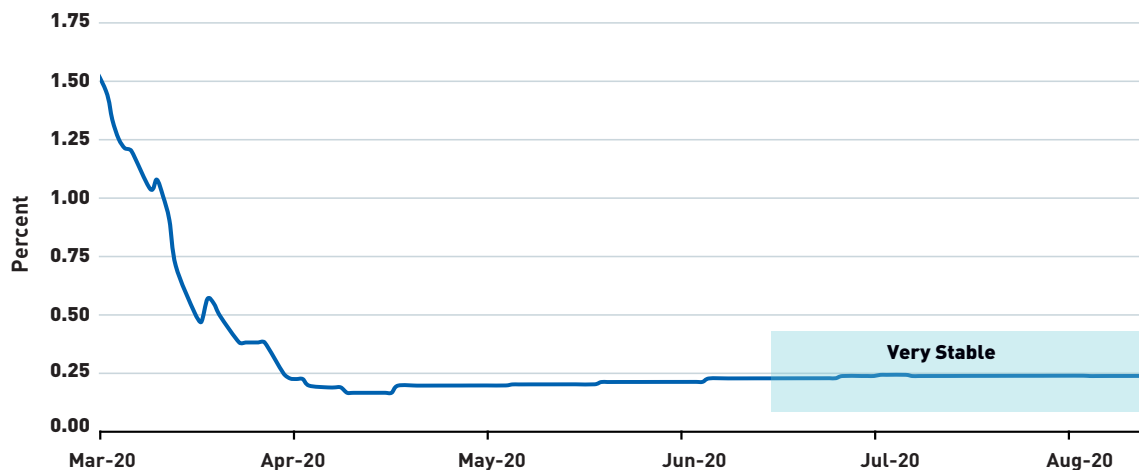
There will be no delivery basket change for the CGB contract this quarter but the CGF cheapest-to-deliver bond (CTD) will change from the 1.25% March 2025 to the 0.5% September 2025. There is a potential story in the shortage of deliverable bonds for the CGB contract as the Bank of Canada has purchased over a third of the Jun29s, the CTD bond for U20 to M21 contracts. Increased issuance of bonds has cheapened auction bonds relative to off-the-run bonds and opportunistic relative value investors may be able to capitalize on this trend.

## Tranquil Roll Period?

Volatile roll periods are driven by three factors, all of which seem to be absent this quarter.

First, a central bank that has overnight rates “in play” can inspire Portfolio Managers to use CGF or CGB as a futures basis play on changes in implied repo rates for the contract versus underlying bonds. With the Bank of Canada firmly on hold and recent discussions focusing on how many quarters or years the overnight target rate will need to remain at 25 basis points, there is really no potential that investors will use contracts as a front-end rate trade. That reality is reflected in the recent history of the Overnight Index Swap (OIS) market, as shown in Figure 1. The period between May and August has been remarkably stable with a consensus on 25 basis points.

**FIGURE 1**  
**CAD 1-Month OIS Since March**



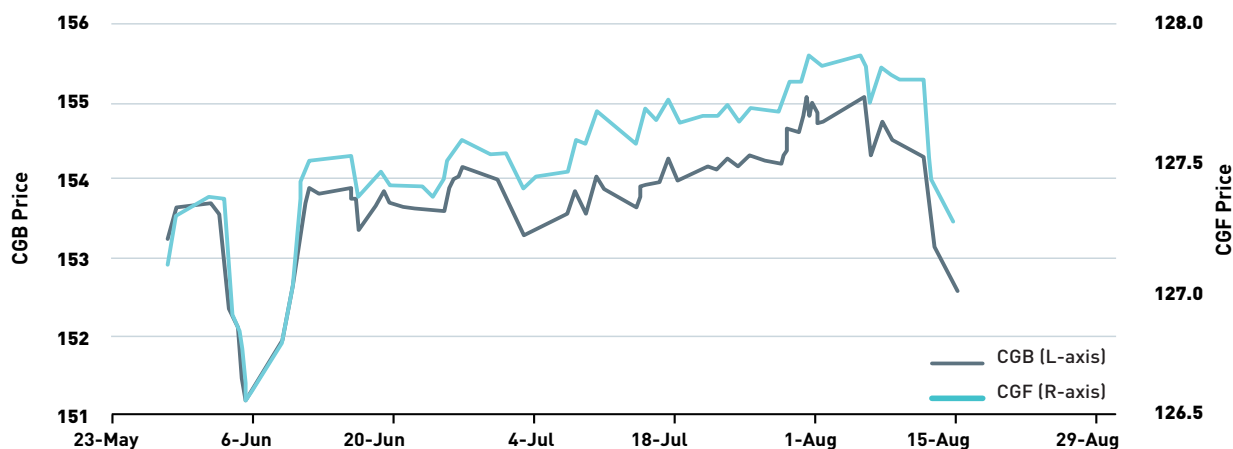
Source: BMO Capital Markets' Fixed Income Sapphire database

Second, some users place value on the embedded options in futures contracts and can value them accurately while others are largely unaware of these options and often accord them little or no value. With no plausible switch of CTD and overnight rates at least 15-20 basis points below bond coupon rates, quality and timing options are literally worthless in today's environment. Only the Wildcard option could potentially be exercised profitably and the probability of that is low, at best. This source of potential volatility in the roll is smaller this quarter than in most recent roll periods.

Third and finally, a supply/demand imbalance may exist between the futures contract and the underlying bonds. This is the scenario we attempt to analyze each quarter by estimating whether speculative portfolios (usually leveraged accounts that dislike or are unable to trade cash bonds for various reasons) have built sizeable long or short positions that they will need to roll or close. These portfolios, often characterized as algorithmic or trend-following strategies, create volatility because they can be "trapped" long or short as the liquidity in the old contract disappears after the roll and the avoid-at-all-costs (for them) delivery period begins.

As shown in Figure 2, prices were volatile and trendless in both CGF and CGB near the start of the contract life, such that trend-following accounts were probably not involved. Further, in the second week of August, any trend-followers that had begun to accumulate long positions as prices rose almost certainly reduced or eliminated those positions.

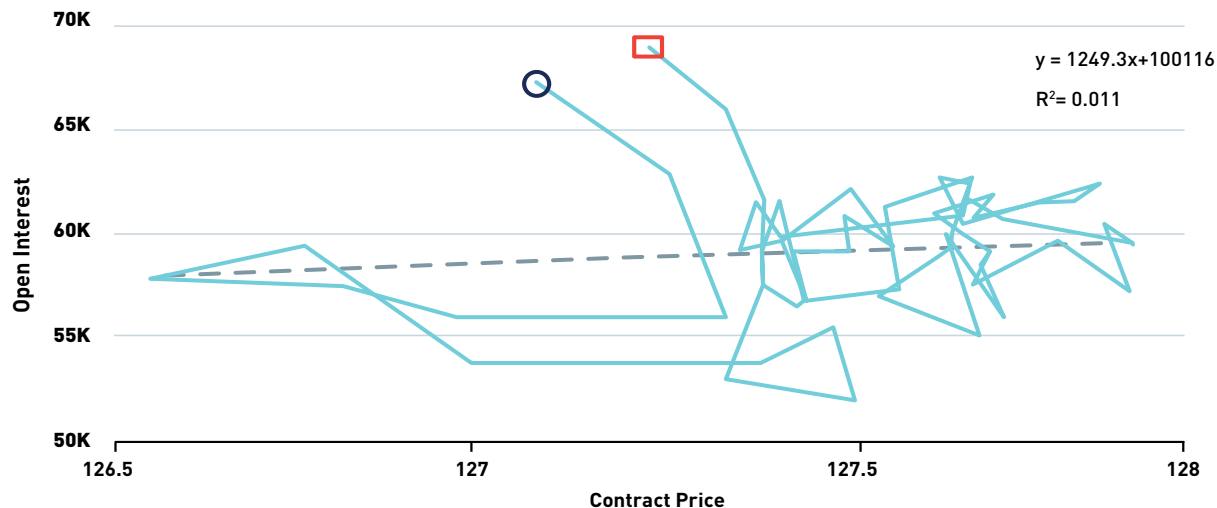
**FIGURE 2**  
**CGF and CGB Price, U20s**



Source: Montréal Exchange

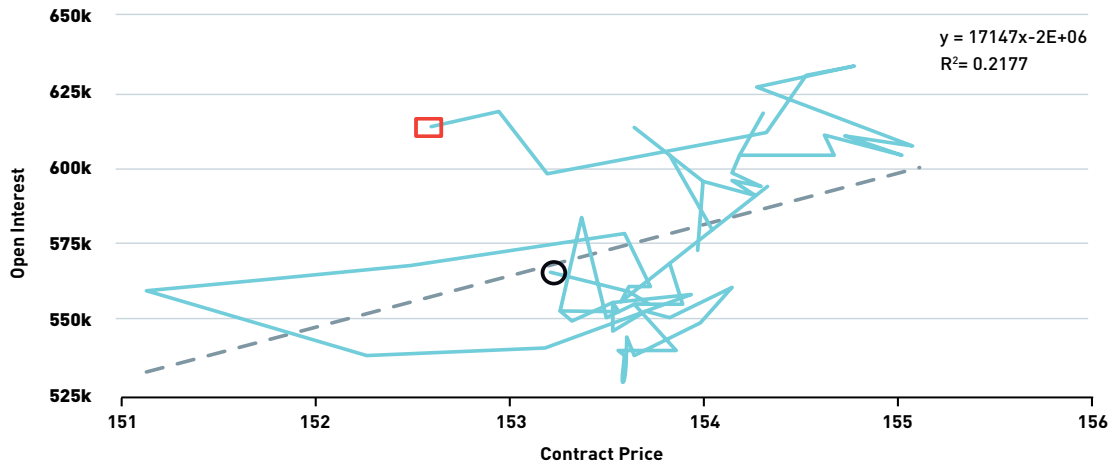
A secondary check using open interest and contract prices reveals that little or no correlation existed this quarter between open interest and price for either CGF or CGB. These plots are shown in Figure 3 and Figure 4, respectively. CGB did have an  $R^2$  of 0.21 but that is below the typical 0.4 where we would say trend-following speculative models have been seriously involved.

**FIGURE 3**  
**CGFU20 Price Versus Open Interest**



Source: Montréal Exchange

**FIGURE 4**  
**CGBU20 Price Versus Open Interest**



Source: : Montréal Exchange

## Cheapest-to-Deliver Switch

Last quarter for the roll update, we wrote that “a recurring theme for physical delivery contracts in Canadian fixed income is the complete lack of a plausible scenario for a CTD switch to occur” and that statement is still true today. Delivery basket math favors high rates and steep curves to increase the probability of a CTD switch and rates are not only at historically low levels, but the yield curve slope between deliverable bonds in the basket is either flat<sup>1</sup> or has even inverted at times.

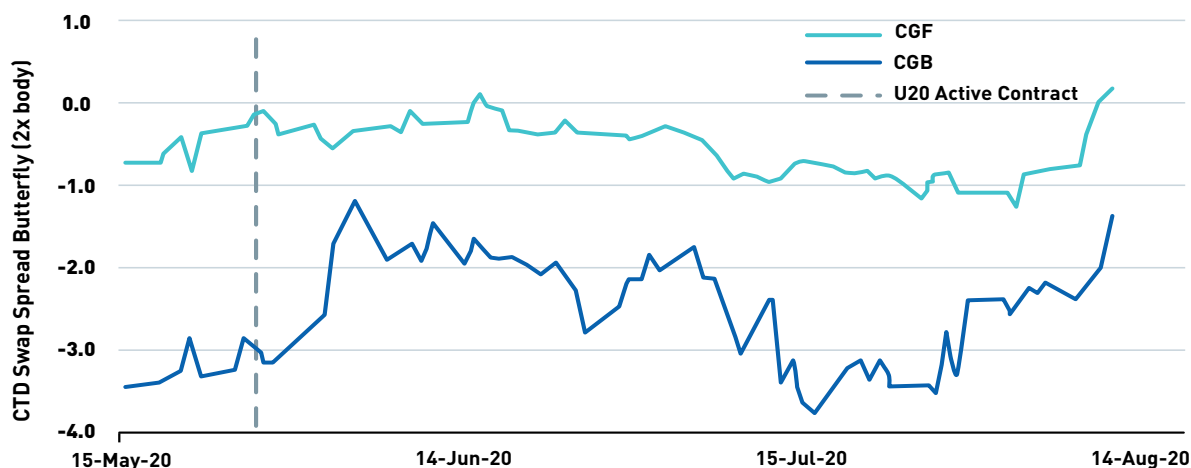
With no reasonable scenario for a switch of deliverable, the embedded quality option and end-of-month options<sup>2</sup> are completely worthless. We discuss the Wildcard potential in a section below.

## Relative Value

Figure 5 plots the swap spread butterfly<sup>3</sup> for the CTD of both the CGF and CGB contracts this quarter. As usual, a move lower on the chart indicates that the CTD became richer relative to its closest neighbour bonds while a move towards the top of the chart indicates the CTD became cheaper relative to neighbour bonds. The vertical grey line indicates the date on which U20 became the active contract.

The figure reinforces a relatively benign CTD relative value picture as the butterfly, in both cases, has traded in a fairly tight range for the entire life of the U20 contracts.

**FIGURE 5**  
**U20 CTD Swap Spread Butterflies**



Source: BMO Capital Markets<sup>6</sup> Fixed Income Sapphire database

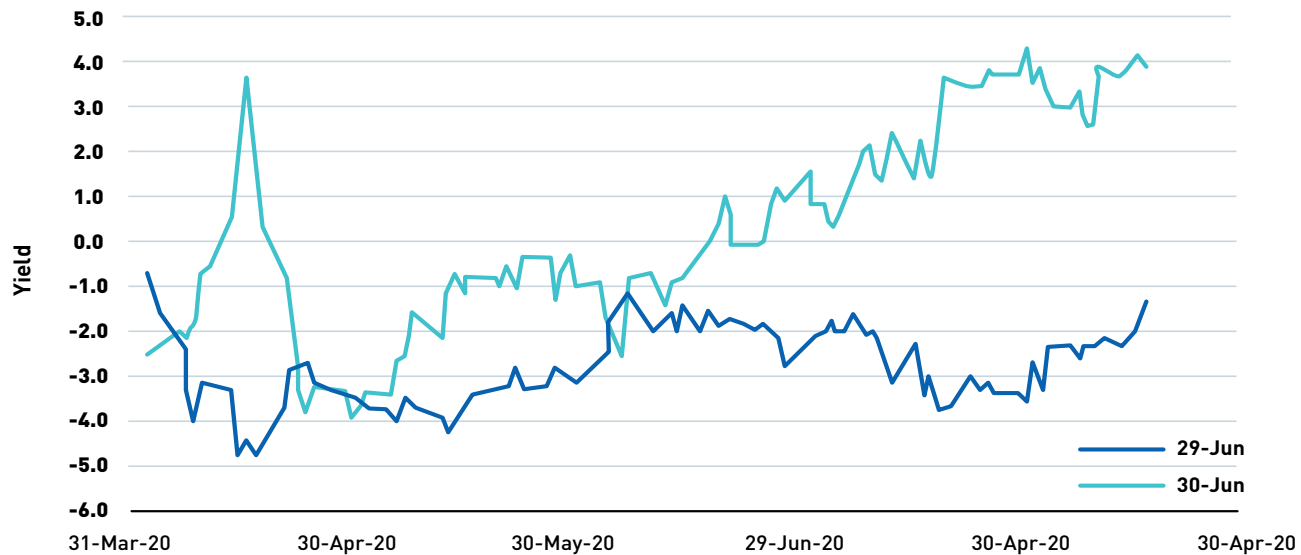
1. Although now a little less flat than in prior quarters.

2. For a full discussion of the embedded options in physical delivery bond futures in Canada, please refer to “[Embedded Options in CGF and CGB](#)” published in November 2018.

3. A common measure of relative value, a swap spread butterfly is constructed by calculating the spread to swaps for the closest similar bonds with maturities before and after the CTD. One then multiplies the spread of the CTD by two and subtracts the spread of the nearest comparator bonds to construct the butterfly. A lower value indicates the CTD (or body of the butterfly) is rich relative to its nearest neighbour (or wing) bonds.

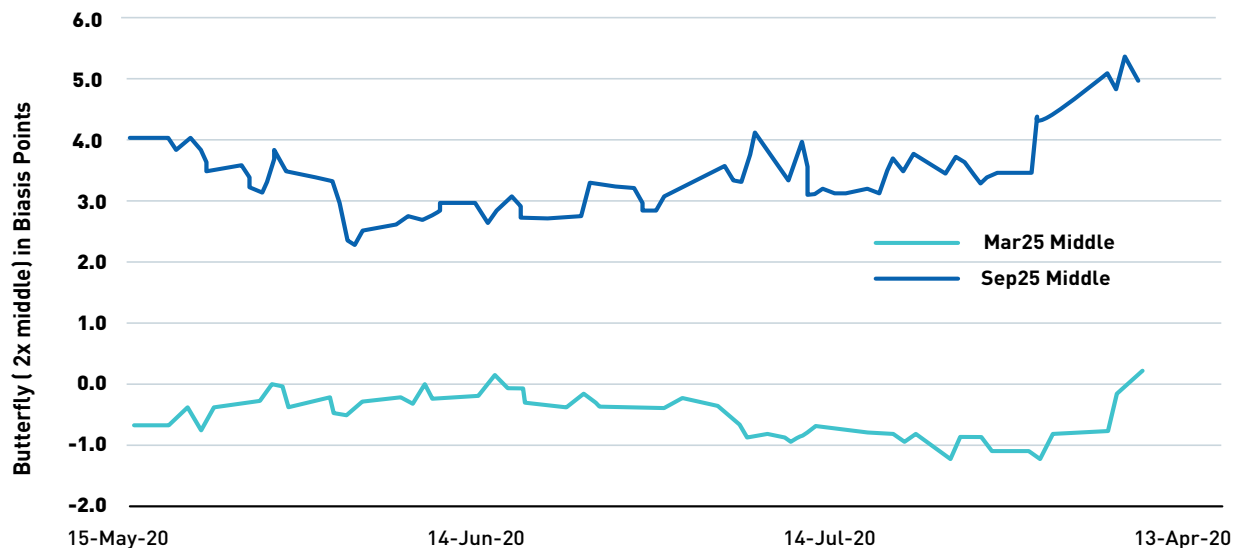
This quarter, much of the relative value activity has occurred in auction bonds cheapening versus neighbour bonds given the upsized issuance program to fund COVID-19 expenditures. Figure 6 shows a plot of the Jun29 swap spread butterfly versus the same relative value measure for the Jun30. In that figure, the Jun30, which is auctioned regularly and now has much more notional outstanding, has sold off rather forcibly versus the Jun29, which is the CTD of the active contract. Nimble managers could take advantage of this difference in relative value by buying the Jun30s and selling the CGBZ20 to cheaply hedge the DV01 risk. A lesser version of this phenomenon has occurred in 5-year bonds and is shown in Figure 7.

**FIGURE 6**  
**Jun30 Versus Jun29 Swap Spread Butterflies**



Source: BMO Capital Markets Fixed Income Sapphire database

**FIGURE 7**  
**Mar25 Versus Sep25 Bond Yield Butterflies**



Source: BMO Capital Markets Fixed Income Sapphire database

## Key Metrics & Expectations

The Key Metrics that may interest a Portfolio Manager with a position in U20 contracts who is contemplating his/her roll strategy this week are shown in Figure 8 and Figure 9. We used closing prices on August 13<sup>th</sup> and have reduced the amount of CTD bonds outstanding by the holdings of the Bank of Canada. Both the Z20 contracts have no open interest so far and the indicated prices, and any analysis driven by the price is not based on a tradeable market level at this time.

Note that, for the first time, the notional amount of bonds needed for full delivery of all CGF contracts in existence will temporarily almost equal the amount available of the Mar25s. This is largely unimportant for CGF, and physical delivery contracts in general, since very few contracts are delivered. The situation is caused solely by reducing the total amount of bonds outstanding by the published holdings of the Bank of Canada, which are now significant.

With coupons on both the CTD of the CGF and CGB contracts currently above the overnight rate, the U20 and Z20 contracts will both carry positively during delivery. Therefore, one should use the Final Delivery date to calculate implied repo or net basis unless the Bank of Canada very unexpectedly raises the overnight rate.

## CGFU20 to CGFZ20

As CGFU20 rolls to Z20, the 1.25% March 2025s will be supplanted as contract CTD by the 0.5% September 2025s. The additional 6 months of maturity coupled with the sharp drop in CTD coupon will combine to create a DV01 per contract roughly 14% higher for the Z20, so open interest could initially decline for the new active contract.

Leading up to the roll period, issuance has been accelerated in bonds but the brunt of increased issuance has been taken by the bonds being auctioned. That means the CTD for U20 has been relatively unharmed while the Z20 CTD, the Sep25s which have seen more issuance volume than anticipated, have sold off on a relative basis as shown previously in Figure 7. In that figure, Sep25s have cheapened by almost 3 basis points since mid-May while Mar25s have cheapened by only a single basis point. As issuance of the Sep25s draws to a close and the Bank of Canada moves on to a Mar26 bond, this gap should inevitably close.

As usual with the CGF contract, we expect a calm and stable roll to occur with no viable reason for volatility to enter the relative pricing of the two contracts. Note that the figure contains a price for CGFZ20 but that price is not yet a “price discovery” level as no open interest exists in the contract. Fair value for the contract roll on August 25<sup>th</sup> is -2.01, significantly different from the -2.13 (taken from settlement price of the Z20 contract that has not yet traded) in the figure.

### FIGURE 8 CGF Key Metrics

13-AUG-2020	FRONT (SEP20)	BACK (DEC20)	DIFFERENCE
Closing Price	127.220	129.350	-2.130
Cheapest-to-Deliver (CTD)	CAN 1.250% Mar 2025	CAN 0.500% Sep 2025	
Delivery Years (Last Delivery)	4.4	4.7	0.3
CTD Conversion Factor	0.8151	0.7756	
CTD Clean Price	103.8270	100.3400	
CTD Yield	0.398%	0.432%	0.034%
Gross Basis (cents)	13.0	1.6	
Net Basis (Final Delivery, cents)	1.1	-7.6	-8.7
Implied Repo (Final Delivery)	0.12%	0.45%	0.33%
DV01/100 of CTD	4.6	5.0	0.4
Open Interest	68,977	0	
CTD Outstanding (millions)	7,823	29,924	22,101
CTD Notional of Front OI	6,898	6,898	
Front OI Multiple of CTD	0.9x	0.2x	-0.7x

Source: BMO Capital Markets' Fixed Income Sapphire database, Montréal Exchange

## CGBU20 to CGBZ20

With the annual CTD change behind us and an absence of speculative positions accumulated this quarter, we expect a very tranquil CGB roll.

The current pricing of the U20 contract, with an implied repo of 0.17%, is a recent phenomenon due to the bond selloff that began August 7<sup>th</sup>. Given the cheapness in U20 and fair value of the Z20 at 22 basis points of implied repo, short positions will probably try to roll early while long positions in U20 will try to wait for prices to better reflect fair value (about 1 cent higher relative to bonds).

One potential exception to the theory of a calm roll period could be if short positions become anxious about the available bonds for delivery. In Figure 9, we have highlighted the Multiple of Outstanding (Front OI Multiple of CTD) metric, which shows that the amount of bonds for CGBU20 that would need to be delivered into all the shorts outstanding would be almost 8 times the number of available bonds. While this is typically not an issue since the number of contracts that go to delivery is around 1% of the peak open interest during the contract, we note that this metric has historically been between 4 and 4.7 times. The difference this quarter is not a lack of bonds, per se, but a lack of available bonds since the Bank of Canada has purchased almost \$4.4 billion of the \$12.3 billion that has been issued, shrinking the bonds available<sup>4</sup> for delivery into short positions.

4. Although the Bank of Canada could always sell some portion of their holdings if the issue became problematic in the CGB market.

## FIGURE 9 CGB Key Metrics

13-AUG-2020	FRONT (Sep20)	BACK (Dec20)	Difference
Closing Price	152.610	150.820	1.790
Cheapest-to-Deliver (CTD)	CAN 2.250% Jun 2029	CAN 2.250% Jun 2029	
Delivery Years (Last Delivery)	8.7	8.4	-0.3
CTD Conversion Factor	0.7475	0.7531	
CTD Clean Price	114.3230	114.3230	
CTD Yield	0.576%	0.576%	0.000%
Gross Basis (cents)	24.7	74.0	
Net Basis (Final Delivery, cents)	1.0	0.9	-0.1
Implied Repo (Final Delivery)	0.17%	0.22%	0.05%
DV01/100 of CTD	9.2	9.2	0.0
Open Interest	613,020	0	
CTD Outstanding (millions)	7,931	7,931	0
CTD Notional of Front OI	61,302	61,302	
Front OI Multiple of CTD	7.7x	7.7x	0.0x

Source: BMO Capital Markets' Fixed Income Sapphire database, Montréal Exchange

## Wildcard Potential

In terms of the potential for a Wildcard option exercise, we calculate and show the price move threshold for CGBU20 during each day of the delivery period in Figure 10, although we expect the conditions for a Wildcard exercise to be absent this quarter. Both CGF and CGB long basis positions are now significantly positive carry, making a Wildcard option exercise far less likely but still possible near the end of the month. Note that there is a FOMC meeting on the 16<sup>th</sup> of September with the usual 2pm (important timing for the Wildcard option) announcement. If a surprise or clumsily worded policy announcement is made that is bullish for bonds, the threshold for Wildcard exercise could be exceeded on this date.

## FIGURE 10 CGBM20 Wildcard Threshold

DATE	Remaining Carry (\$ per contract)	Minimum Δ CTD Price to Exercise Wildcard
28-Aug-2020	208.64	0.618
31-Aug-2020	201.44	0.596
1-Sep-2020	194.25	0.575
2-Sep-2020	187.05	0.554
3-Sep-2020	158.27	0.469
4-Sep-2020	151.08	0.447
8-Sep-2020	143.89	0.426
9-Sep-2020	136.69	0.405
10-Sep-2020	115.11	0.341
11-Sep-2020	107.91	0.319
14-Sep-2020	100.72	0.298
15-Sep-2020	93.53	0.277
16-Sep-2020	86.33	0.256
17-Sep-2020	64.75	0.192
18-Sep-2020	57.55	0.170

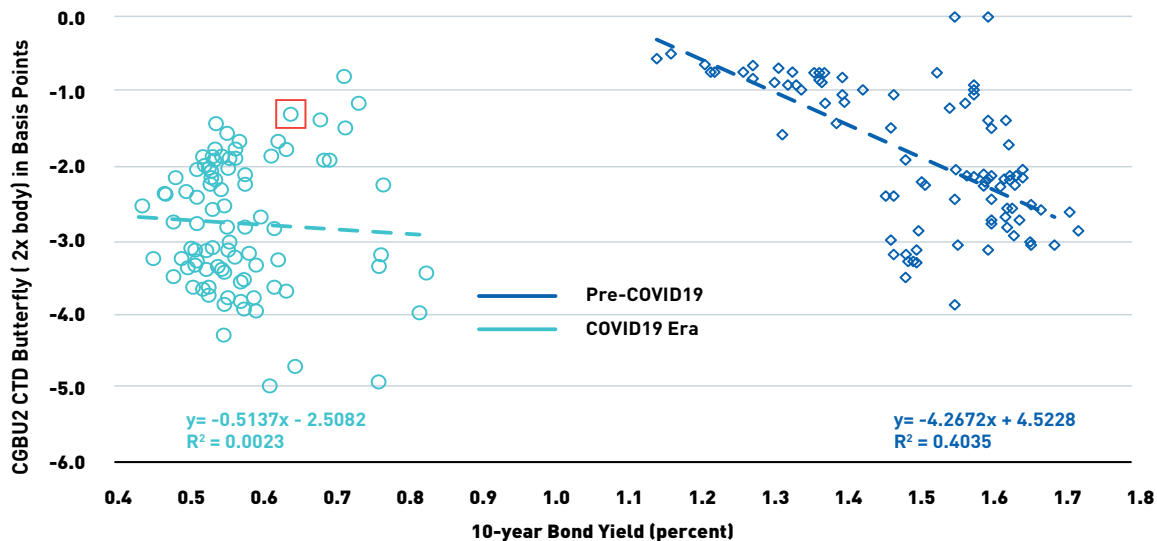
A wildcard exercise in CGFU20 (table not shown) is highly unlikely as it would require more than an 8 basis point fall in yields between 3pm and 5pm at the start of the delivery period and more than 3 basis points at the end.

CDCC Delivery Reports for the M20 contract show that no Wildcard option exercises occurred in the June delivery period when threshold price moves were slightly lower than they are for the U20 contracts.

## Looking Forward & Opportunities

- A market development that is still playing out, we have noticed that in the period before the “COVID Era,” the level of bond yields was a major driver of the richness/cheapness of the cheapest-to-deliver bond; a phenomenon which seems to be no longer observable. Figure 11 separates the previous 10 months into two periods, one before the virus upended financial markets, and one after. While a small sample (so far), the post-virus period has seen a complete disappearance of the 10-year yield driving the richness/cheapness of the cheapest-to-deliver bond. The R2 of the regression has literally fallen to zero.

**FIGURE 11**  
**10-Year Bond Yield Versus CTD Butterfly**



Source: BMO Capital Markets Fixed Income Sapphire database

- The surge in bond issuance to larger benchmark sizes has recently caused relative cheapening in those issues, but not in CGF and CGB contract CTD bonds. Investors may choose to study this developing trend further and capitalize on it by buying the bonds being issued and hedging with futures contracts. One example is given below.
- In the Relative Value discussion above, Figure 6 shows the swap spread butterfly for both Jun30 and Jun29 bonds. The Jun30 has been impacted by the unexpectedly large issuance of 10-year bonds to fund virus relief efforts but the Jun29s, which are no longer auctioned, have not been. A relative value investor could buy the Jun30 and hedge with CGBZ20 in order to achieve a DV01-neutral position that profits on the gap between the relative value of the Jun30 and Jun29 closing as the Bank of Canada moves to a new 10-year bond. A similar, but lower magnitude, trade exists in the 5-year portion of the curve where investors could buy the CGFZ20 and sell the Mar25s to hedge the interest rate risk.
- A new 5-year bond will probably be issued shortly and will be deliverable into the CGFZ20 contract, given current issuance trends. The new bond would probably have a 0.50% coupon and will mature on March 1st, 2026 and has absolutely no impact on the Z20 contract. Virtually no combination of events could make it the CTD for that contract.
- As we have noted in the past, it is almost impossible for the CGBU20 to M21 contracts to have a CTD switch since high coupons and shorter maturities are favored by CTD math. For U20 to M21, the 2.25% June 2029 CTD is a year shorter in maturity and a full percentage point higher in coupon than the next-in-line bond in the delivery basket, making switch potential almost nonexistent until at least the U21<sup>5</sup>.

5. And probably longer given that a new 10-year bond would have an even lower 0.75% coupon at time of writing.

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