CGZ Two-Year Government of Canada Bond Futures

CGF Five-Year Government of Canada Bond Futures

CGB Ten-Year Government of Canada Bond Futures

MONTRÉAL EXCHANGE

U21-Z21 Roll Update

August 2021

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QUARTERLY ROLL Summary

First Notice day is August 30th, so the U21/Z21 roll will probably be most liquid for CGZ, CGF and CGB on August 25th and 26th with plenty of opportunities for final cleanup on Friday the 27th for patient clients.

Trading algorithms are probably long CGBU21 and perhaps even, to a lesser extent, CGFU21 which will likely cause pricing pressures that push U21 cheaper relative to Z21 early in the roll. CGBU21 has broken the "cheap futures" paradigm that has existed for the past several contracts and now trades fair, or even slightly rich, relative to its cheapest-to-deliver (CTD) bond. Opportunities for relative value managers may exist in CGB due to this change in combination with a richening of the CTD versus neighbour bonds.

The lower coupon on the CGBU21 CTD (versus the M21) will create more abundant opportunities for Wildcard option exercise if futures short position holders are so inclined.

Note: Last Delivery day for U21 physical delivery fixed income futures contracts was changed[1] to September 29th due to the creation of the National Day for Truth and Reconciliation national holiday in Canada. Last Trading, Expiration and Last Notice days have also changed in accordance with the standardized contract dates.

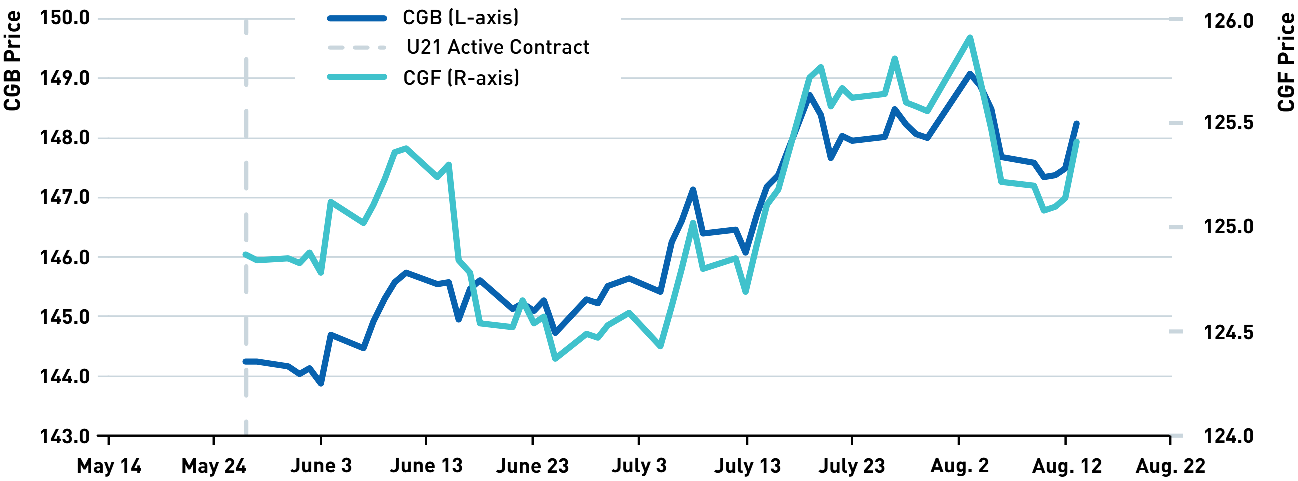
1 See Circular 131-21 and 132-21 for details.

Speculative Positioning

Prices in 5-year and 10-year Government of Canada bond futures (CGF and CGB) resembled each other but diverged more than in recent quarters as shown in Figure 1. CGF had more price volatility and sharper, larger reversals than did CGB which followed a relatively smooth path to higher prices during the life of the contract. Both contracts had a significant reversal of about 15 basis points in early August that may have caused some trend following models to partially remove risk positions that were built up as the trend progressed.

FIGURE 1

CGF & CGB Price, U21s



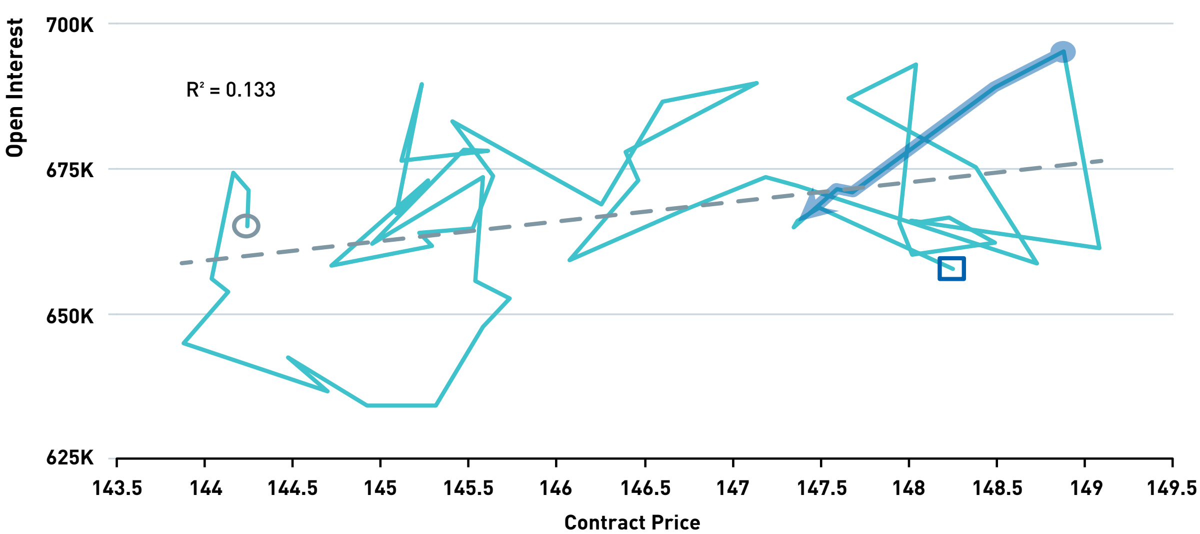
Source: Montréal Exchange

As we do every quarter, we calculated the r-squared for a regression of each contract open interest against price during the life of the contract. For CGZ, this analysis contained no useful information this quarter although we note that open interest in this contract has continued to build and has recently surpassed the 50,000 contract threshold.

For CGB, this analysis confirms that positions were closed out during the early August selloff that broke the sustained trend to higher prices but that only about 30k of positions came off during the August 4th to August 11th period. The plot of open interest and price for CGB during the period CGBU21 was the active contract is shown in Figure 2. The overall trend during the contract life doesn't seem to have been to higher open interest as the R^2 of a regression between price and open interest during the contract life is only 0.13 with just a slight tendency to higher open interest as prices rose.

FIGURE 2

CGBU21 Price versus Open Interest

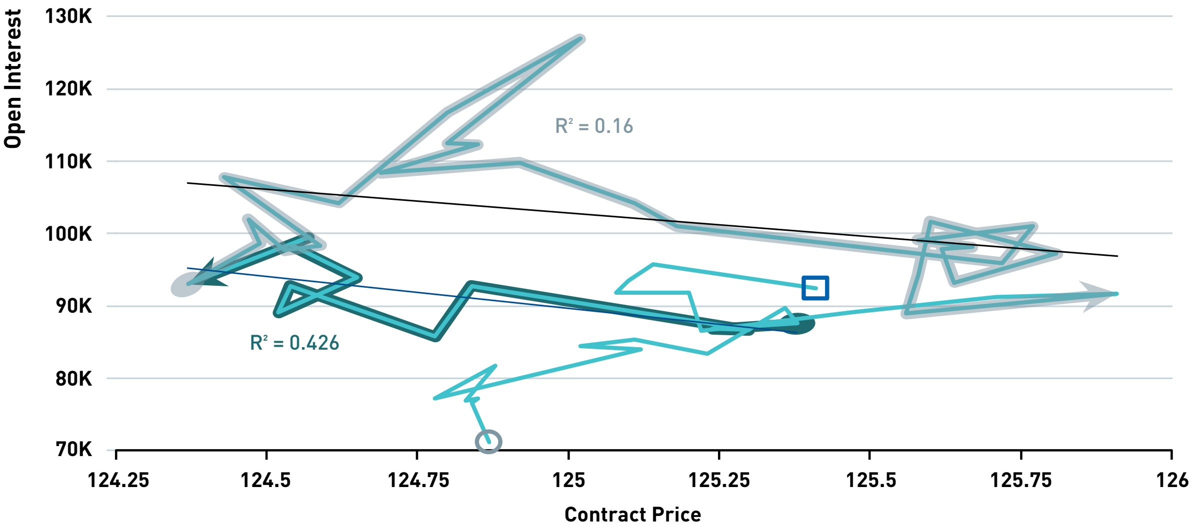


Source: Montréal Exchange

The strongest correlation occurred in CGF (5-year) but we've been forced to dissect the quarter into periods of price rises and falls. After this analysis, price was a reasonably significant explanatory variable given the R^2 of 0.16 for the sustained rally and 0.426 for the selloff as shown in Figure 3. As an aside to the analytic conclusions, we interpret this new correlation between open interest and prices as a positive sign for liquidity in the CGF contract as it would appear to indicate that some clients that run trend models may have added the contract to their list of potential instruments in Canadian interest rates markets. Indeed, the open interest for this contract briefly surpassed the 120,000 contracts threshold this quarter, which should confirm the ongoing liquidity build and attract new clients to the product.

FIGURE 3

CGFU21 Price versus Open Interest



Source: Montréal Exchange

Cheapest-to-Deliver Switch

When interest rates are low and relatively flat, possibilities for a switch in the cheapest-to-deliver (CTD) fade to near-impossible and we continue to observe few scenarios in any of the fixed income physical delivery futures contracts that result in switch potential. The potential for switches, is highest when curves are steep and yields approach the nominal coupon of the futures contract when calculating the bond conversion factors; currently set at a very distant 6% level. In the current environment, contracts will continue to be near-perfect substitutes for the shortest maturity bond in the basket.

In fact, switch potential is so remote for contracts at this time that we will omit the usual tables of yield and slope scenarios that result in a change in CTD and replace them with a space-saving list of approximations to the nearest CTD switch.

- CGZ: +175 basis points in 2-year yield combined with +42 basis points steepening between the August and November 2023 GoC bonds. The former is highly unlikely and the latter virtually impossible.
- CGF: +165 basis points in 5-year yield combined with +30 basis points steepening between the September 2026 and March 2027 GoC bonds. Both are highly unlikely and the combination virtually impossible. Since there is currently only a single bond in the delivery basket, we used a hypothetical 1% March 2027 bond (probably the next to be auctioned) to calculate the switch potential for CGFZ21.
- CGB: +160 basis points in 10-year yield combined with +24 basis points steepening between the June 2030 and December 2030 GoC bonds. While more plausible than the CGZ or CGF scenarios, this scenario for CGB still falls into the "incredibly unlikely" category.

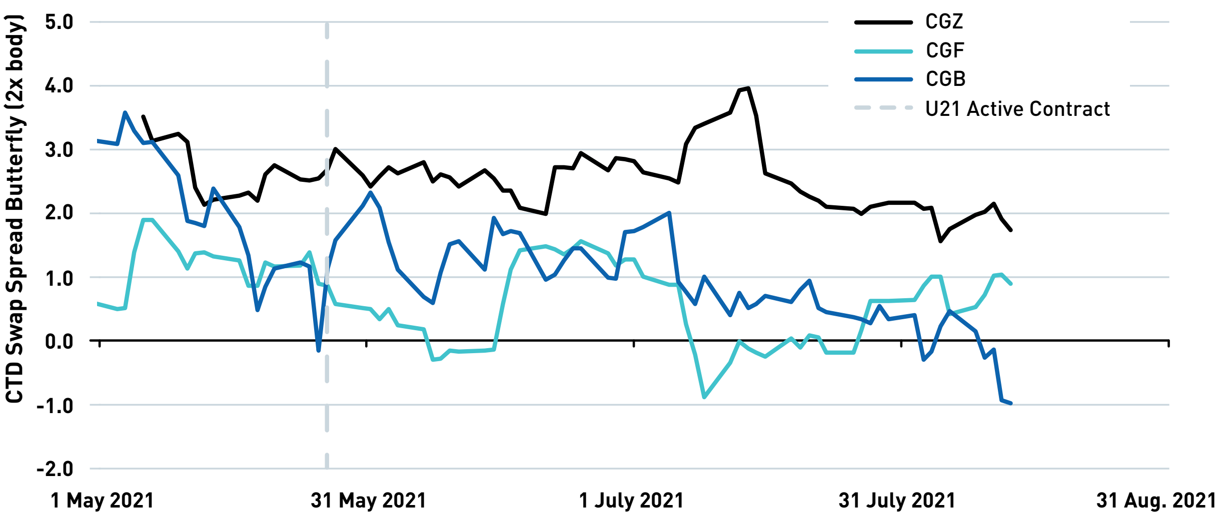
Relative Value of the CTD Bonds

Relative value changes between the cheapest-to-deliver bonds for the CGFU21 and CGBU21 contracts look like an opportunity.

As one can easily see in Figure 4 where we have plotted the closest-neighbour swap spread butterfly[2] for the CTD bonds of CGZ, CGF, and CGB U21 contracts, the CGF and CGB swap butterflies have moved in opposite directions recently. Specifically, the CTD for CGBU21 has richened versus near-neighbour bonds while the CTD for CGFU21 has cheapened. This may be because the March 2026, current CTD for CGFU21, will lose benchmark 5-year bond status shortly in addition to losing CTD status as it exits the delivery basket for CGF. Meanwhile the June 30, CTD for the CGB contract until June 2022, has steadily richened during the quarter. The June 2030 is now at its richest point relative to neighbour bonds since the beginning of 2021.

FIGURE 4

U21 CTD Swap Spread Butterflies

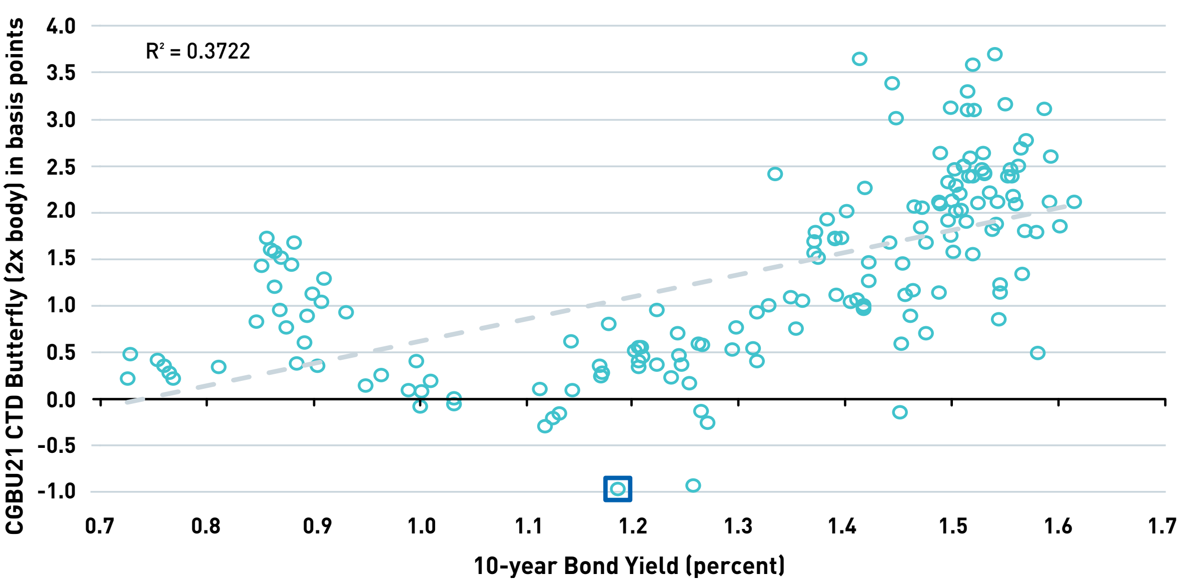


Source: BMO Capital Markets[i] Fixed Income Sapphire database

The observed richening of the CGBU21 (and Z21 since there is no change of CTD this quarter) CTD is often driven by the direction of 10-year rates in Canada and this continues to be true in 2021. Figure 5 shows both the relatively strong explanatory power of yields (R^2 of 0.37) on the CTD swap spread butterfly as well as the current richness (butterfly level very low on the chart, far from the trend line) of the June 2030, CTD for the CGBU21 and Z21 contracts, versus neighbour bonds.

FIGURE 5

10-year Bond Yield versus CTD Butterfly



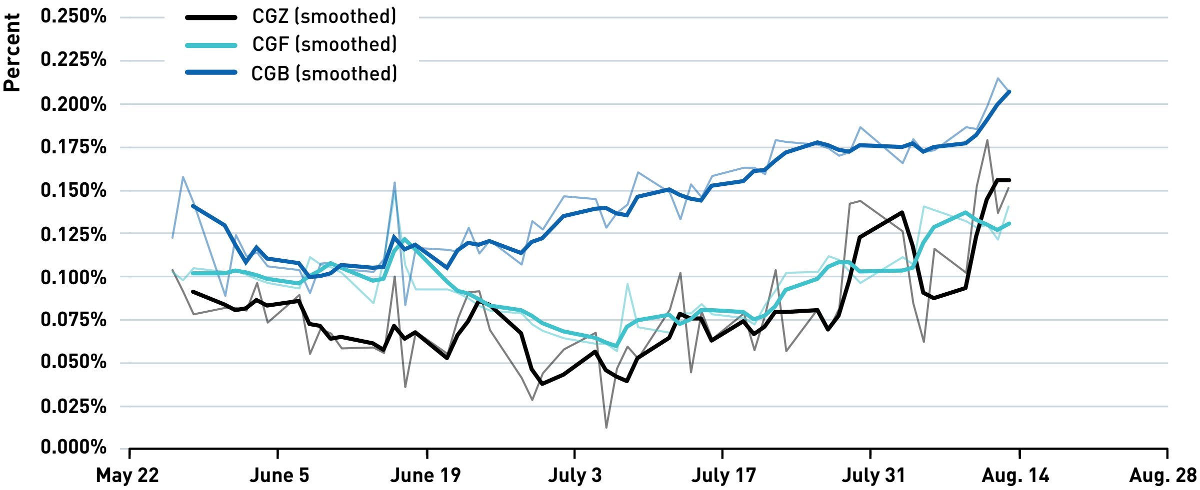
Source: BMO Capital Markets[i] Fixed Income Sapphire database

2 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.

Another interesting relative value development for CGBU21 is that the contract, as has become normal in recent months for futures contracts, has spent most of its life as the active contract trading cheap relative to the CTD with implied repo levels on the contract in the 10-15 basis point range; an observation that could be made about all three physical delivery bond futures contracts in Canada. Recently, CGBU21 has broken this paradigm and now trades at fair value to the short-term interest rate levels implied by the overnight interest rate swap market. This richening of contracts, especially apparent in CGB but also observed to a lesser extent in CGZ and CGF, is shown in Figure 6.

FIGURE 6

Implied Repo: CGZ, CGF, CGB



Source: BMO Capital Markets[i] Fixed Income Sapphire database, Montréal Exchange

Relatively rich contracts, versus a month ago, combined with a relatively rich CTD bond should mean there are opportunities for relative value managers, or even cash portfolio managers, to use CGB as a duration hedge to bond positions; perhaps in steepening (5-10) or flattening (10-30) trades that involve the 10-year point or as a duration hedge while purchasing auction bonds.

Key Metrics & Expectations

Key Metrics that may interest a Portfolio Manager with a position in U21 contracts who is contemplating his/her roll strategy this week are shown in Figure 7, Figure 8, and Figure 9. We used closing prices on August 13th and have reduced the number of CTD bonds outstanding by the holdings of the Bank of Canada, although we strongly feel that even a moderate CTD squeeze like what was experienced in the CGBM21 contract recently is now very unlikely due to a greatly increased supply of CTD bonds. Only a tiny amount of CGBZ21 had traded on our price capture date, and both CGZ and CGF had zero open interest at that time, so the indicated prices for the September contracts, and any analysis driven by the price, is not based on a tradeable market level at this time.

CGBU21 to CGBZ21

Compared to the previous roll in late May, there will be less volatility and opportunity in the U21 to Z21 CGB (10-year) roll. With no change in the expected CTD bond between contracts, the DV01 of the Z21 contract will be 99% of the DV01 of the U21 contract and the roll price should be stable unless interest rates become very volatile during the roll period. CGBU21 currently prices almost exactly fair versus its CTD at 0.21% implied repo; a level that is actually quite unusual given the recent prolonged cheapness in futures relative to bonds.

As argued in the section on speculative positioning above, we believe trend following models in portfolios that must avoid the delivery period are long with moderate risk allocations this quarter. Price pressure early in the roll will probably come from long positions seeking to sell U21 and buy Z21 to maintain positions or even to sell U21 outright if using the roll liquidity to close existing positions. With little chance of early delivery due to highly positive carry in the delivery period, these clients may not feel much urgency to trade, unlike in the CGF roll this quarter which is discussed in its own section below.

FIGURE 7

CGB Key Metrics

13-AUG-2021	FRONT (SEP21)	BACK (DEC21)	DIFFERENCE
Closing Price	148.250	146.380	1.870
Cheapest-to-Deliver (CTD)	CAN 1.250% Jun 2030	CAN 1.250% Jun 2030	No change
Delivery Years (Last delivery)	8.7	8.4	-0.3
CTD Conversion Factor	0.6803	0.6873	
CTD Clean Price	100.9770	100.9770	
CTD Yield	1.133%	1.133%	0.000%
Gross Basis (cents)	12.3	37.0	
Net Basis (Final Delivery, cents)	0.5	-0.1	-0.7
Implied Repo (Final Delivery)	0.21%	0.25%	0.04%
DV01/100 of CTD	8.4	8.4	0.0
Open Interest	657,710	36	
CTD Outstanding (millions)	27,285	27,285	0
CTD Notional of Front OI	65,771	65,771	
Front OI Multiple of CTD	2.4x	2.4x	0.0x

Source: BMO Capital Markets[i] Fixed Income Sapphire database, Montréal Exchange

CGZU21 to CGZZ21

The 2-year contract has surged quickly to an open interest of over 50,000 contracts at one point this quarter but still represents just 30% of the amount of CTD outstanding and has plenty of room to expand. The CTD will change from the May 2023 issue to the August 2023 GoC bond for the next contract, as usual with the CGZ, a relatively negligible maturity extension. Notably, the 2% September 2023, an old 3-year bond that qualified for the CGZU21 delivery basket but was virtually impossible as CTD, will not qualify for delivery into CGZZ21 as it has not been reopened by the Bank of Canada, a requirement for old 3-year bonds under the contract specifications.

Yield changes in 2-year bonds have been muted for about a year but have started exhibiting some volatility again. CGZU21 currently prices slightly cheap to bonds with an implied repo level of 0.12% to delivery, or about 1 cent cheap. We do not expect the duration extension to be a factor in the CGZ roll and the price of the roll should be quite stable; the entire roll will probably be executed within a 2-cent range. Given the expected stability, we anticipate the roll to trade at fair value, roughly 20.3 cents on August 25th given the 2-year interest rate at time of writing. We cannot make any prediction of price pressure on the CGZ roll using our usual analytical methods this quarter.

FIGURE 8

CGZ Key Metrics

13-AUG-2021	FRONT (SEP21)	BACK (DEC21)	DIFFERENCE
Closing Price	109.615	109.425	0.190
Cheapest-to-Deliver (CTD)	CAN 0.250% May 2023	CAN 0.250% Aug 2023	Change!
Delivery Years (Last delivery)	1.6	1.6	0.0
CTD Conversion Factor	0.9101	0.9101	
CTD Clean Price	99.7760	99.6150	
CTD Yield	0.382%	0.448%	0.066%
Gross Basis (cents)	1.5	2.7	
Net Basis (Final Delivery, cents)	1.5	2.7	1.2
Implied Repo (Final Delivery)	0.12%	0.18%	0.06%
DV01/100 of CTD	1.7	1.9	0.2
Open Interest	45,639	0	
CTD Outstanding (millions)	13,545	14,710	1,164
CTD Notional of Front OI	4,564	4,564	
Front OI Multiple of CTD	0.3x	0.3x	0.0x

Source: BMO Capital Markets[i] Fixed Income Sapphire database, Montréal Exchange

CGFU21 to CGFZ21

The CTD for CGF will change from the March 2026 bond to the September 2026, the current auction bond, and the latter bond is, at this time, the only one eligible for delivery into CGFZ21. As usual, by delivery time, a new bond will be created via the Bank of Canada auction process, which will almost certainly qualify for inclusion in the basket by December. At this time the new bond would be a 1% coupon but that may change as interest rates fluctuate over the next few weeks.

An implied repo of just 0.14% at time of writing means CGFU21 still prices cheap relative to bonds but not by the amount observed shortly after the contract became the active contract. Due to the low 0.25% coupon, if CGFU21 prices above fair value at any point, gross basis could turn negative which would, potentially, trigger early delivery. The relative pricing between CGFZ21 (no open interest at time of writing) and the CTD for this contract will probably change from recent indications which imply a very high gross basis and consequently low implied repo level. We suspect the contract will trade much closer to fair value than recent price indications imply.

Given the threat of early delivery and the long positions that we suspect delivery-shy algorithmic models hold, we expect the CGF roll to begin early and be driven by liquidity seekers on the long side of CGFU21; price pressure will be to sell U21 and buy Z21 to continue existing positions or to sell U21 outright if closing existing positions. Shorts in CGFU21 may find it profitable to be patient as pricing pressures develop during the roll.

Although open interest is hitting record highs each quarter recently, open interest in CGF remains manageable for all participants and both hedgers and speculators will probably view this contract roll as a simple continuation of previous positions. Although some encouraging signs of speculative, model-driven activity in this contract are now emerging, we suspect most participants are using the contract as a bond substitute or longer-term hedge.

FIGURE 9

CGF Key Metrics

13-AUG-2021	FRONT (SEP21)	BACK (DEC21)	DIFFERENCE
Closing Price	125.410	125.600	-0.190
Cheapest-to-Deliver (CTD)	CAN 0.250% Mar 2026	CAN 1.000% Sep 2026	Change!
Delivery Years (Last delivery)	4.4	4.7	0.2
CTD Conversion Factor	0.7761	0.7960	
CTD Clean Price	97.3430	100.4487	
CTD Yield	0.848%	0.909%	0.060%
Gross Basis (cents)	1.2	47.1	
Net Basis (Final Delivery, cents)	1.2	19.3	18.1
Implied Repo (Final Delivery)	0.14%	-0.27%	-0.41%
DV01/100 of CTD	4.4	4.9	0.5
Open Interest	92,393	0	
CTD Outstanding (millions)	14,780	12,056	-2,724
CTD Notional of Front OI	9,239	9,239	
Front OI Multiple of CTD	0.6x	0.8x	0.1x

Source: BMO Capital Markets[i] Fixed Income Sapphire database, Montréal Exchange

Wildcard Potential

Unlike for the previous four CGB (10-year) contracts, the carry during the delivery period for the U21 contract is not as positive due to the lower coupon on the new CTD. As such, the potential for Wildcard exercise is heightened versus previous contracts in CGB. The threshold for Wildcard option exercise is shown below in for each day during the delivery period. At the start of delivery, a minimum 2 basis point fall in yield ($0.239 rise in price) between 3pm and 5:30pm is required to make the Wildcard option profitable to exercise but the threshold falls to just a single basis point by September 10th. There is a far better chance of profitable Wildcard option plays with the new CGB CTD than with the previous.

FIGURE 10

CGBU21 Wildcard Treshold

DATE	REMAINING CARRY ($ PER CONTRACT)	MINIMUM ΔCTD PRICE TO EXERCISE WILDCARD
30-Aug-2021	112.38	0.239
31-Aug-2021	108.37	0.231
1-Sep-2021	104.36	0.222
2-Sep-2021	88.30	0.188
3-Sep-2021	84.29	0.179
7-Sep-2021	80.27	0.171
8-Sep-2021	76.26	0.162
9-Sep-2021	64.22	0.137
10-Sep-2021	60.21	0.128
13-Sep-2021	56.19	0.120
14-Sep-2021	52.18	0.111
15-Sep-2021	48.16	0.102
16-Sep-2021	36.12	0.077
17-Sep-2021	32.11	0.068

CGZ and CGF are almost perfectly flat carry but high conversion factors in CGZ make Wildcard option attempts there unlikely as the profit potential is low[3]; investors can probably find better opportunities than CGZ Wildcard option plays.

Just like last quarter, there is a decent chance at successful Wildcard exercise in CGFU21 (5-year), although we have rarely observed them in this contract. Since the contract is almost exactly zero carry[4], the threshold price increase in the CTD for a successful Wildcard option exercise is essentially zero during the entire delivery period.

CDCC Delivery Reports[5] for CGZM21 and CGFM21 contracts show a few thousand of each contract were delivered during the June delivery period, some early due to the flat carry on these contracts, but we don't believe any of these deliveries were Wildcard option exercises. In CGB, more than 25,000 contracts were taken into the delivery period, a significant trade that we wrote about in detail shortly after delivery concluded. Interested investors can read about the CGB June delivery in "Delivery Drought Ended" published by MX in July[6].

3 Profit potential in embedded Wildcard options is greater when conversion factors are farther from 1. In the CGZU21 case, the conversion factor for the CTD is 0.9101, much higher than that of the CTD for CGF or CGB contracts, making the potential profit low, even if a scenario arose to exercise the option.

4 The much higher coupons for the CTD in CGFZ21 and onward will probably eliminate Wildcard option opportunities for at least the next few CGF contracts.

5 CDCC Delivery Reports available on the CDCC website (Delivery Reports page).

6 https://www.m-x.ca/f_publications_en/futures_flash_article3_en.pdf

LOOKING FORWARD & Opportunities

- Versus recent contracts, CGB is rich to bonds and its CTD is rich to neighbouring bonds, which may create opportunities for relative value portfolio managers.
- Relative Value opportunities still exist as auction bonds purchased against hedges of CGB and CGF contracts are almost always attractive. In addition, owning futures contracts in lieu of benchmark bonds appears attractive in CGF given the continued cheapness of that contract relative to its CTD, discussed above.
- Futures remain a popular way to execute 5-10 curve trades quickly and cheaply in Canada. Exchange-executed curve trades continued this quarter and almost 90,000 units of steepening/flattening trades were executed in the 2CGFU21-1CGBU21 strategy on Montréal Exchange already this quarter. Volume in the U21 strategy is about 10,000 contracts less in the U21 contracts than it was in the M21 contracts but will probably end up surpassing the previous record of just under 100,000 contracts by the expiry of the U21 contracts.
- The (relatively) high coupon 2% September 2023 that was eligible for delivery into the CGZU21 contract will not be eligible for CGZZ21 unless it is reopened by the Band of Canada (unlikely). In previous analyses, we have found that it is difficult at low rates for an old 3-year bond to ever become the CTD for the CGZ contract.
- In early 2020, when the Bank of Canada began to accumulate large positions in bonds, we expressed concern that it could lead to a scarcity of bonds to deliver and cause volatility in contract rolls. Those fears initially proved unfounded but the delivery activity in CGBM21 eventually proved out our worries. However, given the much larger issue size of the new crop of CTD bonds for all contracts, including CGB now, we believe there is little chance that CTDs become scarce enough to repeat the delivery experience of CGBM21.

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