

M21-U21 Roll Update

Quarterly Roll Summary

First Notice day is May 28th and the M21/U21 roll will be sandwiched between the May 24th Victoria Day holiday in Canada and the (likely) early close on May 28th for the Memorial Day long weekend in the USA. Liquid days for the contract roll on CGZ, CGF and CGB will probably be May 25th and 26th with some final cleanup extending into the 27th for patient clients.

The CGZ (2-year Government of Canada bond futures) contract will have a change of cheapest-to-deliver (CTD) bond when the active contract switches from M21 to U21 but the focus of this roll will inevitably be the CGB (10-year) contract and the large duration extension as the once-per-year change in the cheapest-to-deliver occurs. The duration extension is usually a significant market event, which makes this roll period in CGB unlike the others¹. There is no change of the delivery basket for the CGF (5-year) contract this quarter.

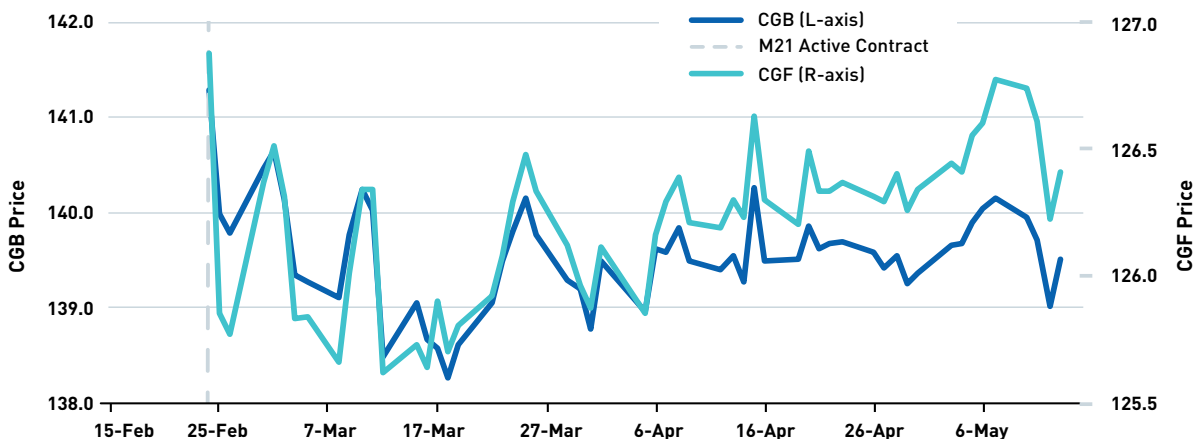
Although the Bank of Canada owns considerable amounts of the deliverable bonds for all three contracts, they have not only committed to repo operations with these bonds, but also recently reinforced their commitment to orderly bond financing markets by increasing the maximum amount an individual participant can bid in the daily Securities Repo Operation.

Speculative Positioning

As shown in Figure 1, prices in 5-year and 10-year Government of Canada bond futures (CGF and CGB) followed similar patterns in the first half of the quarter before diverging for the second half as CGF rallied largely without CGB participation. Both contracts suffered some serious trend reversals in the second quarter, including a severe reversal of over \$1.50 in late March for CGF and another 20+ basis point break in early May.

Given the choppy quarter, we find little evidence that speculative investors with a trend following strategy have much risk allocated to CGB. The trend models created by Macro Hive² in collaboration with Montréal Exchange show that, taken alone, trend models in both CGF and CGB this quarter have either given alternating buy/sell signals or split signals where 1-month and 3-month lookback models disagree.

FIGURE 1
CGF & CGB Price, M21s



Source: Montréal Exchange

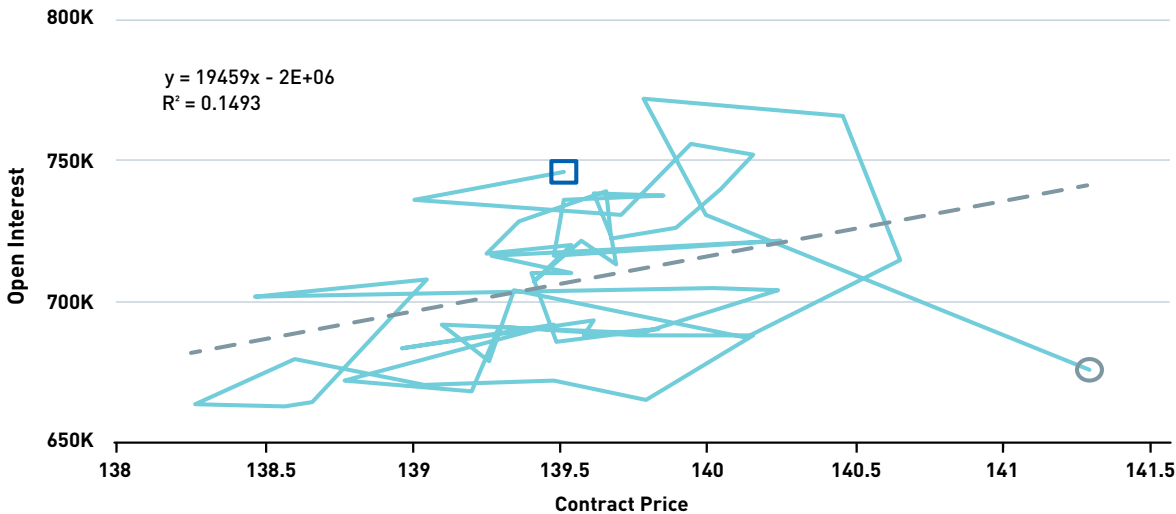
¹ See "Jun/Sep CGB Roll: A Roll Unlike the Others" published by MX in April 2021

² For more, go to m-x.ca/macrohive

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. Unfortunately, this analysis is inconclusive for all contracts this quarter. CGZ, CGF and CGB June contracts neither increased in open interest nor decreased to a significant amount due to price movements, which means no conclusions can be drawn about the involvement of algorithmic portfolios or their likely positions at this time. However, we feel these models would be quite light on risk given the recent price trend reversal in both CGF and CGB, and still doubt many algorithmic models are involved yet in the more recently launched CGZ.

The strongest correlation occurred in CGB (10-year) but price was an insignificant explanatory variable given the r-squared of just 0.15 shown in Figure 2. CGZ (2-year) and CGF (5-year) were even weaker and we omit their charts this month.

FIGURE 2
CGBM21 Price versus Open Interest



Source: Montréal Exchange

Cheapest-to-Deliver Switch

For several quarters now, we have written that no one should assign much more than a zero probability for a switch in cheapest-to-deliver in any of the physical delivery contracts and that argument remains true even after the recent selloff. Switches, or 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 a very distant 6%. Contracts have been, and will continue to be, near-perfect substitutes for the shortest maturity bond in the basket. Switch potential is so remote for CGZ and CGF this quarter that we will omit the usual table of yield and slope scenarios that result in a change in CTD.

Given the annual change in the CTD for the CGB contract that happens this quarter, we include in Figure 3 a table of scenarios that would result in the December 2030 bond becoming the CTD for the CGBU21 contract, but not because there is any probability of it happening. Instead, we want to demonstrate that, despite the selloff in 10-year bonds and the new delivery basket³, there is still no viable scenario which results in a change to the cheapest-to-deliver bond for CGBU21 contracts. It would take a 120 basis point selloff accompanied by an equally unlikely 30 basis points of steepening (between the Jun30 and Dec30 points on the yield curve) to achieve a switch point in the contract. These scenarios are unlikely and the embedded options that the short position owns in CGB should price at close to zero, as are those in CGZ and CGF.

³ At yields under 6%, delivery basket math favors low duration bonds for CTD and the December 30 has a very low coupon making a switch even less likely.

FIGURE 3

Jun30 Yield

SLOPE	1.09%	1.19%	1.29%	1.39%	1.49%	1.69%	1.89%	2.09%	2.29%	2.49%	2.69%	2.89%	3.09%	3.29%	3.49%	3.69%
-2.0	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30
-0.2	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30
1.6	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30
3.4	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30
5.2	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30
7.0	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30
11.6	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30
16.2	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30
20.8	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Dec30
25.4	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Dec30	Dec30	Dec30
30.0	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Jun30	Dec30	Dec30	Dec30	Dec30	Dec30

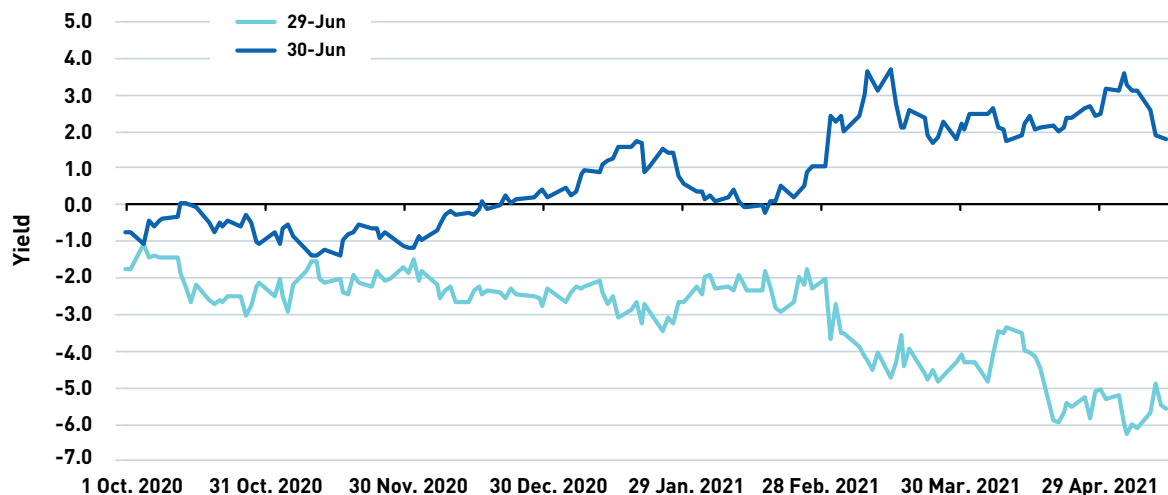
Relative Value of the CTD Bonds

With 2-year bonds in a tight range, for now, due to Bank of Canada promises of low target rates for a long period of time and no change in the delivery basket of CGF contracts this month, we will focus here on the relative value of the cheapest-to-deliver bonds for the CGBM21 and CGBU21 contracts.

As one can easily see in Figure 4 where we have plotted the closest-neighbour swap spread butterfly⁴ for both the June 2029, CTD for the June CGB contract, and June 2030, CTD for the September CGB contract, the June 29 has steadily richened versus its neighbours, particularly after CGBM21 became the active contract in late February. Meanwhile the June 30 has steadily cheapened in the past 6 months using the same measure and during the same period. The two metrics are flip sides of the same phenomenon and likely due to the 10-year benchmark bond change that occurred in late January. Nevertheless, June 30 is the new cheapest-to-deliver for the CGB contract and the underlying bond is relatively cheap versus neighbour bonds.

FIGURE 4

Jun30 versus Jun29 Swap Spread Butterfly

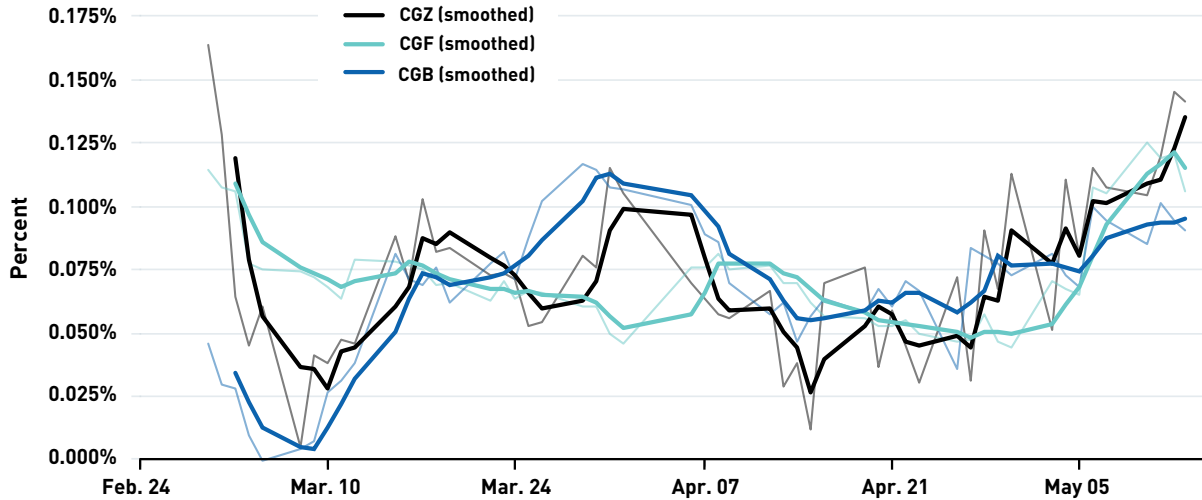


Source: BMO Capital Markets¹ Fixed Income Sapphire database

⁴ 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.

In addition to the CTD of the CGBU21 contract trading cheaper than neighbouring bonds, contracts have been trading cheap to bonds for months, although that has begun to change, and it remains to be seen if the phenomenon of cheap futures contracts will continue into the U21 contracts. Figure 5 shows the daily implied repo⁵ for each of the three fixed income physical delivery contracts in Canada and one can easily see that most of the time, the contracts traded with an implied repo well below the 0.2-0.25% level that has been observed in the overnight index swap market during this same time period. A low implied repo is equivalent to a high gross basis and implies that a futures contract is relatively cheap versus the cheapest-to-deliver bond.

FIGURE 5
Implied Repo: CGZ, CGF, CGB



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

Relatively cheap contracts combined with a relatively cheap CTD bond should mean there are opportunities for relative value managers, or even cash portfolio managers, to own futures versus (or instead of) more expensive neighbour bonds such as the 10-year benchmark.

Key Metrics & Expectations

Key Metrics that may interest a Portfolio Manager with a position in M21 contracts who is contemplating his/her roll strategy this week are shown in Figure 6, Figure 7, and Figure 8. We used closing prices on May 13th and have reduced the number of CTD bonds outstanding by the holdings of the Bank of Canada, although the notion of restricted supply of a CTD appears to have been an unwarranted fear. None of the U21 contracts had any open interest on our price capture date 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.

CGBM21 will carry positively during the June delivery period as the 2.25% coupon on the June 2029 bond is well above the overnight rate. The CTD bonds for both CGZ and CGF bear 0.25% coupons and carry almost flat during the delivery period. If either contract began to trade cheap to its CTD, carry could become negative so early delivery is a possibility this quarter. Given the extremely low negative carry (unless something very improbable happens), we think any leftover positions after the roll will be relatively indifferent to early or final delivery. For all three contracts, we have used the Final Delivery date to calculate implied repo and net basis.

CGBM21 to CGBU21

As usual in late May, there will be a lot of focus on the CGB (10-year) roll given the once-per-year change in the CTD bond for this contract. Unfortunately, we can say little about speculative positioning this quarter, although CGB has been the product of choice for trend following algorithms in the past. We suspect positioning is light at best, but direction is dependent on model parameters, which we cannot know as outside observers.

The M21 contract has spent all its life as the active contract trading cheap relative to the CTD. Recently, the implied repo rate rose slightly but the contract still trades cheap to bonds at an implied repo level of about 0.11%. We suspect this will continue and be reflected in the U21 contract as well.

⁵ Smoothed via a 3-day moving average to eliminate aberrations caused by calculating the implied repo from bond prices and futures prices obtained from different sources.

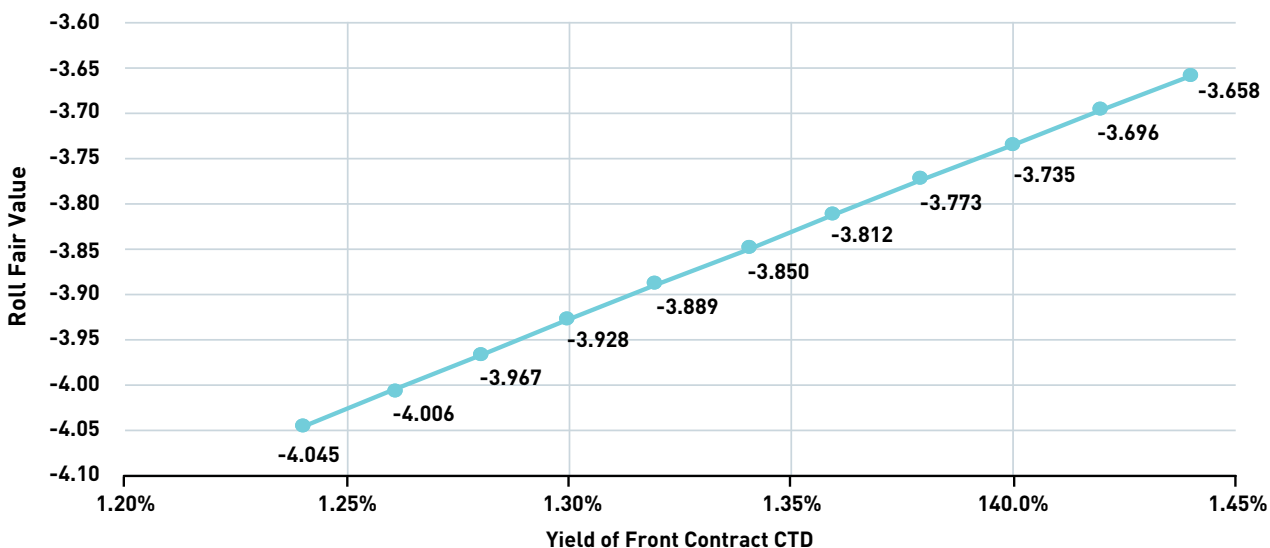
FIGURE 6**CGB Key Metrics**

13-MAY-2021	FRONT (JUN21)	BACK (SEP21)	DIFFERENCE
Closing Price	139.510	143.410	-3.900
Cheapest-to-Deliver (CTD)	CAN 2.250% Jun 2029	CAN 1.250% Jun 2030	Change!
Delivery Years (Last delivery)	7.9	8.7	0.7
CTD Conversion Factor	0.7645	0.6803	
CTD Clean Price	106.9180	97.9551	
CTD Yield	1.340%	1.493%	0.153%
Gross Basis (cents)	26.3	39.3	
Net Basis (Final Delivery, cents)	2.4	1.9	-0.5
Implied Repo (Final Delivery)	0.09%	0.20%	0.11%
DV01/100 of CTD	7.9	8.3	0.4
Open Interest	745,878	0	
CTD Outstanding (millions)	5,231	29,281	24,050
Bond Equivalent Notional	74,588	74,588	
Multiple of Outstanding	14.3x	2.5x	-11.7x

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

We think the CGB roll will be volatile this quarter for three reasons⁶:

1. The roll will be sandwiched between holidays in Canada and the USA introducing (perhaps) a greater sense of urgency to execute roll trades.
2. The 19% DV01 extension between the M21 (10.3 cents per basis point) and U21 (12.3 cents per basis point) contracts means 1-for-1 rolls will be less prevalent. Excess supply of (demand for) U21 versus M21 may be created each time a motivated buyer (seller) of M21 comes to market for roll liquidity but wants to keep their DV01 exposure constant.
3. Fair value of the roll is unstable given the large DV01 extension; fewer participants will leave limit orders and liquidity may not be as deep, resulting in a volatile roll relative to the other quarters. We demonstrate this fair value instability in Figure 7 where we plot the fair value of the roll on May 25th using today's yield curve slope and a 0.10% implied repo level for both contracts. Even small changes in yield change the fair value of the roll by 5-10 cents.

FIGURE 7**CGBM21/CGBU21 Roll Fair Value versus Rate Level, May 25/21**

⁶ For more on this topic refer "Jun/Sep CGB Roll: A Roll Unlike the Others" published by MX in April 2021.

CGZM21 to CGZU21

The 2-year contract, which launched more recently under new contract terms, has an open interest of 37,000 contracts at this time giving little reason to suspect that the roll period will be anything but orderly. The contract carries almost perfectly flat in the delivery period so shorts may (or may not) deliver early if any contracts remain open after the first notice date. The CTD will change from the February 2023 bond to May 2023 for the next contract, a relatively negligible maturity extension. Like both CGF and CGB, CGZ prices slightly cheap to bonds at an implied repo rate of 0.14% given current pricing.

Although there is a CTD delivery basket change and duration extension, the price dynamic is much smaller in CGZ than it is in CGB and fair value for the roll changes by fractions of a cent for a basis point move up or down in 2-year rates. Yield changes in 2-year bonds have been muted of late and we do not expect the duration extension to be a factor in the CGZ roll. Given the expected stability, we anticipate the roll to trade at fair value, roughly 13.2 cents at the time of writing.

FIGURE 8

CGZ Key Metrics

13-MAY-2021	FRONT (JUN21)	BACK (SEP21)	DIFFERENCE
Closing Price	109.815	109.685	0.130
Cheapest-to-Deliver (CTD)	CAN 0.250% Feb 2023	CAN 0.250% May 2023	Change!
Delivery Years (Last delivery)	1.6	1.6	0.0
CTD Conversion Factor	0.9101	0.9101	
CTD Clean Price	99.9566	99.8530	
CTD Yield	0.275%	0.325%	0.050%
Gross Basis (cents)	1.4	2.9	
Net Basis (Final Delivery, cents)	1.4	2.9	1.5
Implied Repo (Final Delivery)	0.14%	0.17%	0.03%
DV01/100 of CTD	1.7	2.0	0.2
Open Interest	37,533	0	
CTD Outstanding (millions)	14,879	19,385	4,506
Bond Equivalent Notional	3,753	3,753	
Multiple of Outstanding	0.3x	0.2x	-0.1x

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

CGFM21 to CGFU21

There is no change to the delivery basket (aside from conversion factors, of course) for the CGF (5-year) when moving from the M21 to U21 contract.

An implied repo of just 0.11% at time of writing means CGFM21 prices cheap relative to bonds by about 1 cent, a normal situation recently. If CGFU21 prices closer to fair value when liquidity begins to build, short positions in M21 may choose to roll earlier rather than later to capture the cheapness in the older contract.

Open interest in this contract remains manageable for all participants and both hedgers and speculators will probably view this contract roll as a simple continuation of previous positions. We expect a calm and stable roll to occur with no viable reason for volatility to enter the relative pricing of the two contracts.

FIGURE 9

CGF Key Metrics

13-MAY-2021	FRONT (JUN21)	BACK (SEP21)	DIFFERENCE
Closing Price	126.410	124.640	1.770
Cheapest-to-Deliver (CTD)	CAN 0.250% Mar 2026	CAN 0.250% Mar 2026	No change
Delivery Years (Last delivery)	4.7	4.4	-0.3
CTD Conversion Factor	0.7654	0.7761	
CTD Clean Price	96.7720	96.7720	
CTD Yield	0.941%	0.941%	0.000%
Gross Basis (cents)	1.8	3.9	
Net Basis (Final Delivery, cents)	1.7	3.6	1.9
Implied Repo (Final Delivery)	0.11%	0.15%	0.04%
DV01/100 of CTD	4.6	4.6	0.0
Open Interest	91,179	0	
CTD Outstanding (millions)	18,538	18,538	0
CTD Notional of Front OI	9,118	9,118	
Front OI Multiple of CTD	0.5x	0.5x	0.0x

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

Wildcard Potential

CGB is positive carry during the delivery period this quarter and it would take a 6 basis point fall in the CTD yield after the settlement price is established for the contract to make a wildcard option exercise profitable at the start of the delivery period. Although the price change threshold falls to just a couple of basis points by the end of trading in the contract, we do not expect there to be many investors attempting wildcard exercise this quarter in CGB. The H21 contract had nearly identical wildcard option characteristics to the M21 contract and less than 200 contracts were delivered in total⁷.

CGZ and CGF are almost perfectly flat carry but low open interest and high conversion factors in CGZ make wildcard option attempts there unlikely as the profit potential is low⁸; investors can find better opportunities than CGZ wildcard option plays.

Just like last quarter, there is a better chance at successful wildcard exercise in CGFM21, although we have rarely observed wildcard exercises in this contract. Since the contract is almost exactly zero carry, the threshold price increase in the CTD for a successful wildcard exercise is essentially zero during the entire delivery period. An investor could hold a long basis position in, say, 1000 contracts through the delivery period at essentially no cost (i.e. their wildcard option suffers no premium decay). If a late-day bond rally of 2 basis points occurred (about 9 cents in the 5-year), that investor could sell the delivery tail at a profit and deliver the remainder of their bonds into the contract for a profit of about \$28,000. However, even if there is no wildcard exercise opportunity, the opportunity to roll from M21 to U21 will have long passed and the investor must be willing and able to make delivery.

CDCC Delivery Reports⁹ for all three contracts show just a small number of each were delivered for the March expiry. This lack of delivery reflects the lack of optionality in the contracts recently and, perhaps, better relative value opportunities than exist in futures basis.

Looking Forward & Opportunities

- This roll will be the last of an era for CGB since the next duration extension, when the June 2030 bond falls out of the delivery basket for the M22/U22 roll, will be only 6 months of maturity rather than a full year. The duration extension appears poised to become a twice-annual event with a shorter duration extension each time at least while two 10-year bond maturities are created each year.
- Recent interest in using CGF and CGB contracts to express curve trades continued this quarter and almost 90,000 units of steepening/flattening trades were executed in the 2CGFM21-1CGBM21 strategy on Montréal Exchange. Volume in the M21 strategy already exceeds the total amount observed in the H21 contracts and futures remain a popular way to execute 5-10 curve trades quickly and cheaply in Canada.
- 0.25% coupons on the CTD for both CGZU21 and CGFU21 contracts maintain the possibility of “negative basis” and the potential for early delivery. We recently wrote about the concept, which can be meaningful to some clients and sometimes confusing for others ([“Forecasting/Understanding Negative Basis in Futures”](#) article published in April 2021).

⁷ In theory, some of these could have been investors attempting to play the wildcard option in very small size.

⁸ Profit potential in embedded Wildcard options is greater when conversion factors are farther from 1. In the CGZH21 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.

⁹ CDCC Delivery Reports available on the CDCC website ([Delivery Reports page](#)).

- Relative Value opportunities are still abundant 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, especially in CGB given the cheapness of that contract's CTD discussed above.
- 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 proved unfounded for several reasons, but the Bank recently responded to perceived bond shortages in the repo market (unrelated, we think, to futures contracts) by expanding the size of the program available to any individual participant. This action puts to rest any potential for disrupted futures markets due to CTD scarcity.



Kevin Dribnenki writes about fixed income derivatives and opportunities in Canadian markets. He spent over 10 years managing fixed income relative value portfolios as a Portfolio Manager first at Ontario Teachers' Pension Plan and then BlueCrest Capital Management. During that time he managed domestic cash bond portfolios as well as international leveraged alpha portfolios and has presented at several fixed income and derivatives conferences. He received a BA in Economics from the University of Victoria, an MBA from the Richard Ivey School of Business, and holds the Chartered Financial Analyst designation.

For more information

T +1 514 871-3501
 irderivatives@tmx.com

m-x.ca/futures

i BMO Capital Markets is a trade name used by BMO Financial Group for the wholesale banking business of Bank of Montreal, BMO Harris Bank N.A. (member FDIC), Bank of Montreal Ireland plc., and Bank of Montreal (China) Co. Ltd and the institutional broker dealer businesses of BMO Capital Markets Corp. (Member SIPC) in the U.S., BMO Nesbitt Burns Inc. (Member Canadian Investor Protection Fund) in Canada and Asia and BMO Capital Markets Limited (authorized and regulated by the Financial Conduct Authority) in Europe and Australia. "BMO Capital Markets" is a trademark of Bank of Montreal, used under license.

This information is provided for information purposes only. This article is not endorsed by TMX Group or its affiliated companies. The views, opinions and advice provided in this article reflect those of the individual author. This publication is not endorsed by TMX Group or its affiliated companies. Neither TMX Group Limited nor any of its affiliated companies guarantees the completeness of the information contained in this publication, and we are not responsible for any errors or omissions in or your use of, or reliance on, the information. This publication is not intended to provide legal, accounting, tax, investment, financial or other advice and should not be relied upon for such advice. The information provided is not an invitation to purchase securities or derivatives listed on Montreal Exchange, Toronto Stock Exchange and/or TSX Venture Exchange. TMX Group and its affiliated companies do not endorse or recommend any securities referenced in this publication. CGB, CGF, CGZ, CTD, Montréal Exchange and MX are the trademarks of Bourse de Montréal Inc. TMX, the TMX design, The Future is Yours to See., and Voir le futur. Réaliser l'avenir. are the trademarks of TSX Inc. and are used under license.

Copyright © 2021 Bourse de Montréal Inc. All rights reserved. Do not copy, distribute, sell or modify this document without Bourse de Montréal Inc.'s prior written consent.