THE FUTURE IS YOURS TO SEE.

CGF Five-Year Government of Canada Bond Futures

CGB Ten-Year Government of Canada Bond Futures

H20-M20 Roll Update

February 2020

Quarterly Roll Summary

For H20 contracts, First Notice day is February 27th which seems late due to the extra day in February this year. The liquid days for the contract roll on both CGF and CGB will be February 24-26th and both contracts have high open interest this quarter so the roll should be active and, perhaps, offer opportunities to nimble Portfolio Managers.

We observed new positions being added during the January rally which increased open interest in both CGF and CGB by sizable amounts and those speculative positions appear to still exist. As such, we believe both speculative trend followers and more traditional (but flexible) domestic asset managers have net long positions to roll. For CGF that appears to be a non-event as the H20 contract prices about fair as of our analysis. However, CGBH20 is 4 cents cheap relative to the cheapest-to-deliver (CTD), possibly an attempt to force long positions to close/roll at unattractive levels. CGB long positions with patience will likely be rewarded by better levels later.

Long positions in CGF who enter the delivery period should expect to be delivered early due to negative carry for a hedged short position in CGFH20. Although we warned of it in November for the Z19 roll, we barely took the possibility of a Wildcard exercise in CGF seriously[1]. However, early delivery on CGFH20 late in the day may be a possibility this quarter as we believe a basis trader dabbled in a Wildcard option play on CGFZ19, something we had not observed before in this contract.

The CGFM20 contract will have a different CTD, the March 2025, than the H20 contract but there will be no delivery basket change for the CGB contract[2] this quarter. Next quarter, of course, brings the annual change to the basket for CGB.

The Bank of Canada has not (so far) followed through on a bias toward easier monetary policy but fair value for the M20 contracts[3] should reflect the possibility of a rate cut during the contract life since there are fixed announcement dates on March 4th, April 15th, and June 3rd. However, very little monetary accommodation is priced into other short term instruments.

Positioning

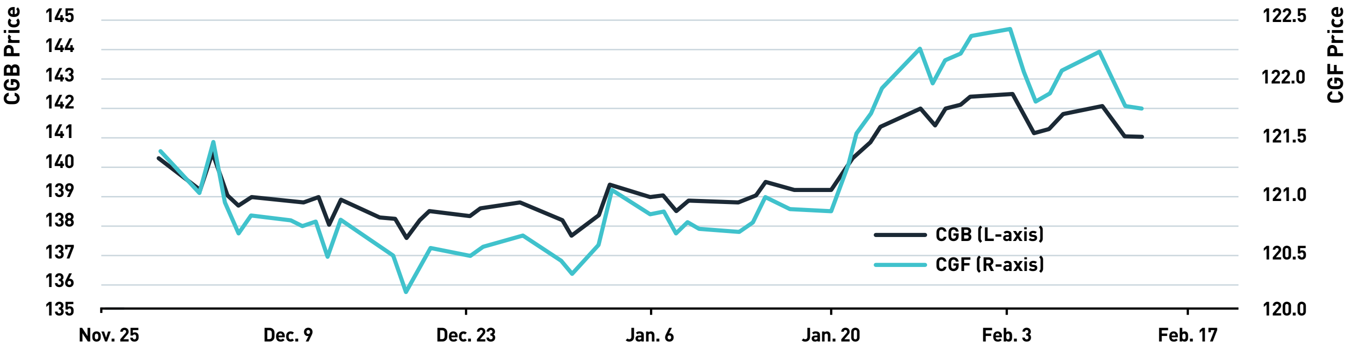
We believe motivated roll participants are net long this quarter bringing significant pressure to the CGB and, possibly, the CGF roll as these participants attempt to sell their front contracts.

As can be observed in Figure 1 which plots the price of the CGF and CGB contracts since the last roll, a strong upward price trend was established in January and, although it ebbed in February, a complete reversal didn't occur to trigger a reduction of trend-following positions.

1 Since a Wildcard exercise is profitable only if the cheapest-to-deliver price increases substantially after 3pm and the profit amount is dependent on the size of the price move and the delivery tail, successful exercise of CGF Wildcard options is significantly less probable and profitable than on CGB contracts.
2 The conversion factors for each deliverable bond differ between contracts.
3 Via the implied repo rate embedded in the price difference between cash and futures.

FIGURE 1

CGFH20 and CGBH20 Price



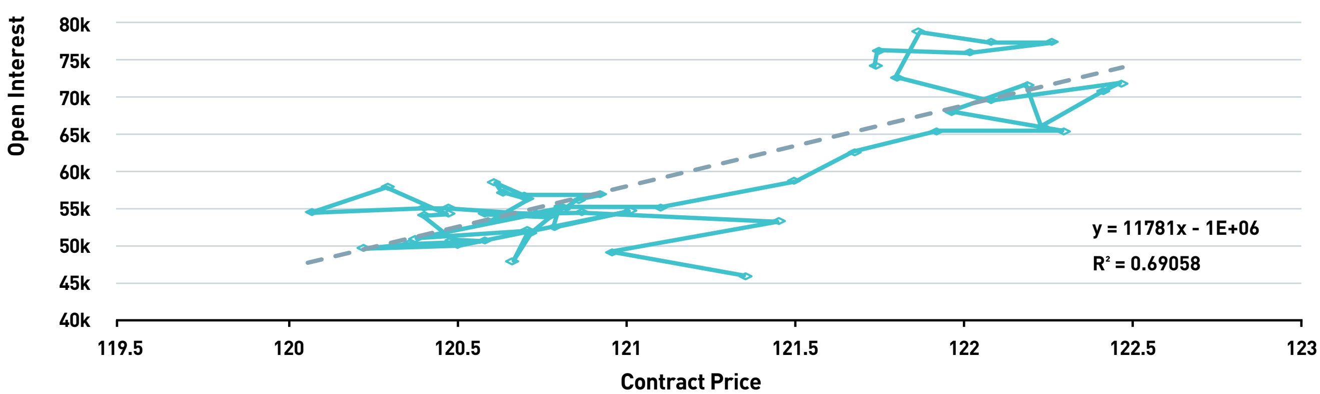
Source: Montréal Exchange

In addition, although the expected profits may not have been realized, we believe cash and relative value asset managers attempted to capitalize on the cheap futures contracts that had existed since mid-November. We identified this opportunity in early January when contracts were about 5-6 cents cheap but nimble managers may have switched from bonds to CGB futures at even better levels.

The strong bond rally between January 20th and February 6th added over 20,000 new positions to CGFH20, 30,000 new positions to CGBH20 and resulted in relatively high correlation between open interest and price for CGF, as shown in Figure 2. These are probably speculative positions rather than hedges and may result in motivated sellers driving the price action during the roll period for both CGF and CGB contracts this quarter.

FIGURE 2

CGFH20 Price versus Open Interest



Source: Montréal Exchange

Cheapest-to-Deliver Switch is Implausible

As in all recent quarters, there is almost no potential for a switch of cheapest-to-deliver (CTD) bond in both CGF and CGB for the June expiry. Delivery basket math favors high rates and steep curves to increase the probability of a CTD switch and rates are currently too low and curves are too flat for a CTD switch to be plausible. With no plausible scenario for a CTD switch, the quality option and end-of-month options[4] are essentially worthless. Wildcard options, which don't require a CTD switch to be profitably exercised, may have some value to active participants[5].

4 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.

5 For an examination of a successful Wildcard option play and notes on Wildcard potential in the Z19 contracts, refer to "CGB Case Study: Wildcard Option Exercise" published in July 2019.

Although currently of limited value, we show the yield/slope combinations that would result in a CTD switch for the CGFM20[6] and CGBM20 contracts in Figure 3 and Figure 4. In those figures, the yield is shown along the x-axis with the current yield in bold. The slope between the current CTD and the "next-in-line" bond is plotted on the y-axis and is also shown in bold font. The combinations of yield and slope that result in each bond becoming CTD are color-coded but the next cheapest bond is so far away in terms of yield/slope combinations that they're hardly worth discussing here.

FIGURE 3

Mar25 Yield

SLOPE	0.60%	0.80%	1.00%	1.20%	**1.40%**	1.60%	1.80%	2.00%	2.20%	2.40%	2.60%	2.80%	3.00%	3.20%	3.40%	3.60%
-10.0	Mar25	Mar25	Mar25	Mar25	**Mar25**	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25
-8.0	Mar25	Mar25	Mar25	Mar25	**Mar25**	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25
-6.0	Mar25	Mar25	Mar25	Mar25	**Mar25**	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25
-4.0	Mar25	Mar25	Mar25	Mar25	**Mar25**	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25
-2.0	Mar25	Mar25	Mar25	Mar25	**Mar25**	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25
0.0	**Mar25**	**Mar25**	**Mar25**	**Mar25**	**Mar25**	**Mar25**	**Mar25**	**Mar25**	**Mar25**	**Mar25**	**Mar25**	**Mar25**	**Mar25**	**Mar25**	**Mar25**	**Mar25**
10.0	Mar25	Mar25	Mar25	Mar25	**Mar25**	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25
20.0	Mar25	Mar25	Mar25	Mar25	**Mar25**	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25
30.0	Mar25	Mar25	Mar25	Mar25	**Mar25**	Mar25	Mar25	Mar25	Mar25	Mar25	Sep25	Sep25	Sep25	Sep25	Sep25	Sep25
40.0	Mar25	Mar25	Mar25	Mar25	**Sep25**	Sep25	Sep25	Sep25	Sep25	Sep25	Sep25	Sep25	Sep25	Sep25	Sep25	Sep25
50.0	Sep25	Sep25	Sep25	Sep25	**Sep25**	Sep25	Sep25	Sep25	Sep25	Sep25	Sep25	Sep25	Sep25	Sep25	Sep25	Sep25

FIGURE 4

Jun28 Yield

SLOPE	0.41%	0.66%	0.91%	1.16%	**1.41%**	1.66%	1.91%	2.16%	2.41%	2.66%	2.91%	3.16%	3.41%	3.66%	3.91%	4.16%
-15.0	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28
-12.3	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28
-9.6	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28
-6.8	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28
-4.1	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28
-1.4	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**
8.9	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28
19.2	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun29	Jun29
29.4	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29
39.7	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29
50.0	Jun28	Jun29	Jun29	Jun29	**Jun29**	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29

The timing option remains important for CGFH20 and probably M20 contracts but, absent a Bank of Canada target rate increase in the next few months, will not be a factor for CGB. Although an imperfect rule-of-thumb, a CTD coupon rate below the target rate means that carry will be negative during the delivery period and that Portfolio Managers long the CTD basis[7] will have an incentive to exercise their timing option and deliver early. In a similar argument, Gross Basis will almost certainly be negative for CGFM20, just as it was negative for CGFH20.

6 Only one bond exists in the basket for CGFM20 but we assume a 1.5% Sep25 will be issued before the delivery period in June.

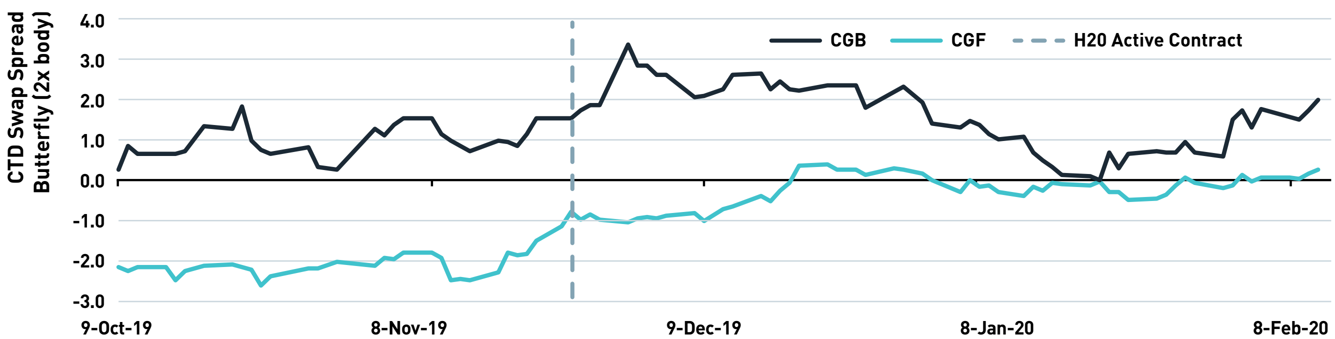
7 A long CTD basis trade is a risk neutral trade where the investor simultaneously buys the cash bond and sells the futures contract in equivalent risk amounts. The short futures position has the option to deliver early.

Relative Value

Figure 5 plots the swap spread butterfly[8] for the CTD of both the CGF and CGB contracts this quarter and, for once, shows an interesting relative value story unfolded during the quarter. As usual, a move lower on the chart indicates that the CTD became more rich 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 H20 became the active contract.

FIGURE 5

H20 CTD Swap Spread Butterflies



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

The range for both CGF and CGB swap spread butterflies was large this quarter. For CGF, the relative value of the CTD was driven largely by the fact that the CTD was rich going into the November roll period and eventually cheapened by a basis point or two over about a month, possibly in anticipation of the final Bank of Canada auction of the next 5-year bond, the March 25s, became imminent. As of today the Sep24 CTD for CGFH20 is very close to fair value relative to its neighbours bonds, given the flat curve. Although no secret, the next 5-year bond, a Sep25, will likely be auctioned cheap the first few times with potential relative value opportunities for active managers – perhaps hedged with CGF contracts.

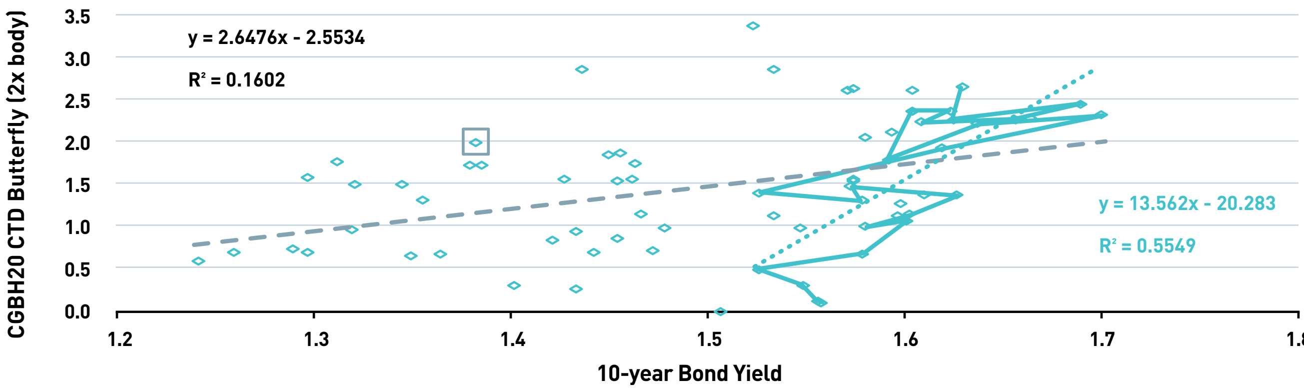
The Jun28 CTD for CGBH20 had a bit of a wild ride from a relative value standpoint this quarter with a range of 0 to 3 basis points on the butterfly. As is normal for this contract, a lot of the relative value of the bond was driven by the movement of interest rates, although the correlation of the butterfly to the 10-year bond yield for the entire contract life wasn't particularly strong as shown in Figure 6. However, Figure 6 also depicts the strong rally from January 20th to February 6th (in blue) and the much higher correlation during this period. During the strong rally, we believe demand for CGBH20 outstripped supply, richening the contract and its underlying deliverable bond[9]. Most of that richness has now abated, as shown in Figure 5.

8 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.

9 But, notably, not richening the contract relative to the CTD bond.

FIGURE 6

10-year Bond Yield versus CGBH20 CTD Butterfly



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

Key Metrics & Expectations

The Key Metrics that may interest a Portfolio Manager with a position in H20 contracts who is contemplating his/her roll strategy this week are shown in Figure 7 and Figure 8. We used closing prices on February 13th in order to avoid any anomalies with the early close on the 14th. Note that neither CGFM20 nor CGBM20 has any open interest at this time so pricing, and any analysis driven by the pricing, is not based on market driven price discovery at this time.

CGFH20 to CGFM20

A long basis position in CGFH20 contracts carries negatively by just less than 2.5 cents per contract during the delivery period which will almost certainly prompt any residual short positions after First Notice day to deliver early. Since early delivery is probable, the correct date to assess Net Basis and Implied Repo to is the First Delivery day, not the Last Delivery day.

Currently the 1.6% implied repo to First Delivery on the H20 makes the contract 0.6 cents cheap given that overnight index swaps (OIS) to the same (early) delivery day is 1.75%. We expect the fair value of the roll to begin somewhere around -1.62 to -1.63 given current fair value levels. As usual for the CGF and despite more open interest than in many previous roll periods, we expect this roll to be relatively benign with an outside chance that the January jump in open interest was caused by price insensitive trend followers that may show some desperation to roll to M20. However, we have not observed (yet!) this type of account utilizing CGF extensively in this manner.

FIGURE 7

CGF Key Metrics

13-Feb-2020	FRONT (Mar20)	BACK (Jun20)	Change
Closing Price	121.700	123.400	-1.700
Cheapest-to-Deliver (CTD)	CAN 1.500% Sep 2024	CAN 1.250% Mar 2025	
Delivery Years (Last delivery)	4.4	4.7	0.2
CTD Conversion Factor	0.8248	0.8062	
CTD Clean Price	100.3760	99.2970	
CTD Yield	1.414%	1.395%	-0.019%
Gross Basis (cents)	-0.2	-18.8	

Net Basis (First Delivery, cents)	0.7	-4.6	-5.4
Implied Repo (First Delivery)	1.60%	1.93%	0.33%
DV01/100 of CTD	4.4	4.8	0.4
Open Interest	76,333	0	
CTD Outstanding (millions)	16,200	12,600	-3,600
CTD Notional of Front OI	7,633	7,633	
Front OI Multiple of CTD	0.5x	0.6x	0.1x

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

CGBH20 to CGBM20

The roll period for CGB will again be eventful and active this quarter as the contract is almost 5x as large, from a risk perspective, as the bonds underlying it. Further, M20 will be the last contract with Jun28s as the CTD so there may be some anticipation trades for the next contract. Carry is positive by about 1.7 cents per contract for a long basis position through to the end of June so early delivery is unlikely on the H20 contracts and long positions can afford to be patient if they can risk delivery. Depending on where the roll begins trading, existing short positions may take advantage of the cheapness of front contracts in order to roll early at attractive prices, especially if the implied repo rate of the M20 contract is anything close to the 1.70% fair value given that the 1.50% implied repo level on the H20 contracts is still about 4 cents cheap. Long positions should, and probably will, hold out as long as they can due to the existing cheapness of the CGBH20 contract.

FIGURE 8

CGB Key Metrics

13-Feb-2020	FRONT (Mar20)	BACK (Jun20)	Change
Closing Price	140.830	139.630	1.200
Cheapest-to-Deliver (CTD)	CAN 2.000% Jun 2028	CAN 2.000% Jun 2028	
Delivery Years (Last delivery)	8.2	7.9	-0.2
CTD Conversion Factor	0.7426	0.7488	
CTD Clean Price	104.6300	104.6300	
CTD Yield	1.406%	1.406%	0.000%
Gross Basis (cents)	5.0	7.5	
Net Basis (Final Delivery, cents)	3.1	1.6	-1.5
Implied Repo (Final Delivery)	1.49%	1.70%	0.21%
DV01/100 of CTD	8.0	8.0	0.0
Open Interest	641,720	0	
CTD Outstanding (millions)	13,500	13,500	0
Bond Equivalent Notional	64,172	64,172	
Multiple of Outstanding	4.8x	4.8x	0.0x

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

Wildcard Potential

In terms of the potential for a Wildcard option exercise, we calculate and show the price move threshold for CGBH20 during each day of the delivery period in Figure 9. The positive carry makes a Wildcard less likely but not impossible. Under similar conditions and judging solely by the CDCC Delivery Reports, virtually no one tried this during the Z19 delivery period which is unfortunate since a near-perfect opportunity[10] for Wildcard exercise appears to have occurred on December 17th.

FIGURE 9

CGBH20 Wildcard Threshold

Date	Remaining Carry ($ per contract)	Minimum ΔPrice to Exercise Wildcard
27-Feb-2020	17.06	0.049
28-Feb-2020	16.47	0.048
2-Mar-2020	15.88	0.046
3-Mar-2020	15.29	0.044
4-Mar-2020	14.71	0.042
5-Mar-2020	12.94	0.037
6-Mar-2020	12.35	0.036
9-Mar-2020	11.76	0.034
10-Mar-2020	11.18	0.032
11-Mar-2020	10.59	0.031
12-Mar-2020	8.82	0.025
13-Mar-2020	8.24	0.024
16-Mar-2020	7.65	0.022
17-Mar-2020	7.06	0.020
18-Mar-2020	6.47	0.019
19-Mar-2020	4.71	0.014
20-Mar-2020	4.12	0.012

A negative basis in CGF means the threshold to exercise Wildcard options in CGFH20 is essentially zero, and any remaining long CGFH20 positions after First Notice day should be very wary of being suddenly delivered and having to deal with their delivery tail and a sudden loss if bond prices rise after 3pm.

CDCC Delivery Reports for the Z19 contract show a few thousand contracts being delivered on December 2nd and 4th; dates when 5-year bond prices were volatile and rose after the futures market closed. Although not certain and in small amounts, it appears that some basis traders may be beginning to play the Wildcard option in CGF contracts; something we haven't seen in CGF before the Z19 contract.

10 Since carry is positive for CGB, the best scenario to exercise is a large price increase after 3pm on the day before the last trading day.

Medium Term Observations

- The next roll for CGB will bring the annual change in the cheapest-to-deliver which often has ramifications for the relative value of the outgoing and incoming CTD. With the open interest of the contract now representing almost 5x the total amount of the deliverable bond (not a worry, just an observation), there is no reason to expect 2020 to be different in this regard.
- CGFM20 will have a CTD of 1.25% Mar25 and, without at least two Bank of Canada rate cuts, will carry negatively during the delivery period of the June contract. Assess the implied repo rate and Net Basis to First Delivery day, not Last Delivery day, unless the Bank cuts rates twice.
- Looking way ahead, given the low coupon on the 1.25% June 2030 bond, the CGBU20 to M21 contracts will have essentially no chance of a switch since high coupons and shorter maturities are favored by CTD math. For U20 to M21, the CTD 2.25% June 2029 will be 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[11].

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.

Printed in Canada

11 And probably not even then unless rates rise a lot.