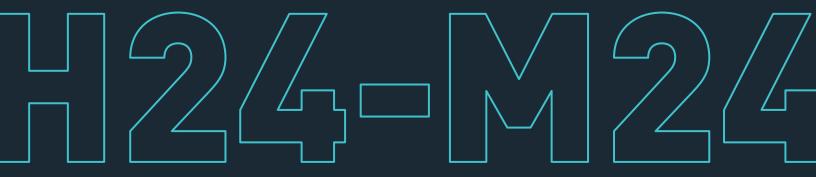
CGZ Two-Year Government of Canada Bond Futures

CGF Five-Year Government of Canada Bond Futures

CGB Ten-Year Government of Canada Bond Futures

LGB Thirty-Year Government of Canada Bond Futures

MONTRÉAL EXCHANGE



Roll Update

February 2024



ROLL Summary

With the turn in the monetary policy cycle, clients should refamiliarize themselves with the timing option, positive futures basis, and any implications for their own portfolio, especially in the Two-Year Government of Canada Bond Futures (CGZ^{TM}) contract. Many speculative positions in futures contracts were probably shaken out by the painful reversal at the start of February which makes predicting the supply/demand pressure on the roll is a difficult exercise this quarter. However, relative value managers must delight in some of the rich/cheap opportunities currently between futures contracts as well as various bonds in the delivery baskets of the CGZ, Five-Year Government of Canada Bond Futures (CGF^{TM}), and Ten-Year Government of Canada Bond Futures (CGB^{TM}) contracts.

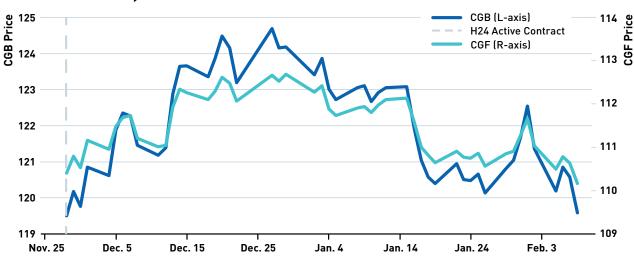
First notice is February 28^{th} , and the liquid part of the roll period will probably be February 23^{rd} , a Friday, and February 26^{th} - 27^{th} . Again, this quarter, clients with long positions should expect to be delivered very early (except the 30-Year Government of Canada Bond Futures (LGBTM), of course) as long basis trades in all contracts carry negatively.

A very large number of CGZ (2-year) contracts were delivered in December, which is unusual for futures contracts in general. Managers should note that delivery for the June contracts will occur after the May 27th transition to T+1 settlement which will affect first notice, last notice, and final settlement dates for the M24 and following contracts.

Speculative Positioning

We doubt any trend-following portfolios enjoyed the severe reversal near the end of January and beginning of February. A great directional quarter with sustained trends was rudely interrupted by a strong rally and almost immediate reversal at the turn of the month. We suspect that many risk positions were stopped out or merely reduced due to volatility. Figure 1 shows the profit-damaging spike and immediate reversal of CGB (10-year) prices best but the price action was ubiquitous across the curve as can also be seen in Figure 2 which shows the price action for CGZ (2-year) and LBG (30-year) contracts.

FIGURE 1 CGF & CGB Price, H24s



Source: Montréal Exchange

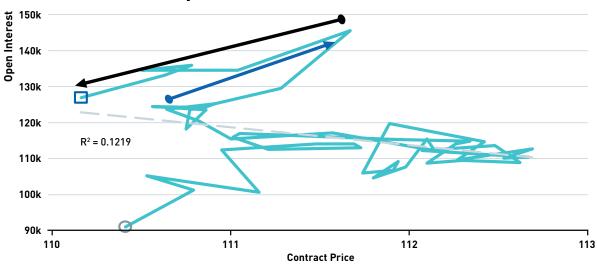
FIGURE 2 CGZ & LGB Price, H24s



Source: Montréal Exchange

Readers can see some of the evidence of speculative carnage in the chart of CGF open interest versus contract price in Figure 3, where we've labelled the price and open interest activity around the February 1st reversal with coloured arrows. Despite the relatively low overall correlation between contract price and open interest, the correlation is quite high during periods of rising prices and falling prices, indicating that positions were being added consistently as the December and January trends were happening. At the end of January and into early February, open interest surged as prices rose initially and then fell precipitously, by tens of thousands of contracts – presumably some of the same positions that had been opened in the rally – almost immediately as clients (and algorithms) recognized that this was not going to be a sustained trend. Such is life for trend following speculative models and they'll be back in shortly but we suspect risk deployed is no longer at a maximum, although some may still be quite short since not all of the open interest that had been building was removed.

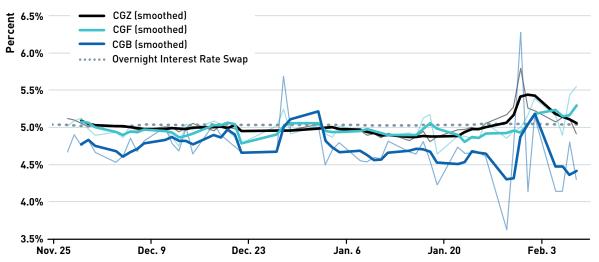
FIGURE 3
CGFH24 Price versus Open Interest



Source: Montréal Exchange

The same volatility wreaked havoc on the relative value relationship between bonds and futures contracts as managers of both sought liquidity to speculate or hedge. Figure 4 plots the implied repo for CGZ (2-year), CGF (5-year), and CGB (10-year) contracts during the quarter. Generally, the implied repo (and, similarly, the gross basis) was well behaved during the quarter with, perhaps, futures being driven a little rich to bonds at the end of the December rally, especially in the 5-year and 10-year contracts. That richness paled in comparison to the rapid richening of futures contracts (futures are rich to bonds when the implied repo is higher than fair value or higher than the dotted line in the figure) at the end of January as, we presume, accumulated short positions sought to close these out quickly by buying contracts. The abrupt richening of futures contracts relative to bonds was apparent in all the contracts (Figure 4) and has lingered in the case of the CGF contract which may provide an opportunity for nimble managers.

FIGURE 4
Implied Repo: CGZ, CGF, CGB



Source: BMO Capital Marketsⁱ Fixed Income Sapphire database, Montréal Exchange

Cheapest-to-Deliver Switch

A combination of inverted curves and small deliverable baskets ensures that very little switch risk is embedded in any of the Montréal Exchange contracts again this quarter. Unless curves become steep or the bond selloff of 2022/23 continues with renewed vigor in 2024, risk of a change to the cheapest-to-deliver bond (CTD) on any contract is minimal.

It's a big stretch but, at present, the biggest CTD switch risk probably lies in the CGB contract, although that risk is severely remote. This is largely because, as of the time of writing, there is only one deliverable bond in the June 2024 basket for both CGZ (2-year) and CGF (5-year) contracts. As shown in Figure 5, a vicious 10 basis point steepening between the June 2032 and December 2032 would accomplish such an event, as would a 5 basis point steepening accompanied by a 100 basis point selloff in 10-year yields. We consider both scenarios implausible and suspect almost all managers would put only a tiny probability on interest rates behaving in this way during the coming quarter.

FIGURE 5

Jun32 Yield

SLOPE	2.99%	3.14%	3.29%	3.44%	3.59%	3.79%	3.99%	4.19%	4.39%	4.59%	4.79%	4.99%	5.19%	5.39%	5.59%	5.79%
-5.0	Jun32															
-4.1	Jun32															
-3.2	Jun32															
-2.3	Jun32															
-1.4	Jun32															
-0.5	Jun32															
1.6	Jun32															
3.7	Jun32	Dec32	Dec32													
5.8	Jun32	Dec32	Dec32	Dec32	Dec32	Dec32	Dec32									
7.9	Jun32	Dec32														
10.0	Jun32	Jun32	Jun32	Jun32	Dec32											

Source: Author Calculations

Relative Value of the CTD Bonds

With no change of CTD for the CGB contract, relative value between the likely delivery bonds for the H24 and M24 contracts is not relevant this quarter. However, there are still some interesting dynamics at play in mid-February.

First, although the June 2032 Canada bond is the CTD for both the CGBH24 and CGBM24 contracts, the yield butterfly in Figure 6 (and swap spread butterfly, not shown) has already fallen back to levels where the CTD is relatively rich to neighbour bonds while the December 2032 has not followed along. This is likely due to the phenomenon in CGB, specifically, where futures contract liquidity demands, both from buyers and sellers, dictate the richness or cheapness of the CTD relative to similar maturity bonds. Opportunities may exist to substitute the December 2032 bond for CGBM24 contracts until the relative price difference corrects.

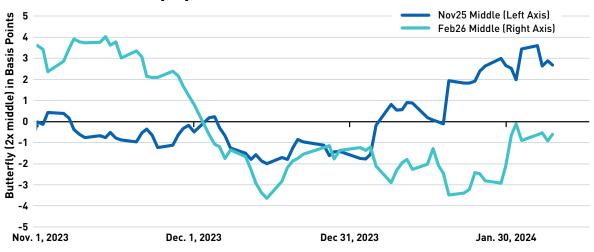
FIGURE 6
Dec31 v. Jun32 Yield Butterfly



Source: BMO Capital Marketsⁱ Fixed Income Sapphire database

Perhaps more interesting is the fact that, in mid-February, the cheapest-to-deliver (CTD) for the CGZ (2-year) active contract had been steadily losing value relative to neighbour bonds since the start of the year. Figure 7 plots the swap spread butterfly for the November 2025 (CTD for the CGZH24 contract) and February 2026 (CTD for the CGZM24 contract) and, while both bonds have cheapened from end-of-year, the November 2025 has cheapened from a butterfly level of about -2bps all the way to +3bps while the February 2026 has cheapened just about half as much. Sellers of CGZH24 during the roll should be aware that they are selling a relatively cheap bond in the 2-year space.

FIGURE 7
Nov25 v. Feb26 Swap Spread Butterflies



Source: BMO Capital Marketsⁱ Fixed Income Sapphire database

Key Metrics & Expectations

Figure 8, Figure 10, Figure 11, and Figure 12 summarize the key metrics and differences between March and June contracts. We used closing prices on February 8th and have reduced the number of CTD bonds outstanding on the CGB contract by the holdings of the Bank of Canada². June contracts have not yet traded so we use the exchange settlement price which is usually not a tradeable price before the roll begins.

² The Bank lends its holdings, so the bonds are still available to deliver. The Bank holds only a small amount of the June 2032 now, CTD for the CGB contract, but none of the CTD bonds for other contracts.

CGBH24 to CGBM24

CGB (10-year) contracts, despite the recent rise in open interest for CGF (5-year) and CGZ (2-year), are still over half of all the contracts open on the Montréal Exchange so many clients will have interest in this roll despite the lack of a change in cheapest-to-deliver bond. Since the DV01 of the new contract will be almost the same as that of the old contract, the roll should be quite stable during intraday yield changes and be driven mostly by liquidity demands for H24 or M24 contracts.

On our price capture date, CGBH24 was trading two cents cheap to an optionless fair value for the contract but the wildcard option had a value of about five cents making the contract three cents rich to bonds when netted. If this persists, short positions that need to buy to close or roll will be paying too much to do so and should wait if possible.

Trend following models built short positions this quarter but must have taken off some risk in early February on the sharp reversal. They are probably still short but not at full risk deployment. There will likely be early pressure to buy March contracts by speculative clients, who are typically eager to roll and who generally ignore relative pricing versus bonds. A strange dynamic may emerge in this contract as a rich contract gets pressured to richen even more by price insensitive demand. Dealers or nimble clients may be able to capitalize on this, especially if they are able to monetize the wildcard option during the delivery period.

Some clients may choose to forego CGB positions completely if the CGBM24 contract trades as rich as the H24 during the roll since the CTD they are implicitly buying is also trading rich to neighbours. Those that are able may substitute the December 2032 cash bond for their CGBM24 positions and try to take out a basis point or more of relative value on the CTD/December 2032 bond switch as well as 3 cents per contract. This would create a lack of equal buying pressure on June contracts and affect the roll price.

FIGURE 8 CGB Key Metrics

8-FEB-2024	CGBH24	CGBM24	DIFFERENCE
Closing Price	119.590	119.430	0.160
Cheapest-to-Deliver (CTD)	CAN 2.000% Jun 2032	CAN 2.000% Jun 2032	No change
CTD Conversion Factor	0.7426	0.7488	
Probable Delivery Date	01-Mar-24	03-Jun-24	
Gross Basis (cents)	-10.2	-72.4	
Net Basis (cents)	1.3	2.3	
Implied Repo (to Prob. Delivery)	4.69%	4.91%	
DV01/100 of CTD	6.7	6.7	0.0%
Open Interest	478,714	0	
CTD Outstanding (millions)	23,405	23,405	0
Front OI Multiple of CTD	2.0x	2.0x	

Source: BMO Capital Marketsⁱ Fixed Income Sapphire database, Montréal Exchange

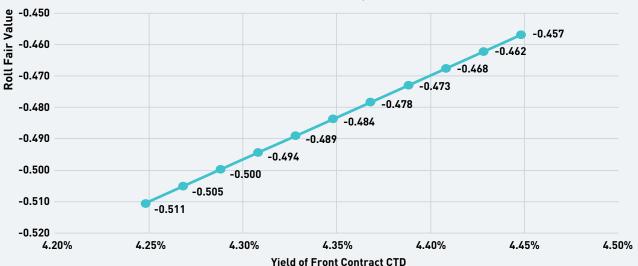
CGZH24 to CGZM24

In CGZ (2-year) contracts this quarter there is a CTD change, as usual, and the open interest is higher than it has ever been for this contract. Note, however, that 25% of the CGZZ23 contracts were delivered – an unusual amount for futures contracts – so roll activity may be somewhat reduced. We have speculated for a few quarters that some clients were using this contract as a bond substitute and that algorithm driven models don't use it much. We still believe this and surmise that it is probably due to greater liquidity available in other front-end contracts that tend to be simpler; BAX and CRA futures, for example. Clearly a very large portion of December contracts had no trouble at all with physical delivery since between 2% and 7% of all open interest is more commonly delivered in a normal quarter.

The DV01 of the contract will extend by over 14% which is normal for this contract, especially when the new and old CTD bonds have the same 4.5% coupon. Although the initial rate cut is now priced to be no sooner than the July Bank of Canada meeting (there is less than a 50% chance for the June meeting as of mid-February), a cycle of monetary loosening could begin much earlier than is currently forecast. If that were to happen and the Bank proceeded at a faster pace than markets imply, managers should be aware that the futures basis could move from negative to positive with the implication that delivery would quite suddenly be priced to the end of the delivery period rather than the start. We, nor the market in general, expect that to happen at this time but the subject will probably warrant a more thorough discussion when we address the move to September 2024 contracts.

As usual for CGZ, where the roll price is unstable due to the DV01 difference between the contracts, managers should be careful leaving standing orders this quarter as the CGZ roll fair value pricing can easily fluctuate by up to two cents intraday as shown in Figure 9. Trend models and speculative positions will probably not be a factor but short positions of H24 contracts may recognize that the CTD is very cheap and try to roll early putting upward pressure on the price of H24 contracts relative to M24. Given the prevalence of deliveries recently they could also begin to buy the cheap CTD and give notice to deliver as soon as possible.

FIGURE 9
CGZH24/CGZM24 Roll Fair Value v. Rate Level, Feb 23/24



Source: Author Calculations

FIGURE 10 CGZ Key Metrics

8-FEB-2024	CGZH24	CGZM24	DIFFERENCE
Settle Price	102.690	103.255	-0.565
Cheapest-to-Deliver (CTD)	CAN 4.50% Nov 2025	CAN 4.50% Feb 2026	Change!
CTD Conversion Factor	0.9765	0.9765	
Probable Delivery Date	01-Mar-24	28-Jun-24	
Gross Basis (cents)	-3.3	-24.9	
Net Basis (cents)	0.0	-4.4	
Implied Repo (to Prob. Delivery)	5.00%	5.11%	
DV01/100 of CTD	1.6	1.9	14.4%
Open Interest	170,975	0	
CTD Outstanding (millions)	19,750	23,000	3,250
Front OI Multiple of CTD	0.9x	0.7x	

Source: BMO Capital Marketsⁱ Fixed Income Sapphire database, Montréal Exchange

CGFH24 to CGFM24

The cheapest-to-deliver bond on the 5-year (CGF) contract will change from the 3.25% September 2028 to the 4% March 2029, a significant increase in the CTD coupon. There are two implications of a higher coupon on the CTD; wildcard option value will be less due to the inherently higher conversion factor of the CTD and the DV01 extension is smaller than it would normally be at just 9%. For CGF, the value of the wildcard option is often not priced correctly, even when the value is higher, so we expect that to continue now that the value will likely be even less in future. For CGFH24, the wildcard option has a value of about one cent per contract, and the contract was already trading rich even when ignoring that value. In total the CGFH24 is trading 1.5 cents too expensive so buyers of this contract during the roll should wait, if they are able, to see if some of that richness can be avoided when rolling.

As mentioned above, we suspect that any momentum models using CGF probably de-risked substantially around the start of February, but they could still be very short as not all the slow build in open interest was removed. If that is the case, buying pressure will be substantial on the H24 with, assuming they roll positions rather than closing, similar selling pressures on M24. That may result in a rich contract with a relatively rich CTD getting even richer due to liquidity needs of short positions, an identical dynamic to the CGB contract this quarter.

FIGURE 11 CGF Key Metrics

8-FEB-2024	CGFH24	CGFM24	DIFFERENCE
Closing Price	110.160	111.270	-1.110
Cheapest-to-Deliver (CTD)	CAN 3.250% Sep 2028	CAN 4.000% Mar 2029	Change!
CTD Conversion Factor	0.8929	0.9183	
Probable Delivery Date	01-Mar-24	03-Jun-24	
Gross Basis (cents)	-8.2	-48.0	
Net Basis (cents)	-0.1	-12.2	
Implied Repo (to Prob. Delivery)	5.12%	5.50%	
DV01/100 of CTD	4.1	4.6	12.3%
Open Interest	126,856	0	
CTD Outstanding (millions)	20,000	17,000	-3,000
Front OI Multiple of CTD	0.6x	0.7x	

Source: BMO Capital Marketsⁱ Fixed Income Sapphire database, Montréal Exchange

LGBH24 to LGBM24

Investors that utilize LGB (30-year) contracts usually take advantage of the lack of urgency to roll (LGB futures have no delivery period or first/last notice dates so there is no threat of early delivery) and do so at their leisure, sometimes during the traditional roll period but often not.

No embedded wildcard option and no change to the CTD for the LGBM24 contract versus the March means roll pricing should be quite stable, although all physical delivery futures this quarter need to contend with the small possibility of a Bank of Canada policy move during the quarter. The implied repo (from settle prices but on a contract that has no open interest yet) looks way too high for LGBM24 in Figure 12. We calculate the fair value of the roll at almost exactly flat given the fact that the implied repo should be closer to 5.02% for the June 19th delivery day of LGBM24 contracts.

FIGURE 12 LGB Key Metrics

0 FED 202/	LODUA/	LODMO	DIFFERENCE
8-FEB-2024	LGBH24	LGBM24	DIFFERENCE
Closing Price	160.650	161.200	-0.550
Cheapest-to-Deliver (CTD)	CAN 2.750% Dec 2055	CAN 2.750% Dec 2055	No change
CTD Conversion Factor	0.5412	0.5425	
Delivery Date	19-Mar-24	19-Jun-24	
Gross Basis (cents)	-16.4	-87.2	
Net Basis (cents)	-0.9	-31.3	
Implied Repo (to Delivery)	5.10%	6.03%	
DV01/100 of CTD	17.5	17.5	-0.3%
Open Interest	1,889	0	
CTD Outstanding (millions)	11,750	11,750	0
Front OI Multiple of CTD	0.0x	0.0x	

Source: BMO Capital Marketsⁱ Fixed Income Sapphire database, Montréal Exchange

December Delivery Summary

Quite a large amount of CGZ contracts remained open into the delivery period in December, and, predictably, almost all of them were delivered on the very first eligible date. November 29th was the first notice date, and 85% of all contracts, excluding LGBH24 of course, were delivered on either the first or second eligible day in the delivery period.

FIGURE 13

CONTRACT	DELIVERED	PRE-ROLL OPEN INTEREST	PERCENT DELIVERED
CGZH24	37,360	140,243	26.6%
CGFH24	10,342	110,159	9.4%
CGBH24	14,075	544,665	2.6%

Source: Montréal Exchange, Canadian Derivatives Clearing Corporation (CDCC)

About 10,300 CGF (5-year) contracts were delivered on the first and second days of the delivery period, perhaps as a wildcard option play but the profits from doing so were, as has often been the case in CGF, quite small. Some wildcard players in CGB (10-year) were more successful with delivery notices given on November 30th and December 1st which look like reasonably successful wildcard deliveries since the price of the CTD increased after futures markets settled on those days. Profits on the 10-year were potentially much higher with theoretical gains approaching \$700,000 of alpha split among all players, as shown in Figure 14, where the bulk of the deliveries occurred on the optimal date of December 5th (notice for said delivery was on December 1st).

FIGURE 14

		CGBH24					
NOTICE DATE	DELIVERY DATE	QUANTITY	POSITIVE CARRY REMAINING / CONTRACT	WILDCARD OPTION VALUE / CONTRACT	CTD EQUIVALENT WILDCARD EXERCISE THRESHOLD ³	CTD 3PM-5PM APRICE	THEORETICAL WILDCARD EXERCISE \$GAIN
29-Nov-23	01-Dec-23	0	0.000	0.051	0.146	0.059	0
30-Nov-23	04-Dec-23	5,500	0.000	0.051	0.142	0.058	110,018
01-Dec-23	05-Dec-23	8,575	0.000	0.049	0.138	0.198	587,486
04-Dec-23	06-Dec-23	0	0.000	0.048	0.132	0.158	0
05-Dec-23	07-Dec-23	0	0.000	0.046	0.128	-0.016	0
06-Dec-23	08-Dec-23	0	0.000	0.044	0.121	0.049	0
07-Dec-23	11-Dec-23	0	0.000	0.042	0.115	-0.025	0
08-Dec-23	12-Dec-23	0	0.000	0.040	0.108	0.066	0
11-Dec-23	13-Dec-23	0	0.000	0.037	0.101	-0.008	0
12-Dec-23	14-Dec-23	0	0.000	0.035	0.091	-0.091	0
13-Dec-23	15-Dec-23	0	0.000	0.031	0.078	-0.045	0
14-Dec-23	18-Dec-23	0	0.000	0.027	0.063	0.123	0
15-Dec-23	19-Dec-23	0	0.000	0.022	0.041	0.184	0
18-Dec-23	20-Dec-23	0	0.000	0.014	0.000	0.174	0
19-Dec-23	21-Dec-23	0	0.000	0.000		-0.033	
20-Dec-23	22-Dec-23	0	0.000	0.000		0.177	
21-Dec-23	25-Dec-23	0	0.000	0.000		-0.132	
21-Dec-23	26-Dec-23	0	0.000	0.000		-0.132	
21-Dec-23	27-Dec-23	0	0.000	0.000		-0.132	
22-Dec-23	28-Dec-23	0	0.000	0.000		0.049	
27-Dec-23	29-Dec-23	0	0.000	0.000		-0.115	
		14,075	← 2.6% of OI				\$697,504

Source: BMO Capital Marketsⁱ Fixed Income Sapphire database, Canadian Derivatives Clearing Corporation (CDCC)

³ The minimum threshold for a wildcard exercise is the remaining carry foregone by delivering the bonds early to close a long basis position plus the remaining value of the wildcard option. The per contract amounts are adjusted by dividing by the hedge tail to calculate the CTD equivalent price change.

⁴ The profit a long basis holder would have generated by selling the hedge tail at the 5pm price and giving notice to deliver less the remaining carry.

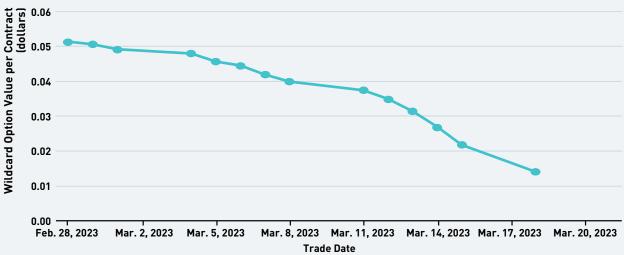
Wildcard Option Value

As is the norm every quarter, the LGB (30-year) contract has no embedded wildcard option and the wildcard option embedded in the CGZ (2-year) contract, has almost no value due to the very large conversion factors for the CTD every quarter.

Due to increased volatility, we calculate that CGFH24 wildcard option values are slightly higher than for the prior Z23 contract at just under 1.1 cents per futures contract. If the M24 contract begins trading at rich levels, as the H24 contract was doing at the time we captured prices this quarter, clients may be able to accumulate the option for a negative price and, eventually, take out some gains either through eventual exercise in the delivery period, or when the market reprices to fair value.

CGBH24 positions going into delivery could easily experience a Wildcard exercise against their position if it remains open in December as this remains a modestly popular trade, although we suspect less popular going forward. Although the fair value of the option in March CGB contracts is, all else equal, considerably less than that of the same option embedded in most of the 2023 contracts, it still has a value of about five cents per futures contract which is usually well-reflected in the contract price, although not currently. Futures contract buyers demand about that amount to be subjected to being short the wildcard option in delivery which often results in late-day delivery notification.

FIGURE 15
CGBH24 Wildcard Option Value



Source: Author Calculations

LOOKING FORWARD & Opportunities

- Managers should review how their holdings will re-price IF (but not yet likely) there is a surprise Bank of Canada rate cut during the life of the June contract. Generally, the implied repo would fall by at least the amount of the rate cut, say 25 basis points, and futures contracts would fall in price relative to bond prices. Further, for CGZH24, if the rate cut was more than a 25 basis point cut, the contract would re-price, upward this time, to reflect delivery at the end of the delivery period, rather than the beginning⁵. That might be worth about 1-2 cents, depending on when it occurs but is relevant only for the CGZ contract this quarter as the other contracts have cheapest-to-deliver bonds that bear coupons well below the current Bank of Canada target rate.
- Higher coupons on the CGB contract in 2024 means wildcard options embedded in CGB contracts are less attractive. One can never be sure, but we expect wildcard exercise attempts to be reduced for some time going forward.
- The June 2024 delivery period will be the first one under the upcoming T+1 settlement cycle, scheduled to be implemented on May 27, 2024 in Canada⁶. As per Advisory Notice A24-006⁷, participants should be aware that starting with the June 2024 contract, the first and last notice day will shift by 1-day and the delivery day of Government of Canada bond futures (as well as all the physically-delivered futures and options on the Montréal Exchange) will happen under the new T+1 regime.

⁵ Technically, a 50 basis point cut would make the contract about zero carry so many clients may be ambivalent about early or final delivery dates and just deliver whenever is most convenient for them.

⁶ https://ccma-acmc.ca/en/wp-content/uploads/CCMA-Announces-Canadian-T1-Start-Date-March-14-2023.pdf

⁷ https://www.m-x.ca/en/resources/notices/advisory-notices?id=56



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