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CGF Five-Year Government of Canada Bond Futures

CGB Ten-Year Government of Canada Bond Futures

Z19-H20 Roll Update

November 2019

Quarterly Roll Summary

Short positions in both CGFZ19 and CGBZ19 will probably attempt to roll early to capture some of the relative cheapness observed in those contracts. In CGF, long positions wary of an early delivery will probably balance out this buying demand. However, in CGB, we suspect some short positions[1] to favor holding their position into the delivery period and this lack of buying pressure could cheapen front CGB contracts even more than is already observed prior to the roll period.

There will be no change in the delivery basket for either CGF or CGB contracts as we move from Z19 to H20. Absent any extreme market moves, Canada 1.5% Sep24 will be the cheapest-to-deliver bond (CTD) for CGFH20 and Canada 2% Jun28 will be the CTD for CGBH20; the baskets for Z19 and H20 contracts are identical[2].

First Notice day for delivery on the Z19 contracts is November 28th so the active days of the contract roll should begin in both CGF and CGB contracts on Monday November 25th. The Thanksgiving long weekend in the US occurs immediately before the start of the roll period this year so there is some possibility that some US-based participants in the market may want to complete their roll before November 21st. Given liquidity considerations in the H20 contracts before they take active status, we believe this will be difficult or very costly. As such, nearly the entire roll period will be compressed into November 25th to 28th and will keep bank dealers active during those three days.

CGFZ19 will carry negatively during the delivery period and any short positions are expected to deliver early. Long CGF positions should be wary of the near certainty of early delivery and the potential for a Wildcard option exercise against them. CGBZ19 carries positively during the delivery period and remaining short positions after the roll will avoid delivering early unless the conditions exist to profitably exercise their Wildcard option (see below).

The Bank of Canada appeared to take a bias toward easier monetary policy at its last announcement and fair value for the H20 contracts[3] should reflect the possibility of a rate cut during the contract life since there are fixed announcement dates[4] on January 22nd and March 4th.

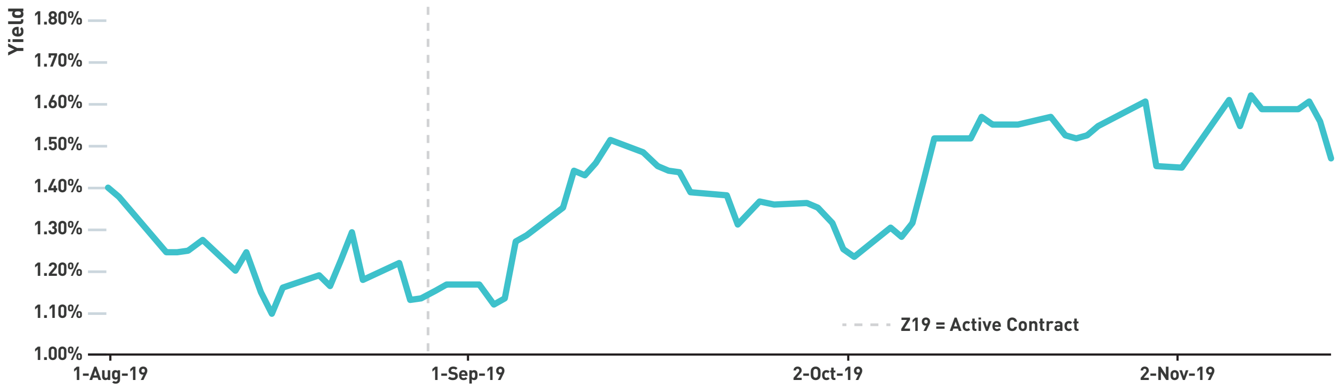
Positioning

The period where Z19 was the active contract was not an easy one for momentum traders and we expect these speculative accounts that avoid the delivery period at all costs to have very modest sized positions to roll in late November. As we can see easily in Figure 1, yields rose very quickly just after the Z19 became the active contract but then reversed sharply in mid-September and then reversed that reversal in trend once again in early October. Such choppy markets tend to reduce the risk allocation to trend following models or stop them out entirely. In the period of sideways yields between mid-October and mid-November, there appears to be no strong trend that would have induced such algorithms to re-enter their positions.

1. Specifically long basis positions, not outright short CGBZ19.
2. But, of course, the conversion factors for each bond differ between contracts.
3. Via the implied repo rate embedded in the price difference between cash and futures.
4. 2020 Fixed Announcement Dates

FIGURE 1

10y Bond Yield, Past 3 Months



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

As one would expect with no sustained trend in interest rates, correlation between price and open interest was insubstantial for both the CGF and CGB contracts this quarter. Contract open interest ranged between 45,000 and 60,000 for CGF and showed no relationship to contract prices. CGB open interest ranged from 550,000 to 600,000 throughout the choppy yield market during the life of the Z19 contract. Unfortunately no prediction of price-insensitive flows during the roll period can be made for the Z19/H20 roll.

Cheapest-to-Deliver Essentially Pre-Determined

As in all recent quarters, there is almost no potential for a switch of cheapest-to-deliver (CTD) bond in both CGF and CGB. 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[5] are essentially worthless. Wildcard options, which don't require a CTD switch to be profitably exercised, may have some value to active participants[6].

For completeness, we show the yield/slope combinations that would result in a CTD switch for the CGFH20 and CGBH20 contracts in Figure 2 and Figure 3. 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 show in bold font. The combinations of yield and slope that result in each bond becoming CTD are color-coded.

FIGURE 2

	Sep24 Yield															
SLOPE	0.67%	0.87%	1.07%	1.27%	**1.47%**	1.67%	1.87%	2.07%	2.27%	2.47%	2.67%	2.87%	3.07%	3.27%	3.47%	3.67%
-10.0	Sep24	Sep24	Sep24	Sep24	**Sep24**	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24
-7.9	Sep24	Sep24	Sep24	Sep24	**Sep24**	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24
-5.8	Sep24	Sep24	Sep24	Sep24	**Sep24**	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24
-3.6	Sep24	Sep24	Sep24	Sep24	**Sep24**	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24
-1.5	Sep24	Sep24	Sep24	Sep24	**Sep24**	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24
0.6	**Sep24**	**Sep24**	**Sep24**	**Sep24**	**Sep24**	**Sep24**	**Sep24**	**Sep24**	**Sep24**	**Sep24**	**Sep24**	**Sep24**	**Sep24**	**Sep24**	**Sep24**	**Sep24**
10.5	Sep24	Sep24	Sep24	Sep24	**Sep24**	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24
20.4	Sep24	Sep24	Sep24	Sep24	**Sep24**	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24
30.2	Sep24	Sep24	Sep24	Sep24	**Sep24**	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Sep24	Mar25	Mar25	Mar25	Mar25
40.1	Sep24	Sep24	Sep24	Sep24	**Sep24**	Sep24	Sep24	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25
50.0	Sep24	Sep24	Mar25	Mar25	**Mar25**	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25	Mar25

5. 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.
6. 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.

In Figure 2, there appears to be no viable path to a CTD switch for CGFH20. It would take more than a 220 basis point rise in yields or a 50 basis point steepening of the 6-month section of the yield curve between September 2024 and March 2024 to accomplish a switch. Either scenario, or any combination of them, seem implausibly remote.

A CTD switch is also unlikely for CGBH20, requiring a similarly improbable steepening between the yields of the June 2028 and June 2029 bonds of almost 40 basis points as shown in Figure 3, or a steeping of 30 basis points combined with a 130 basis point rise in yields over the three months H20 will be the active contract.

FIGURE 3

	Jun28 Yield															
SLOPE	0.47%	0.72%	0.97%	1.22%	**1.47%**	1.72%	1.97%	2.22%	2.47%	2.72%	2.97%	3.22%	3.47%	3.72%	3.97%	4.22%
-15.0	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28
-12.1	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28
-9.1	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28
-6.2	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28
-3.2	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28
-0.3	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**	**Jun28**
9.8	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28
19.8	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun28	Jun29	Jun29	Jun29
29.9	Jun28	Jun28	Jun28	Jun28	**Jun28**	Jun28	Jun28	Jun28	Jun28	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29
39.9	Jun28	Jun28	Jun28	Jun28	**Jun29**	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29
50.0	Jun29	Jun29	Jun29	Jun29	**Jun29**	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29	Jun29

The timing option remains important for CGF contracts at this juncture. The current Bank of Canada target rate is above the coupon rate on the CGFH20 CTD. Although an imperfect rule-of-thumb, a 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. The follow-on effect is that Gross Basis should be negative for CGFH20, just as it was negative for CGFZ19. In addition, short positions remaining in CGFZ19 will continue to face negative carry each day and will, in all likelihood, deliver bonds early.

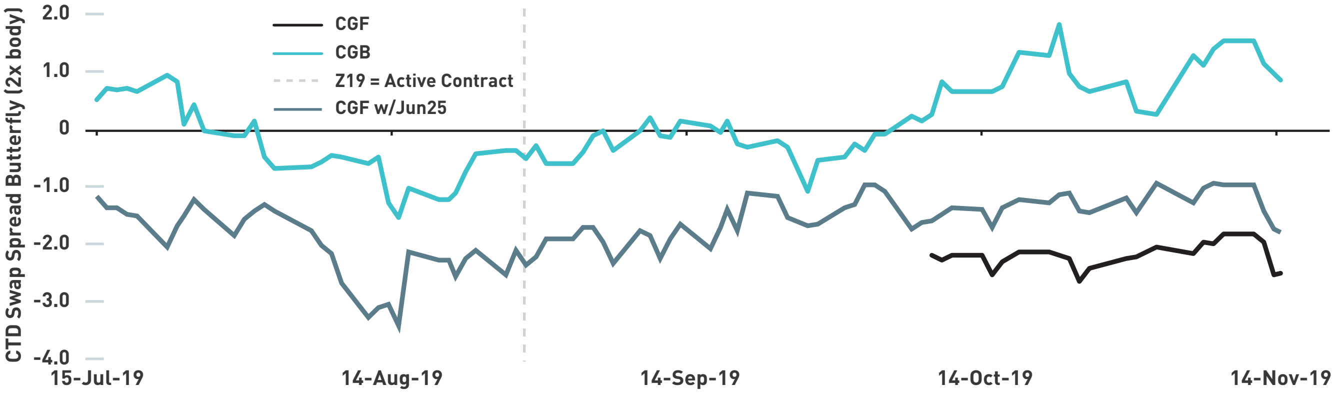
Relative Value

Figure 4 plots the swap spread butterfly[8] for the CTD of both the CGF and CGB contracts this quarter, although the CGF time series is limited by the fact that the new 5-year bond, which is required to plot the butterfly, didn't exist until early October. To compensate for this missing bond, we have plotted two CGF time series this quarter; the first is the pure CTD butterfly using only 5-year bonds and the second substitutes the 2.25% June 2025, an old 10-year bond, in order to generate a longer time series. 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 Z19 became the active contract.

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.
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.

FIGURE 4

Z19 CTD Swap Spread Butterflies

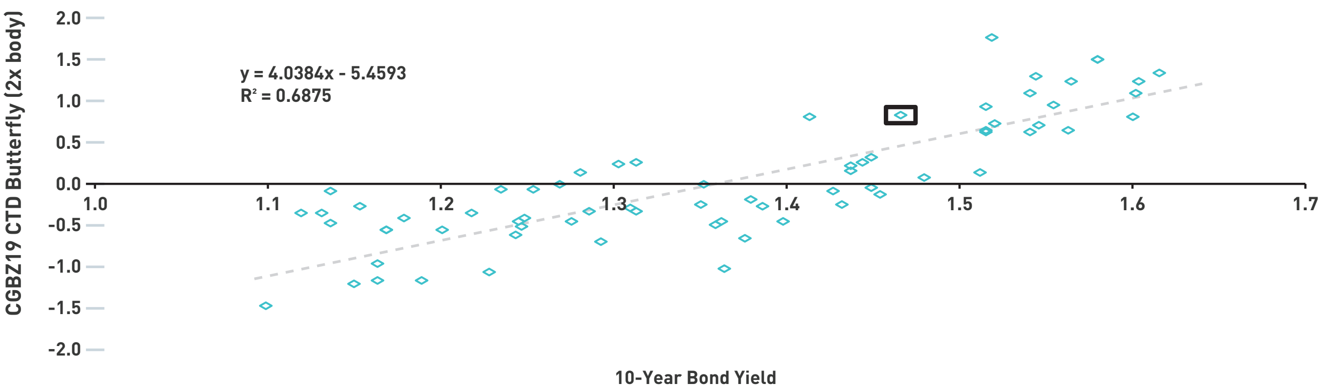


Source: BMO Capital Markets[i] Fixed Income Sapphire database

The range for the CGB swap spread butterfly was larger than normal this quarter. Due to the prominence of CGB as the liquid instrument in the 10-year sector, the CTD for the active contract tends to become rich when bonds are richening and cheap when bonds are cheapening. This tendency is shown in Figure 5 which shows the CGBZ19 CTD swap spread butterfly regressed against the 10-year bond yield since the beginning of July. At an r-squared of 0.69, much of the observed richness or cheapness of the CTD bond versus its neighbours is explained by the level of yields.

FIGURE 5

10-Year Bond Yield Versus CGBZ19 CTD Butterfly



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

The CTD for the CGB contract is relatively cheap, according to this measure, at +1.0 basis points, although certainly not outside normal observations. Since both the CGBZ19 and CGBH20 will be identical assets to the Jun28 bond at delivery, the owner of the contracts is long an asset that has potential to richen relative to neighbour bonds. However, since the two contracts have the same CTD, the relative value of the delivery bond should have no discernable effect on the timing or pricing dynamic of the roll this quarter.

Unlike the CGB contract, relative value in the CGF contract is not usually driven as much by the level of rates. As shown in Figure 4, CTD for both the Z19 and H20 contracts (the Sep24 bond) was range bound between -2 and -1 basis points[9] during the life of the Z19 contract. As usual, the CGF CTD swap spread butterfly appears rich in that it is well below that of the CGB contract. This is likely due to a liquidity premium attached to the CTD which is also the benchmark 5-year bond. For this reason, we do not expect this observed richness of the CGFZ19 CTD versus its neighbours to subside in the near term.

9. Using the alternative CGF w/ Jun25 measure in Figure 5.

Key Metrics & Expectations

The Key Metrics that may interest a Portfolio Manager with a position in Z19 contracts who is contemplating his/her roll strategy this week are shown in Figure 6 and Figure 7. We used closing prices on November 14th in order to meet the publication deadline.

CGFZ19 to CGFH20

A long basis position in CGFZ19 contracts carries negatively during the delivery period which will likely prompt any residual short positions after First Notice to deliver early. Since early delivery is probable, the correct date to assess Net Basis and Implied Repo to is the First Delivery date, not the Last Delivery date.

Currently the 1.63% implied repo to First Delivery on the Z19 makes the contract almost 3 cents cheap given that OIS to the same (early) delivery date is 1.74%. At the 1.72% implied repo inferred by the settlement price of the CGFH20[9] that contract would be priced just 1 cent cheap. Short positions may be inclined to roll early if they can do so given the relative cheapness of the Z19.

FIGURE 6

CGF Key Metrics

14-Nov-2019	FRONT (Dec19)	BACK (Mar20)	Change
Closing Price	122.640	121.460	1.180
Cheapest-to-Deliver (CTD)	CAN 1.50% Sep 2024	CAN 1.50% Sep 2024	
Delivery Years (Last delivery)	4.7	4.4	-0.2
CTD Conversion Factor	0.8164	0.8248	
CTD Clean Price	100.118	100.118	
CTD Yield	1.474%	1.474%	0.000%
Gross Basis (cents)	-0.5	-6.2	
Net Basis (First Delivery, cents)	0.5	1.2	0.7
Implied Repo (First Delivery)	1.63%	1.72%	0.09%
DV01/100 of CTD	4.6	4.6	0.0
Open Interest	58,930	0	
CTD Outstanding (millions)	16,200	16,200	0
CTD Notional of Front Open Interest	5,893	5,893	
Front Open Interest Multiple of CTD	0.36x	0.36x	0.0x

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

CGBZ19 to CGBH20

As has become the norm, the roll period for CGB will likely be eventful and active, despite no change to the deliverable basket. CGB open interest is relatively high and many Z19 positions need to be adjusted to the H20 contract during the short window of roll liquidity. Carry is positive for a long basis position so early delivery is unlikely on the Z19 contracts and long CGBZ19 positions can afford to be patient. Existing short positions may take advantage of the cheapness of front contracts in order to roll early at attractive prices, especially if they have no ability to exercise a Wildcard option.

9. Not a tradeable price since the open interest in the contract is zero and no contracts have traded yet.

On November 14th implied repo for Z19 to Last Delivery was 1.52% as shown in Figure 7 but the overnight index swap market reflected a rate of 1.73% making Z19 over 3 cents cheap relative to the CTD bond.

FIGURE 7

CGB Key Metrics

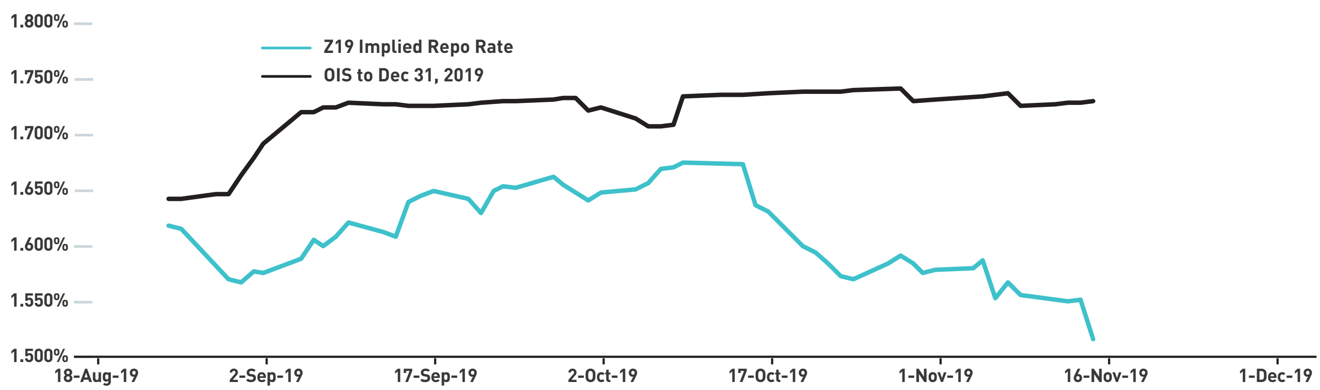
14-Nov-2019	FRONT (Dec19)	BACK (Mar20)	Change
Closing Price	141.410	140.220	1.190
Cheapest-to-Deliver (CTD)	CAN 2.00% Jun 2028	CAN 2.00% Jun 2028	
Delivery Years (Last delivery)	8.4	8.2	-0.2
CTD Conversion Factor	0.7367	0.7426	
CTD Clean Price	104.222	104.222	
CTD Yield	1.472%	1.472%	0.000%
Gross Basis (cents)	4.5	9.5	
Net Basis (Final Delivery, cents)	2.6	3.6	1.0
Implied Repo (Final Delivery)	1.52%	1.66%	0.14%
DV01/100 of CTD	8.2	8.2	0.0
Open Interest	567,273	0	
CTD Outstanding (millions)	13,500	13,500	0
CTD Notional of Front Open Interest	56,727	56,727	
Front Open Interest Multiple of CTD	4.2x	4.2x	0.0x

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

While the Z19 contract was cheap to OIS during its entire life as the active contract, the cheapening began in earnest after October 17th and has continued to mid-November. Figure 8 plots the implied repo rate to final delivery for CGBZ19 with the OIS rate to the same date and shows how the differential has only increased since mid-October.

FIGURE 8

Indicative CGB Implied Repo & OIS to Delivery



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

The richness in CGBZ19 could imply a belief that the CTD will be rich in the repo market for an extended period, although the cheapness of the issue versus neighbour bonds in Figure 4 directly contradicts this conclusion. It could also be optimistic relative value traders setting up to potentially exercise a Wildcard option during the delivery period. CGBZ19 is positive carry so any profitable exercise of the Wildcard must compensate the long basis holder for the remaining carry which makes the threshold for exercise higher than in some previous contracts when carry was negative. However, the carry isn't overly positive so the threshold to profitably exercise is not outside the realm of possibility.

We calculate and show the price move threshold for CGBZ19 during each day of the delivery period in Figure 9. Some sophisticated market participants may have calculated the value of the Wildcard option embedded in CGBZ19 to be worth the 2.6 cents (the Net Basis) they are paying for that option by buying the basis at current levels. If that is indeed the case, one would not expect the contract to richen to fair value before the delivery period.

FIGURE 9

CGBZ19 Wildcard Threshold

DATE	Remaining Positive Carry (per contract)	Minimum ΔPrice to Exercise Wildcard
28-Nov-2019	18.90	0.053
29-Nov-2019	18.25	0.051
2-Dec-2019	17.60	0.049
3-Dec-2019	16.94	0.047
4-Dec-2019	16.29	0.046
5-Dec-2019	14.34	0.040
6-Dec-2019	13.69	0.038
9-Dec-2019	13.03	0.036
10-Dec-2019	12.38	0.035
11-Dec-2019	11.73	0.033
12-Dec-2019	9.78	0.027
13-Dec-2019	9.12	0.026
16-Dec-2019	8.47	0.024
17-Dec-2019	7.82	0.022
18-Dec-2019	7.17	0.020

Additional Observations

- Negative basis in CGF means the threshold to exercise Wildcard options in CGFZ19 is essentially zero. A long basis position exercises the Wildcard option only if more profits can be obtained by exercising than by holding the long basis position to delivery. Since carry is negative each day, the Wildcard owner (short position in CGFZ19) has a very low threshold to exercise and will almost certainly do so on the first day where rates rise between the close of futures trading and the deadline to give notice. Any remaining long CGFZ19 positions after November 28th should be very wary of being suddenly delivered and having to deal with their delivery tail and a sudden loss.

- 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 contract (and probably not even then unless rates rise a lot). A similar but lesser phenomenon is occurring right now for CGF contracts, where the CTD at 1.5% coupon is shorter to maturity and 25 basis points higher in coupon than the only other bond in the basket.

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