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MONTRÉAL EXCHANGE

CGB Case Study: Wildcard Option Exercise

Delivery report and market data suggests that clients successfully exercised the CGBM19 wildcard option on June 3rd, 2019.

Wildcard Option

There are several options embedded in a physical delivery futures contract[1] but one of the least understood is often the wildcard option. The wildcard option exists because the settlement price for futures contracts is set before the time at which delivery notice must be made while it is still possible to trade bonds during this time. In Canada, the wildcard option exists only between 3pm[2] and 5:30pm starting on first notice day and ending on the last trading day[3].

We have been skeptical of the value and profit potential of wildcard options for some time given the extremely nimble coordination required between the Portfolio Manager (PM) or bank trading desk and the group responsible for the mechanics of delivery; usually the settlements department or "middle office." After all, in order to capitalize on the wildcard option embedded in CGBM19, several things needed to occur within 2.5 hours (or 4.5 hours on the last trading day):

1. The market price of the cheapest-to-deliver bond (CTD), the 1% June 2027, needed to increase enough to make exercise profitable on a date between May 30th and June 19th after 3pm and before 5:30pm. Price moves outside of these narrow windows are irrelevant to the wildcard option.

2. A post-3pm price move needed to occur quite early in the delivery cycle since PMs long the futures basis[4] were experiencing negative carry which they would be tempted to avoid by closing the position early in the delivery cycle. As the wildcard option is created each day at the futures settlement time and ceases to exist at 5:30pm (until the futures settle on the next trading day), the profits associated with exercising it must be weighed against the certainty of negative carry as well as the potential lost profits on subsequent days since exercising the option means foregoing any future exercise opportunities for the wildcard option and the end-of-month option[5].

3. If the market did move after 3pm, the PM had to efficiently coordinate a delivery notice to the CDCC, probably very near the end of the working day.

4. In order to fully exercise his/her option and close the position, the PM also had to sell the delivery tail, possibly outside of liquid bond market hours and after many market makers had already closed their books.

June 3rd CGBM19 Wildcard Exercise

We can say with certainty that many CGBM19 contracts were delivered on June 3rd since we can observe a large reduction in the open interest for the contract with relatively little trading. In futures contracts, the open interest reflects the total count of short positions (or long, since every short position has a counterparty that is long) on each trading day. If there weren't

1 For a full discussion of all the options embedded in CGF and CGB contracts, refer to "Embedded Options in CGF and CGB" published by the Montréal Exchange in late 2018.
2 Except for early close trading days where the settlement calculation is done at 1pm.
3 Another option, not discussed here and called the end-of-month option, exists between the close on the last trading day and the last notice day. Unlike the wildcard option, the end-of-month option requires a change in the CTD to be valuable.
4 An interest rate neutral position that is short futures contracts and long a risk-equivalent amount of cash bonds.
5 To be fair, the end-of-month option has no value as it would require a change of the CTD bond which is virtually impossible at current market levels.

enough contracts traded to reduce the open interest, the contracts that "disappeared" are the minimum that must have been delivered. In addition, CDCC publishes a delivery report each day which indicates the number of contracts delivered. For June 3rd, the report indicates that just over 10,000 contracts were delivered.

We can't say with certainty that these contracts were delivered in order to exercise the wildcard option since we don't know that the delivery notification came after 3pm. We only know that those contracts were delivered that day. In fact, the total of 10,000 contracts is likely a hodgepodge of different positions held by different portfolios for various reasons rather than a single position. However, given the coincidence of the wildcard option becoming profitable on the 3rd and a large delivery, let's examine what a successful wildcard exercise probably looked like on that day.

Initial Position

To examine how a successful wildcard exercise worked, we begin with a long basis position of 1,000 contracts of CGBM19. This risk-neutral position would consist of a short CGBM19 position of 1,000 contracts hedged with a long position of $145.773 million notional of the Canada 1% June 2027 maturity bond, the CTD for the CGBM19. The position and offsetting risk amounts are shown in Figure 1.

FIGURE 1

Security	Position	Security DV01	Position DV01
CGBM19	-1,000	10.79	-107,934
Canada 1% June 2027	145,773,000	7.40	107,934
Total			0

Market Movement

Ordinarily, a risk-neutral position like the one shown in Figure 1 has no profit or loss from outright movements in interest rates since it is designed to be perfectly hedged against such moves. Instead, the position will benefit only from changes in the relative value of the two similar securities. However, this dynamic changes during the delivery period due to the existence of the wildcard option.

The wildcard option became valuable on June 3rd due to an exceptional price move in the CTD bond after futures settlement had occurred for the day at 3pm. At 3pm, the bond was trading at 96.968 but, by 5pm it was trading about 16 cents higher at 97.132[6]. Since the settlement price for CGBM19 set at 141.3 at 3pm, a bond price equivalent of 96.932, it was possible, between 3pm and 5:30pm on June 3rd, to give delivery notice at the 3pm price for that day in order to capitalize on the post-3pm price movement.

Mechanics of the Wildcard Option Exercise

In order to successfully exercise the wildcard option embedded in CGBM19, the PM had to give notice of intent to deliver to CDCC prior to the 5:30pm deadline and arrange to deliver the bonds on June 5th. Each contract has an underlying deliverable of $100,000 notional and, given the fact that any bond besides Canada 1% June 2027 was much more expensive to deliver, the short position would have declared intent to deliver $100 million notional[7] of the June 27s. The invoice price for the contract, given by the 3pm settlement price and the conversion factor for the June 27s was 96.9318.

Selling the Delivery Tail

The short position delivered $100 million notional to satisfy the contract. However, the original position consisted of $145.773 million notional so, after declaring intention to deliver, the short position must sell the remaining bonds, referred to as the delivery tail, to close the position. To do so, he/she could sell the position at, say, the 5pm price of 97.132. Recall that the position was perfectly hedged until 3pm such that increases or decreases in the price of the CTD would be reflected almost exactly in the price of the CGBM19. After 3pm that was no longer true since the settlement price of the contract remains static while the bond price continues to move. In this case the futures short could capitalize on a 16 cent price move, not on the entire position, *but on the delivery tail*.

6 Source: BMO Capital Markets[i] Fixed Income Sapphire database
7 1,000 contracts x 100,000 notional per contract

Gain

In our example, the long basis position of 1,000 contracts would have made just over $91,000, if he/she managed to sell the delivery tail at the 5pm price noted above[8]. Similarly, a short basis position would be forced to buy bonds to close out the delivery tail at a higher price but only if they were the ones to whom delivery was made.

FIGURE 2

Security	Hedge Tail Position	ΔPrice	Gain in Dollars
Canada 1% June 2027	45,773,000	0.20	91,638

How Common is a Wildcard Exercise

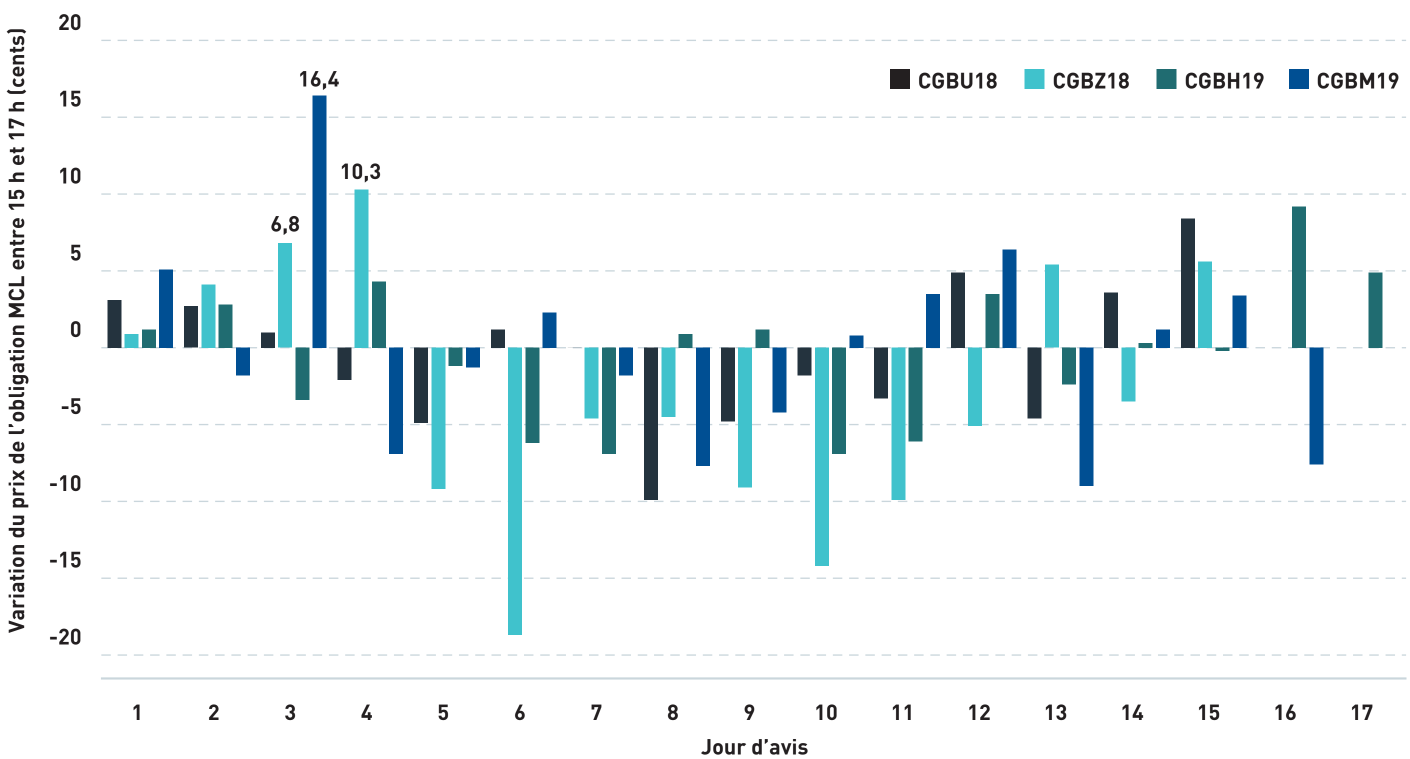
Opportunities for wildcard exercise have been somewhat uncommon lately since the CGBU18 to CGBM19 contracts all had a very low coupon CTD and therefore the long basis (or short futures) position was negative carry during the delivery period. This resulted in hesitation on the part of long basis positions to endure the negative carry in the contract delivery month in the hope that a late-day price move would eventually allow them to profitably exercise a wildcard option. However, the low coupon on the CTD bond also resulted in large delivery tails which make post-3pm price moves more profitable for the holder of the wildcard option.

We plot all the 3pm to 5pm price moves during delivery for the four contracts where the June 27s were the CTD in Figure 3 and find only one other probable instance of profitable wildcard option exercise – the CGBZ18[9] on December 3rd and 4th. In Figure 3, only positive price moves result in wildcard opportunities and probably only price moves of more than 5 cents[10] which occurred in the first 5-7 days of delivery. However, the opportunity on June 3rd eclipsed all the others due to the magnitude of the move at 16 cents or more and the fact that it came so early in the delivery period. We doubt that opportunities near the end of the delivery period were capitalized upon since all long basis positions were closed by that time, thus eliminating any wildcard options.

Given the large post-3pm move so early in the CGBM19 delivery period, the wildcard option owner could hardly have hoped for a more favorable outcome.

FIGURE 3

3pm to 5pm Price Moves During Delivery



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

8 The total profit is 20 cents rather than 16 cents since the futures settlement was a bond equivalent price of 96.9318, even lower than the bond was trading at 3pm.

9 Unfortunately, it looks like the wildcard was exercised on December 3rd as open interest fell drastically to almost nothing on the 4th. If someone did exercise their wild-card option on the 3rd, they did so profitably but they were probably disappointed that they pulled the trigger a day too early.

10 Only about 30% of the total price move could be captured by a wildcard exercise since the delivery tail is only about 30% of the size of the total bond position.

CGBU19 and Onward

Going forward the ultra-low coupon Canada 1% June 2027 is no longer part of the delivery basket. This is important because:

1. Delivery tails will be smaller in future, reducing the value of exercising the wildcard option. The size of the delivery tail is a function of the conversion factor for the CTD bond and smaller conversion factors result in larger delivery tails. For instance, the delivery tail for CGBU19 is just 80% of the size of that of CGBM19 so an equal magnitude post-3pm price move in future will be less profitable. Conversion factors will rise steadily at least until the March 2021 contract as shown in Figure 4[11]. According to Figure 4, the delivery tails, and thus the profitability of a wildcard exercise given a specific change in CTD price between 3pm and 5:30pm during the delivery period, will decline steadily to just 0.2355 in June 2021. Larger price moves will be required to generate similar profits on wildcard options for the next few years.

FIGURE 4

Contract	Probable CTD Conversion Factor	Delivery Tail	Daily Carry per 1,000 Contracts Long Basis
CGBU18	0.6634	0.3366	-$2,823
CGBZ18	0.6708	0.3292	-$2,782
CGBH19	0.6783	0.3217	-$2,776
CGBM19	0.6860	0.3140	-$2,735
CGBU19	0.7307	0.2693	$634
CGBZ19	0.7367	0.2633	$669
CGBH20	0.7426	0.2574	$639
CGBM20	0.7488	0.2512	$672
CGBU20	0.7475	0.2525	$1,401
CGBZ20	0.7531	0.2469	$1,438
CGBH21	0.7587	0.2413	$1,402
CGBM21	0.7645	0.2355	$1,437
CGBU21	0.6803	0.3197	-$1,894

2. The delivery period will be positive carry for a short futures position; a return to normal for futures. As shown in Figure 4 where we estimate the daily negative carry during delivery using current yields for both the 10-year bond and overnight rates, a 1,000 contracts long basis position will be much more inclined to wait to exercise a wildcard option since he/she is paid a small amount to do so. Short positions will need to weigh the remaining positive carry on their long basis position against the value of exercising the wildcard option as short futures positions can have their remaining carry or the value of the wildcard option but not both since exercising the option means closing the position and thus forgoing any remaining carry. The wildcard option should only be exercised if doing so provides greater profits than continuing to hold the position to final delivery. From this perspective, from CGBU19 onward, the most beneficial time for a post-3pm price move has now become the end of the delivery period.

   Using the same assumptions[12] as used in Figure 4, we calculate the minimum post-3pm increase in CTD price required to profitably exercise the wildcard option in two CGB contracts in the future in Figure 5 and Figure 6. Figure 5 is for the active U19 contract and Figure 6 is for the high positive carry Z20 contract. We can easily observe that the wildcard holder needs a higher post-3pm price increase near the start of the delivery period to justify exercising his/her option in both contracts, but particularly in the Z20 contract where remaining positive carry is quite high at the start of the delivery period.

11 Note that the table of conversion factors and delivery tails shown in Figure 4 depict only the probable CTD and includes an estimate of the next 10-year bond to be issued, which would probably carry a 1.25% coupon if it were issued today.

12 And also assuming there is no real chance of a CTD switch to make the end-of-month option valuable.

FIGURE 5

Delivery Period: 1,000 Contracts CGBU19 Long Basis

Date	Remaining Positive Carry	Minimum ΔPrice to Exercise Wildcard
29-Aug-19	$17,117	0.046
30-Aug-19	$16,483	0.045
03-Sep-19	$15,849	0.043
04-Sep-19	$15,215	0.041
05-Sep-19	$13,313	0.036
06-Sep-19	$12,679	0.034
09-Sep-19	$12,045	0.033
10-Sep-19	$11,411	0.031
11-Sep-19	$10,777	0.029
12-Sep-19	$8,875	0.024
13-Sep-19	$8,241	0.022
16-Sep-19	$7,607	0.021
17-Sep-19	$6,973	0.019
18-Sep-19	$6,339	0.017
19-Sep-19	$4,438	0.012

FIGURE 6

Delivery Period: 1,000 Contracts CGBZ20 Long Basis

Date	Remaining Positive Carry	Minimum ΔPrice to Exercise Wildcard
27-Nov-20	$43,126	0.132
30-Nov-20	$41,689	0.127
01-Dec-20	$40,251	0.123
02-Dec-20	$38,814	0.118
03-Dec-20	$34,501	0.105
04-Dec-20	$33,064	0.101
07-Dec-20	$31,626	0.096
08-Dec-20	$30,189	0.092
09-Dec-20	$28,751	0.088
10-Dec-20	$24,438	0.075
11-Dec-20	$23,001	0.070
14-Dec-20	$21,563	0.066
15-Dec-20	$20,126	0.061
16-Dec-20	$18,688	0.057
17-Dec-20	$14,375	0.044

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