Futures Flash Series ARTICLE 10

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MONTRÉAL EXCHANGE

Wildcard Options: The Option of Maximum Regret

Behavioral economists continue to present a plethora of situations where investors and economic participants make choices that appear irrational at first but can be explained by psychological and emotional reactions. One such situation is where decision-makers choose to minimize their level of future regret – the feeling that they have made a bad decision after that decision has been made and wistful thinking about what could have been – rather than a more traditional economic goal such as maximizing profits or utility.

In this sense, we wonder why any Portfolio Manager chooses to play the Wildcard option embedded in CGB™ (10-year) and LGB™ (30-year) futures contracts. To be fair, these options are likely rewarding to sophisticated investors who understand them and can value them correctly but, as we will argue in this piece, we are of the opinion that the Wildcard option generates regret at an unprecedented level, even for managers that make rational decisions and use the option to generate profits.

The Futures Basis and the Wildcard Option

For those investors new to the Wildcard, the option exists between the first notice date and the day before the last trading date but ONLY between 3pm when the settlement price of the futures contract is established and 5:30pm when the short position in Canadian physical delivery bond futures contracts must give notice of delivery. During this time, the owner of the Wildcard option can choose to "exercise" the option by delivering bonds to satisfy the obligations of the futures contract and sell any leftover bonds, usually referred to as the delivery tail. Before first notice, the option doesn't exist and after the day before the last trade of the contract, the option never exists again for that contract.

Normally, an investor playing the Wildcard option is in a long basis position; they are short futures contracts and long the cheapest-to-deliver bond in sufficient quantity to make the trade exactly neutral to changes in interest rates. An example of this trade is constructed for 100 CGBU22 contracts in Figure 1. In the figure, we show the total amount of bonds that create a DV01 hedge to the short futures position in two different line items, although the trade would be for the total amount of bonds versus the sale of the futures contracts. We show the construction in this way simply to highlight the delivery tail – the bonds that will not be delivered into the contract.

FIGURE 1

SECURITY	POSITION	SECURITY DV01	POSITION DV01
CGBU22	-100	10.33	-10,328
CAN 0.5% Dec 2030 *For Delivery	10,000,000	6.67	6,674
CAN 0.5% Dec 2030 *Delivery Tail	5,475,085	6.67	3,654
Total			**0**

While both markets are open, the yield of the bond and the futures contract are very closely related due to the possibility of arbitrage. The Wildcard is the delivery tail because, after the settlement price of the futures is established at 3pm, the short position has an additional 2.5 hours to decide whether they want to give notice of delivery at that price. Since only 10 million notional of the December 2030 needs to be delivered and the price of the additional 5.475 million notional can fluctuate, considering the bond market remains open, the short position can choose to deliver and capture any increase[1] in the price of the bond since 3pm as profit – essentially the payout on their Wildcard option.

1 For clarity, everything written in this piece assumes 10-year yields are under 6% and that conversion factors are less than 1. If yields rise above 6% many components of the Wildcard change: lower prices after 3pm are profitable for the Wildcard holder who is buying, not selling, due to the conversion factor being higher than 1. We ignore all of that in this piece since yields are well below any point where we need to take this possibility into consideration.

A Series of Complex Issues

Valuation and understanding of the Wildcard can be challenging for several reasons and many investors dislike it for its complexity:

- First, the Wildcard option, like all options associated with physical delivery futures contracts is an embedded option that one is long or short simply by buying or selling one of the futures contracts. They aren't a separate entity that is a derivative of some other asset but rather an integral part of the contract. Even more confusing, for some, is the fact that the short futures position owns all the options… the exact opposite position in something more vanilla like an equity option where the long position has the right to exercise.
- Second, for fixed income products that trade over the counter, even a closing price is sometimes subject to upward or downward bias depending on the model used to calculate it and each dealer will generally have a different price. For the Wildcard option, intraday prices are important, and this data is even less available and reliable.
- Third, the option is a complex one which is created each day at 3pm and disappears each day at 5:30pm for roughly 15 business days. One way to think of the Wildcard is as a series of 2.5 hour call options on the price of the CTD bond but the strike price (here, the 3pm price) resets every day.
- Fourth, while the decision rule for choosing to exercise the option is quite simple – exercise if the gains to be made from delivering early exceed the remaining value of the option plus any additional carry from holding the long basis position – the rule depends on the value of the option on the next business day and the level that one expects the basis to trade at on the next business day.
- Fifth, any manager that is long the Wildcard during the delivery period needs to manage the position, sometimes on a minute-to-minute basis as we will see below. Recall that the option disappears and becomes worthless for that day if the exchange doesn't receive the delivery notice by 5:30pm. Managers, especially those that are short contracts, need to manage this high maintenance position every day during the delivery period.
- Finally, unlike with equity options, the amount the client who was long the option gains isn't equal to the amount the client who was short the option loses. The Wildcard is, confusingly for some, not a zero-sum game. The reason for the disparity in P(L) is that the price at which the manager who sells the delivery tail is not the same as the price at which the manager must buy it. In fact, the manager who has the long position may not receive delivery notice from the exchange until the next morning and bond prices will have fluctuated since the short position traded their delivery tail.

Sources of Regret CGBM22

Knowing the complexities raised in the previous section, let's examine the delivery period for the June CGB (10-year) and LGB (30-year) contracts earlier this year[2].

For CGB, 9,683 contracts were taken into the delivery period starting on May 30th, the first notice date for the contract. The Bank of Canada raised interest rates, shortly after the delivery period began, to a level above the coupon rate on the cheapest-to-deliver for this contract but, we assume, all the Wildcard participants would have been hedged to delivery, or where they hoped delivery would occur. We therefore assume that long basis positions were probably positive carry for most participants given that their financing terms were probably already locked in.

In Figure 2, we show the captured price change on the 10-year bond between 3pm and 5pm, including five dates that are highlighted in bold. On each afternoon after the futures settlement price was published, the long basis holders would have been watching and waiting to see if there was an opportunity to capture a price difference.

2 All insights in this article were derived from public information such as bond prices and CDCC Delivery Reports. We have no access to internal Montréal Exchange data or non-public information so when we state "they delivered" we are speculating on the reasons why delivery occurred and whether it occurred after 3pm. It should go without saying that we have no idea which clients were long or short or even which Participants gave notice that day.

FIGURE 2

DATE	3PM-5PM PRICE CHANGE
30-May-2022	-0.0256
31-May-2022	0.0746
1-June-2022	**0.0862**
2-June-2022	**0.1041**
3-June-2022	0.0373
6-June-2022	-0.0963
7-June-2022	-0.0791
8-June-2022	-0.0690
9-June-2022	**0.0858**
10-June-2022	-0.0295
13-June-2022	-0.1271
14-June-2022	-0.0306
15-June-2022	**0.5306**
16-June-2022	**0.6230**
17-June-2022	0.0129
20-June-2022	0.0238

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

- On June 1st, bond prices did increase but not by enough. The holder of the long basis position could collect more in positive carry (assuming they did term repo before the Bank meeting) than they could capture by selling the delivery tail and making delivery on the remainder of their bonds to satisfy the CGB contract requirements.
- On June 2nd, watching again closely after 3pm, the Wildcard holders did not make delivery even though the remaining value of the positive carry was less than the amount of profit that could be captured. Why? The option can only be exercised once, and the decision rule must take into account the fact that the remaining value of the option is destroyed by exercising it. The Wildcard owner's decision rule (and valuation) must have indicated that the remaining carry plus the remaining value of the Wildcard option was greater than the amount that they could capture by delivering early. There also exists the possibility the price change occurred too late in the day to inform middle offices to give notice in time.
- On June 9th, after an agonizing wait of more than a week where prices fell after 3pm rather than rose, Wildcard holders got another opportunity when 10-year bond prices increased by over 8 cents and many seized that opportunity. 5,979 contracts gave notice on that date and delivered on June 13th at T+2. Given that over a week had passed, some impatience may have crept into the decision rule but also, after a week, the remaining value of carry in their position was lower and the value of the option had decayed somewhat, presenting a much lower hurdle for making early delivery.
- Another few days later, on June 15th, bonds saw a huge price increase after 3pm as a large rally in bonds began that day which was very volatile in general. 3,379 CGB contracts took the opportunity to sell their delivery tail at a good profit and give notice of delivery.
- On June 16th, bonds again saw a giant price rise after 3pm, even more than the previous day. This was the optimal day to give notice but it came near the end of the delivery period and, as described above, almost all Wildcard options had already been exercised. Just 325 contracts remained and were delivered on T+2.
- Whoever was still short on June 16th, deserves recognition for their patience – this 3.3% of all contracts taken into delivery for a Wildcard play are the only contracts that didn't create any regret for the Portfolio Manager! For the remaining 96.7% of contracts, there was a more optimal choice – unknown at the time, of course – that probably ended up creating some regret in the manager's mind about "what could have been".

So short positions spent a great amount of time managing their position – some made lots of money and some made very little – while the long position stood waiting. Of course, the long position can monitor the market as well, but hedging decisions are far from simple for the Wildcard and would have created regret (and possibly losses) for most long positions.

Recall that the long position must buy their delivery tail the moment they are made aware, sometimes the next day, that their futures position no longer exists and they have bonds instead. They wait on tenterhooks each afternoon to see whether they receive notice or observe a large price move.

- On June 1st and 2nd, long futures positions may have thought they were being delivered and tried to hedge by buying the delivery tail early[3], but no one delivered so they'd need to reverse that regretful hedge.
- On June 9th, on average, a hedge was the right move since most contracts gave notice. But 3600 long positions would have hedged erroneously since they did not get notice that day.
- Even on June 15th, when a hedge would be obviously beneficial, 325 contracts weren't delivered and anyone that hedged but did not receive notice the next day had to reverse the trade in the morning, and in this case, do it all over again the next day!

We believe that even the winners among the long and short positions that went into delivery on the CGB have experienced some sort of regret, not because they lost money but because they didn't earn what they could have. Regret is about seeing better outcomes that you wish happened, but which did not, which is why we are beginning to refer to the Wildcard as the option of maximum regret. Only the 325 contracts that gave notice on June 16th have no cause for regret – Just 3.3% of the contracts taken into delivery!

What About LGB?

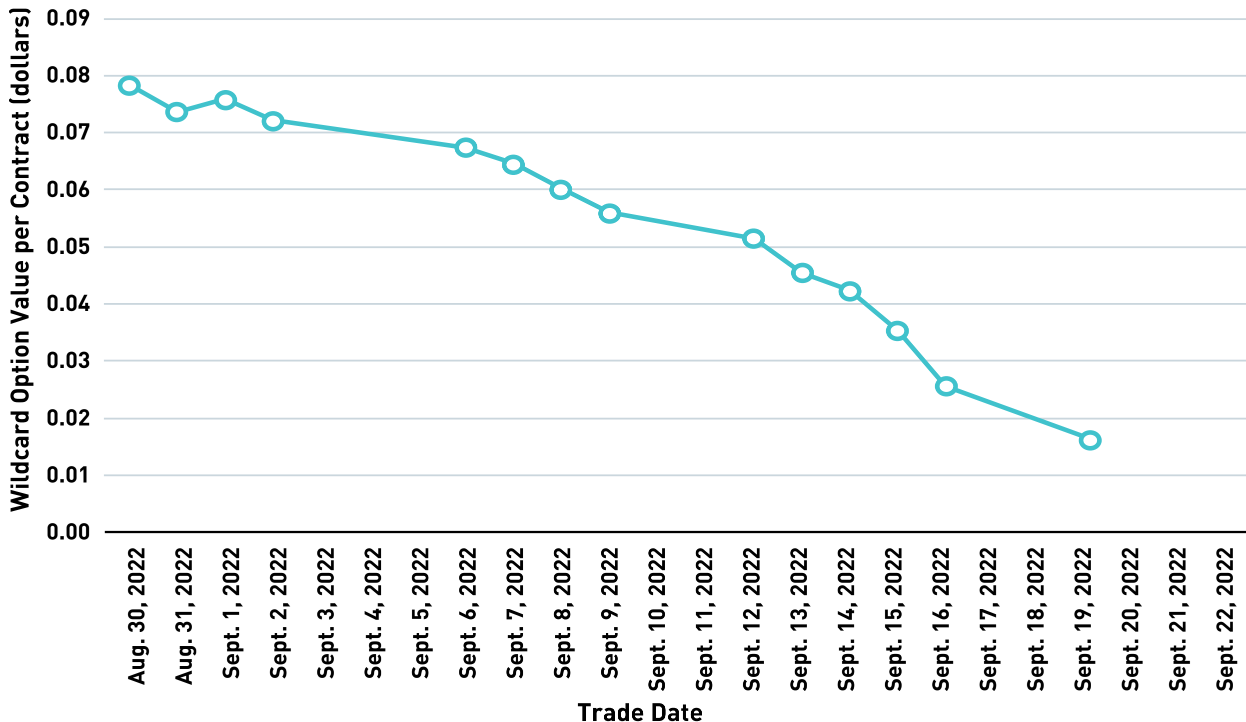
Unfortunately, perhaps only for the Wildcard owners in this case, regretful decisions were made in the LGBM22 delivery as well. Much like with CGB above, holders of the LGB Wildcard leaped at the chance to make a profit when long bond prices increased by about 73 cents after 3pm on June 3rd. Every single contract of the 2,372 contracts that were taken into the delivery period gave notice that day. With hindsight we know that had they waited another week, a profit opportunity over twice as large (June 16th, +$1.49 between 3pm and 5pm) would present itself. Sadly for the long basis positions, but very happily for the long futures contracts that risked delivery, not one contract remained to take advantage of this outsize opportunity to exercise the Wildcard for large profits.

The Current Situation for September Contracts

After examining the June delivery period, let's turn our eyes on the current situation. Pricing on the CGBU22 contract on August 12th, about two weeks before the first notice date, showed that the contract was 9 cents cheap relative to the cheapest-to-deliver bond which is close to our theoretical value of the Wildcard option[4] before it begins to decay in the delivery period as shown in Figure 3.

FIGURE 3

CGBU22 Wildcard Option Value



3 Generally trying to delta hedge the Wildcard is not feasible. One doesn't know if one needs to hedge until the price increase is observable and, by definition, by then it is too late unless the manager has views on the momentum of the trend.

4 For those interested, we use an iterative simulation model where the daily decision rule is identical to the manager's decision rule described above and the daily price change from 3pm to 5:30pm fits a Johnson's $_{SU}$ distribution calibrated to actual observed price changes since the start of the COVID-19 pandemic.

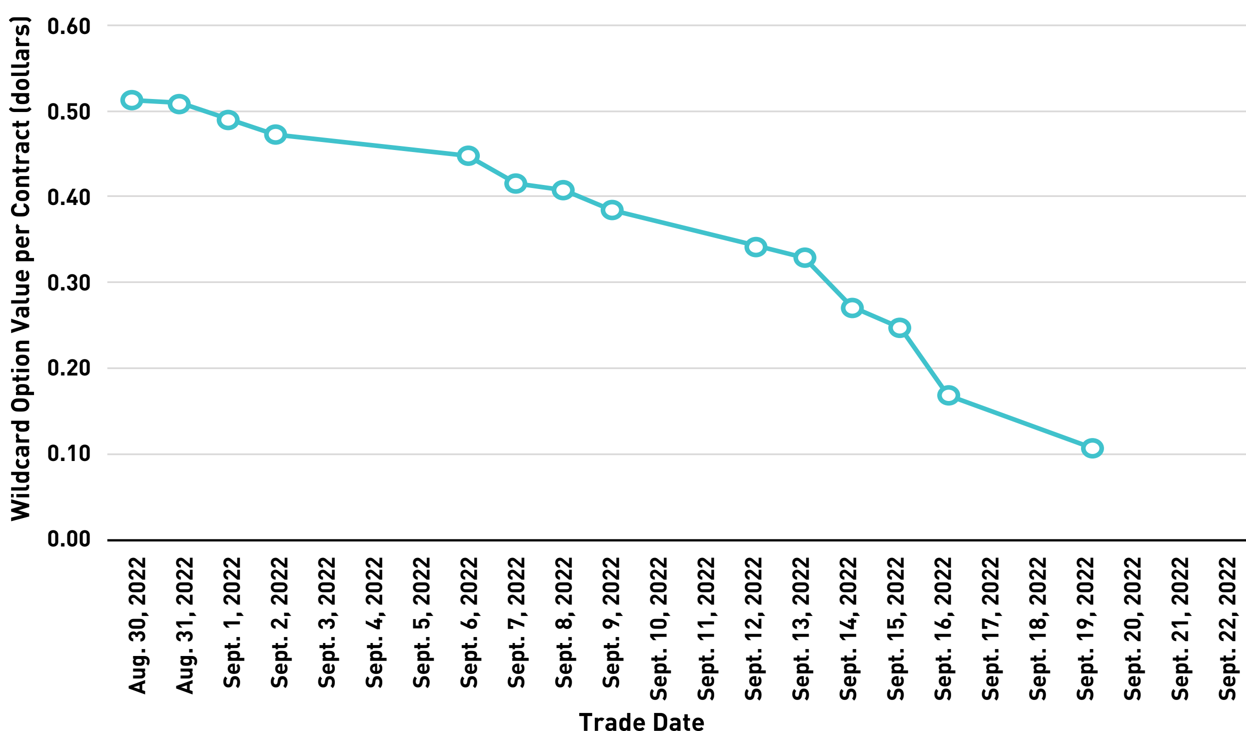
However, we note that the CGBU22 contract is very different from the CGBM22 – the contract has a very low coupon CTD and overnight rates are now much higher – in that long basis positions in CGBU22 will be negative carry by about 0.7 cents per day for each contract. That will add up to more than the theoretical option value by around the second week of the delivery period. In fact, the "correct" decision rule for this option, if you accept our valuation and carry calculations, is to close the position as though the Wildcard doesn't exist since you can capture the value of the Wildcard by selling your long basis position, without any of the hand-holding the position will need during delivery, in addition to avoiding any negative carry. We can't be certain but will see in the coming roll period whether market participants agree with our assessment.

And what about LGBU22? We calculated that the contract is $1.67 cheap to the CTD bond, the 2051s, but the value of the option appears to be only about 52 cents. We cannot fathom why a manager that is long the basis (and owns the Wildcard) would go to all the trouble, and potential regret, of managing the position through delivery when they could capture more than triple the intrinsic value of the option by simply closing the long basis position at the observed levels on August 12th, assuming liquidity could be found to do so. Of course, it is certain they use a different valuation model than we do and, perhaps, they see some value in the potential for a giant gain since there is no theoretical upside limit to the profit they can make on a volatile late afternoon. We dislike this "lottery ticket" explanation since it agrees with neither the theory that managers avoid regret nor the theory of rational decision making.

Again, the roll period and number of remaining positions after it will determine whether these managers will roll the dice on the Wildcard option or close it out by rolling their position to Z22 contracts. Of course, if they close the position and a giant post-3pm price move occurs in the 2051 bond, the Wildcard will truly earn its new nickname, "The Regret Option".

FIGURE 4

LGBU22 Wildcard Option Value



Summary

In summary, almost every participant in the Wildcard market will experience some sort of regret which could, we think, influence markets going forward. Although managers that stuck to their decision rule and took profits when they exceeded the value of not giving delivery notice made, in our option, the correct decision, these managers no doubt experience rueful regret that they were unable to see the future and may have spent some time wishing for "what could have been" if they had been more patient.

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