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MONTRÉAL EXCHANGE

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"Free Money Trade": Astute CGB Basis Traders Found a Free Option

In 2008, early in our career as Portfolio Managers we witnessed a large trade that was described as "self-healing" and "impossible to lose". Given the date, amid the financial crisis years, readers can imagine how this trade eventually turned out. Since then, it has been, among ex-employees of the firm, sarcastically labelled the "Free Money Trade" – sarcastic since at least one manager argued that profits would come without risk when, in fact, the risk (and loss) turned out to be enormous. As we all learn when first studying finance, there is always a tradeoff between return and risk. However, in early May we did observe in the Ten-Year Government of Canada Bond Futures (CGB™) market what we would term a "free money trade" (for real this time) for those astute and nimble enough to catch it.

Description and Potential Trade Entry

Recall that a futures basis[1] buyer "owns" the embedded options in the contract[2] since the short futures position determines the timing and choice of delivery instrument. Since this cash/futures arbitrage trade structure is DV01 neutral and the basis will converge to zero at delivery, we can say that, not counting any optionality for now, the trade structure should generate only the risk-free rate between entry of the trade and the delivery date to preserve the law of one price. In May, the level of short-term rate expectations was quite steady with the Bank of Canada taking a well-communicated break from tightening policy, so the implied repo rate[3] of the futures basis cash-and-carry arbitrage should have been about 4.5% when ignoring any options.

Normally, contracts that have valuable embedded options trade at a lower price than they would without the embedded option as the buyer, aware that they are selling an option, demands payment for taking that risk by paying a lower price for the contract. A lower futures price results in a lower implied repo rate and a higher gross basis; both have been entirely normal in CGB contracts for several quarters now.

The price dynamic above almost always holds in very liquid futures markets but is occasionally shaken by outsize flows in either futures or cash bonds which appears to be what happened in early May 2023, as shown in Figure 1. In the early days of May, the implied repo of the futures was well below 4.5% to account for the value of the wildcard option embedded in CGBM23 but, on May 3rd and 4th, the contract richened relative to bonds (basis lower, implied repo higher) significantly. Even using closing levels on those days, to say nothing of intraday pricing which may have been even more extreme, the implied repo for the futures approached and exceeded 4.5%, the option-free fair value of the contract. In fact, on May 4th, the implied repo rate made the futures contract about 2.5 cents cheap relative to bonds (about 20 bps of implied repo yield that day).

1 A futures basis trade is a highly structured and levered trade where the manager intends to benefit from a relative mispricing between the futures contract and the cheapest-to-deliver for the contract. Specifically, a basis buyer is a manager that buys the cheapest-to-deliver bond and sells the futures contracts in equal DV01 amounts in a cash-and-carry arbitrage trade. The manager may close the position before the delivery period by reversing the trade in both the futures and cash markets or by delivering the long bond position to satisfy the delivery terms of the contract.

2 Readers requiring a refresher on the types of embedded options in futures contracts can refer to Embedded Options in CGF and CGB Futures published in November 2018.

3 The implied repo rate is the most accurate way to assess the fair value of futures contracts relative to bonds. Interested readers may refer to Understanding the Implied Repo Rate, published by Montréal Exchange in April 2020.

Remember, sellers of futures basis, assuming there were some[4], would have captured not just the 2.5 cents of cheapness in the contract but would have received the embedded wildcard option for free – in essence there existed a possibility to be paid to own an option in a risk-free structure.

FIGURE 1

DATE	CGB PRICE	CTD BOND PRICE	GROSS BASIS	IMPLIED REPO
27-Apr-23	125.30	89.7734	-11.7	3.21%
28-Apr-23	126.08	90.3049	-14.5	3.62%
01-May-23	125.15	89.6496	-13.3	3.54%
02-May-23	126.48	90.6010	-13.6	3.61%
03-May-23	126.79	90.7713	-18.8	4.45%
04-May-23	127.10	90.9929	-18.9	4.80%
05-May-23	125.67	90.0360	-12.0	3.78%
08-May-23	125.20	89.7195	-9.9	3.51%
09-May-23	125.24	89.7416	-10.6	3.73%
10-May-23	125.86	90.1801	-11.2	3.94%
11-May-23	126.39	90.5824	-9.0	3.81%
12-May-23	125.75	90.1508	-6.2	3.27%

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

Given that we calculate the fair value of the CGBM23 wildcard option to be about 7 cents per contract, astute traders would have calculated that they could potentially profit by 9.5 cents per contract (2.5 cents cheaper than the option-free fair value plus the 7 cent per contract value of the wildcard option), if their wildcard play worked, or 2.5 cents per contract, even if the wildcard option ended up worthless. An outsize arbitrage gain, or free money.

Managers could have structured the long futures basis trade shown in Figure 2, for example, where a sale of 1,000 futures contracts is DV01 matched with a purchase of $139,392,000 face value of the cheapest-to-deliver Canada bond. Although only one bond trade for the full size is executed, to facilitate the discussion of a wildcard exercise in the trade exit, we have segregated the total bond amount into a reserve for delivery to close the contract and the excess bonds not needed for delivery which will generate the wildcard profit.

FIGURE 2

SECURITY	POSITION	SECURITY DV01	POSITION DV01
CGBM23	-1,000	9.51	-95,106
CAN 1.5% Jun 2031 *For Delivery	100,000,000	6.82	68,229
CAN 1.5% Jun 2031 *Delivery Tail	39,392,000	6.82	26,877
Total			**0**

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

Trade Exit

Two exit strategies exist for this trade:

First, and most obvious, would be to close the long basis trade in the basis market for CGBM23 prior to, or during, the roll to the new contract. This strategy would be ideal for most clients as it does not involve daily monitoring of the position during delivery and/or giving notice of intent to deliver to Montréal Exchange if a wildcard exercise opportunity arises. In fact, as we can observe in Figure 1, someone who bought the basis at abnormally low levels on May 4th would have been able to close out the trade at levels closer to fair value, including the value of the option, on the 12th of May for a tidy profit. While this may be the ideal exit strategy, it might not be the most profitable and the market may or may not provide such an opportunity in the near term which leaves the delivery and/or wildcard exit strategy.

4 The author has no access to non-public trading data on Montréal Exchange, nor non-public delivery data. We speculate here on the high probability that someone did this trade and on motivations for delivery, etc., but this is only speculation on what some clients may have done because it was possible and profitable.

Second, a long basis position can always be (assuming the trading desk and firm has the infrastructure in place, see the final section below) taken to delivery to close the arbitrage position. In our example trade above, the trade was negative carry so short positions could have chosen to deliver on the first delivery date to avoid the negative carry. No clients chose to do that because doing so would have eliminated the potential to capitalize on the embedded wildcard option. Instead, as we can see in the summary of deliveries for the first week or so of June, no early deliveries were made in the first four days because the price change after settlement of the futures but before the end of bond trading didn't exceed the value of the remaining option. Finally, on the 5th trading day of the delivery period, the owners of short futures positions tired of waiting for upward price volatility in the late afternoon and paying negative carry[5] or perhaps they realized substantially better pricing than the closing levels we observe, because almost all of the open interest remaining gave notice to deliver on that date as shown in the final row of Figure 3.

FIGURE 3

		CGBM23					
NOTICE DATE	**DELIVERY DATE**	**QUANTITY**	**POSITIVE CARRY REMAINING / CONTRACT**	**WILDCARD OPTION VALUE / CONTRACT**	**CTD EQUIVALENT WILDCARD EXERCISE THRESHOLD**	**CTD 3PM-5PM ΔPRICE**	**THEORETICAL WILDCARD EXERCISE $GAIN**
30-May-23	01-Jun-23	0	0.000	0.068	0.173	0.071	0
31-May-23	02-Jun-23	0	0.000	0.068	0.176	0.110	0
01-Jun-23	05-Jun-23	0	0.000	0.069	0.167	-0.017	0
02-Jun-23	06-Jun-23	0	0.000	0.066	0.156	0.029	0
05-Jun-23	07-Jun-23	**4,106**	0.000	0.061	0.154	0.063	101,471

Source: BMO Capital Markets[i] Fixed Income Sapphire database, Canadian Derivatives Clearing Corporation (CDCC) Delivery Reports

The wildcard gain[6] can be calculated from the price difference between 3pm and 5pm on June 5th and the excess bond amounts from Figure 2 that are not needed for delivery, the delivery tail, which is sold in the afternoon to capture the price increase. In the case of 1000 futures contracts, the wildcard gain was about $25,000 but, recall that the trader was probably paid some amount to take on the position as well!

FIGURE 4

"FREE MONEY" CALCULATION	
CTD ΔPrice between 3pm and 5pm (cents/$100 Notional)	0.063
Delivery tail gain from wildcard "exercise"	24,817

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

Costly Mistake?

Since every futures contract seller has a buyer at the same price, does the fact that the basis was trading at a negative implied value for the wildcard option mean that the futures buyer made an error, and the seller exploited this error? There are two valid points of view to be considered.

To begin, we present the No argument. Here we note that most trades in futures are NOT actually highly structured and levered basis trades and that anyone that was the counterparty to the basis buyer didn't trade at the "wrong price" except in the event that they were a speculative basis seller. The buyer of futures that allowed the seller, in our basis trade structure above, to trade at such an advantageous price, may have needed duration and been an outright buyer. The price volatility of contracts is many multiples the price volatility of the embedded options in the same contract so the futures buyer in this case may have got exactly what they wanted – duration to hedge some other instrument or simply to speculate on the direction of 10-year interest rates. In fact, the buyer may have held the position for only a day or even just a few hours or minutes – far too little time for the mispriced wildcard option to revert to fair value.

The flipside to the above argument, just as valid in our view, is that the contract that someone bought was trading at too high of a price, i.e., way too high to reflect the fair value of the contract including the option. By buying it someone consciously or unconsciously traded at a "wrong" price and were taken advantage of since they could, for example, have transacted in bonds instead without exposing themselves to the richness of futures.

5 The wildcard option is notoriously difficult to exercise "optimally" for a variety of reasons. In most months, short positions deliver sub-optimally. For more on this topic refer to Wildcard Options: The Option of Maximum Regret published by Montréal Exchange in August 2022.

6 A more extensive discussion of how a wildcard exercise works can be found in CGB Case Study: Wildcard Option Exercise published in July 2019.

We like both arguments, to be completely honest, and leave it to the reader to decide.

Carpe Diem: A Guide

Although the futures basis trade is not really that complex, there are several moving parts and the institutional requirements to conduct trades like this can be somewhat onerous.

The basic requirements, at the firm and trading desk level, are listed below with brief descriptions:

- **Institutional Requirements**
  - Obviously, a firm and trading desk must be able to trade futures contracts and cash bonds under their investment guidelines.
  - Since the ultimate exit strategy that ensures the futures basis is an arbitrage trade involves taking the position (long or short) into the delivery period for the futures, a firm must be able to take or receive delivery of cash bonds to settle the contracts, including in an efficient and rapid manner in late afternoon.
  - Since any basis trade involves leverage, the firm (and manager, obviously) must be permitted to employ leverage in the portfolio. Similarly, repo/reverse transactions and capability are required.
- **Trading Desk Requirements**
  - Must be able to monitor and assess the futures basis intraday, perhaps not in continuous time but at least in real time during and after the futures trading session.
  - A firm should be able to calculate the fair value of the futures contract without options as well as the value of any embedded options to determine if the contract is mispriced.
  - A manager or portfolio probably needs to have reasonable balance sheet usage allowances or costs as levered trades like the futures basis can generate much larger positions than normal, even though the risk taken is often negligible.

As readers mentally check, or don't check, the boxes above for their own situation and firm, we can begin to see why the futures basis sometimes becomes more volatile than one would expect from a pure cash-and-carry arbitrage. Additionally, the reader may be surprised to discover that such arbitrage opportunities can exist in what is always one of the most liquid markets in Canada – the CGB and its cheapest-to-deliver bond. And finally, we are happy to discover that true "free money trades" do sometimes exist even if the effort to find and capture them is somewhat onerous compared to much more speculative trading styles.

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