



MONTRÉAL EXCHANGE

March 2024

# Trading Mechanics: Price versus Yield Spread

In January, Bloomberg listed Montréal Exchange curve trades<sup>1</sup> on its platform for the six possible combinations of the Two-Year (CGZ™), Five-Year (CGF™), Ten-Year (CGB™) and Thirty-Year (LGB™) Government of Canada Bond Futures. These combinations, which go by the general name, inter-group strategies (IGS) at the Exchange, have existed for many years and were already listed on LSEG/Refinitiv as well as on MX feeds, but their addition to the Bloomberg system<sup>2</sup> serves as a catalyst to remind managers of some of the issues they may face when trading the curve via futures contracts.

## Technical Jargon/Quoting

To ensure that every reader is familiar with the quoting conventions for these strategies, we review them here in point form.

- Each strategy combines the simultaneous purchase of one contract with the sale of another contract in a specific ratio.
- The quoting convention is the BUYER of the strategy is a buyer of the first contract in the strategy and a seller of the second contract. The SELLER of the strategy, of course, executes the opposite transaction, as shown in Figure 1.
- Pricing follows from the quoting convention. For example, the strategy price for the 5y-10y curve strategy, which has a 2:1 ratio will be (2 x CGF price) + (-1 x CGB price).
- With most strategies, the strategy price bears little relation to a recognizable value that is familiar to fixed income managers since it is a function of both the price and the strategy ratio. For example, the 2y-30y strategy may trade at a strategy price of, say, 1893.15, a number that is meaningful only if the ratio of contracts in the strategy is known.

**FIGURE 1**

CURVE SPREAD	CONTRACT RATIO	BUYER OF SPREAD	SELLER OF SPREAD
5y (CGF):10y (CGB)	2:1	Buys 2 CGF, Sells 1 CGB	Sells 2 CGF, Buys 1 CGB
2y (CGZ): 5y (CGF)	3:1	Buys 3 CGZ, Sells 1 CGF	Sells 3 CGZ, Buys 1 CGF
2y (CGZ): 10y (CGB)	11:2	Buys 11 CGZ, Sells 2 CGB	Sells 11 CGZ, Buys 2 CGB
2y (CGZ): 30y (LGB)	20:1	Buys 20 CGZ, Sells 1 LGB	Sells 20 CGZ, Buys 1 LGB
5y (CGF): 30y (LGB)	7:1	Buys 7 CGF, Sells 1 LGB	Sells 7 CGF, Buys 1 LGB
10y (CGB): 30y (LGB)	7:2	Buys 7 CGB, Sells 2 LGB	Sells 7 CGB, Buys 1 LGB

<sup>1</sup> One can find a short explanation of a 2y-10y curve trade here: [Trading on the yield curve](#).

<sup>2</sup> Tickers listed here: [Inclusion of GoC Bond Futures spreads on Bloomberg and LSEG Data & Analytics](#).

# Pricing

The price of each strategy is established by the formula:

$$\text{Strategy Price} = (\text{Leg1 Ratio} \times \text{Leg1 Price}) + (-\text{Leg2 Ratio} \times \text{Leg2 Price})$$

So, to return to our mention of the 1893.15 price for 2y-30y in the 4<sup>th</sup> bullet point above, it was calculated as:

$$\text{Strategy Price} = (\text{Leg1 Ratio} \times \text{Leg1 Price}) + (\text{Leg2 Ratio} \times \text{Leg2 Price}) = (20 \times 102.69) + (-1 \times 160.65) = 1893.15$$

In other words, the buyer of the strategy would buy 20 contracts of the CGZ (2 year) contract and simultaneously sell one contract of the LGB (30-year) at a total price of 1892.55.

## Advantages of Futures Contracts

The advantages of utilizing futures contracts in lieu of, or in addition to, cash bonds are numerous and have been well-discussed at this point. In brief, futures contracts:

1. Can be traded electronically via existing futures execution systems.
2. Often have deep, liquid, markets.
3. Require almost no cash outlays.
4. Do not require a firm to participate, at a cost, in the securities lending/finance markets to fund a trade.
5. Are a levered trade, which may be valuable to clients looking to conserve cash.
6. May benefit from margin netting with other contracts traded by a firm.
7. Don't require short sales of bonds, which can be an issue for some firms.

## Potential Issues

While the advantages are often clear, trading strategies via futures contracts can introduce complexities that don't exist in cash bond trades. Most, if not all, of these issues can be mitigated by an experienced and knowledgeable Portfolio Manager or competent execution desk.

Aside from the lack of a meaningful value, which is not so different from other strategies but is confusing for some managers that are more accustomed to trading on yield spreads, there are some pitfalls that managers and execution desks should be aware of when trading price-based spreads of this kind.

### Not (Quite) DV01 Neutral

Managers accustomed to trading bonds via voice trading probably expect a spread trade to be almost exactly DV01 neutral, or at least close enough to be considered insensitive to the level of interest rates. However, since only whole futures contracts can be traded and the ratio on these strategies is fixed<sup>3</sup>, the resulting filled trade usually deviates from DV01 neutral by a small amount; usually between 3-10% of the total DV01 of the spread trade.

We can quantify the above with an example of the 2-10 strategy in mid-February 2024<sup>4</sup> that is shown in Figure 2. The strategy has a ratio of 11:2 or 11 contracts of CGZ purchased (or sold if one is selling the strategy) for every two contracts of CGB sold (or purchased) to create the steepening (or flattening) trade. The figure depicts a purchase of 140 units of the strategy or \$25,000 DV01.

**FIGURE 2**  
**2-10 Steepener via CGZ/CGB (11:2 ratio)**

BEST MX IGS POSITION	DV01 NEUTRAL POSITION	SECURITY	PRICE	CTD COUPON	MATURITY	DV01/100	IGS TOTAL DV01	DV01 NEUTRAL TOTAL DV01
1,540	1,480	<b>CGZH24</b>	102.69	4.50%	01-Nov-25	1.69	26,018	25,004
-280	-279	<b>CGBH24</b>	119.59	2.00%	01-Jun-32	8.96	-25,102	-25,012
		<b>+11CGZ-2CGB</b>	<b>890.41</b>				<b>916</b>	<b>-8</b>

<sup>3</sup> The Exchange does have a facility to create custom ratios which is probably a simple exercise for dedicated execution desks familiar with futures contracts but may be a struggle for a fixed income manager delving into trading the curve via futures for the first time.

<sup>4</sup> The date is important only for reference. The concept applies at all times except if, by coincidence, the strategy should happen to be exactly DV01 neutral on a given date.

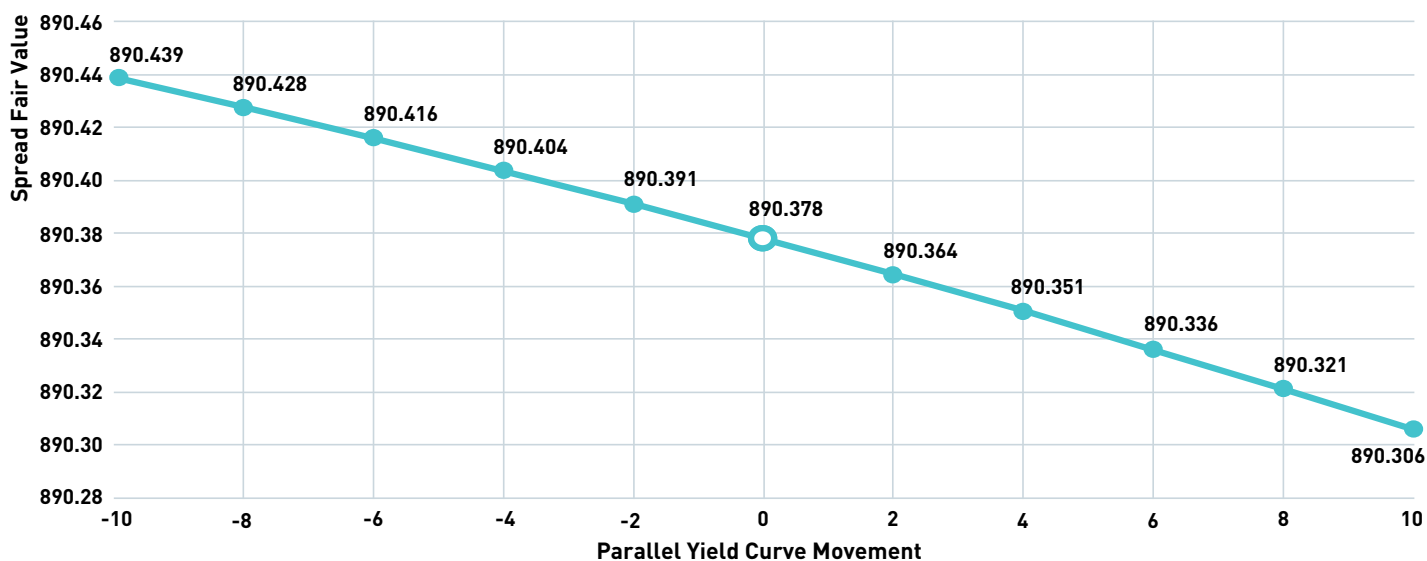
The first column of Figure 2 shows the curve steepening position in futures that is created by trading the futures strategy in sufficient size to target \$25,000 per basis point on the CGB (10-year) contract, while the second column shows the same strategy created manually by trading the optimal number of contracts individually (presumably by legging the trade) to create a DV01 neutral trade. The next-to-last column shows the 2-10 curve strategy net DV01 while the final column shows the strategy net DV01 for the manually constructed trade. The closest to zero that can be achieved, due to rounding to full contracts, is -8 dollars per basis point while using the strategy ratio results in a net DV01 of +916 dollars per basis point, a difference of about 4% of the spread strategy DV01 of \$25,000 per basis point. If the resulting net DV01 concerns the manager, they would need to adjust the trade to purchase 135 units of the strategy and then sell an additional 10 contracts of CGZ which creates a 2-10 steepening trade that is close to DV01 neutral at just -13 dollars net DV01 per basis point.

## Interest Rate Movement

Since the simultaneous purchase and sale of contracts in the strategy isn't exactly DV01 neutral, interest rate movements between the time the order is placed and the time the order is executed can result in an unanticipated change in the spread price, without any steepening or flattening of the curve. This phenomenon is expected but perhaps unfamiliar to the manager that usually trades steepening and flattening movements of the curve via cash bonds based on yield differences. In the latter case, intraday parallel moves in interest rates have no effect on the probability the manager's order is executed. In futures, trading on price differences rather than on yield differences, significant changes in the overall level of interest rates can make the strategy either less or more likely to be executed.

We demonstrate this phenomenon in Figure 3 where the relative value of each contract that comprises the strategy is kept constant relative to bonds, but the level of interest rates is varied. As can be seen in the figure, the value of the strategy is expected to vary by about 1.3 cents for each two basis point move upwards or downwards in rates. With +/- 5 to 10 basis points common on volatile days, the fair value of the strategy can deviate by between 8-15 cents during parallel yield curve movements.

**FIGURE 3**  
**2-10 Steeper via CGZ/CGB (11:2 ratio) Predicted Price**



While the above may seem extreme, it is worth noting that a one cent change in the price of CGZ relative to CGB results in an 11 cent change in the strategy price so the DV01 effect isn't really that extreme in the 2-10 strategy despite the positive net DV01.

## Convexity

A further, albeit much less significant, issue lies with convexity. As a result of convexity, the rate that the individual contract DV01s increase or decrease as interest rates change is not constant for the strategy. This difference of second derivative with respect to price (convexity) results in the net DV01 of the strategy changing daily BUT only by very small amounts in the absence of truly enormous interest rate changes<sup>5</sup>.

<sup>5</sup> Typically, at least a hundred basis points.

## Monitor for Delivery: A Client Responsibility

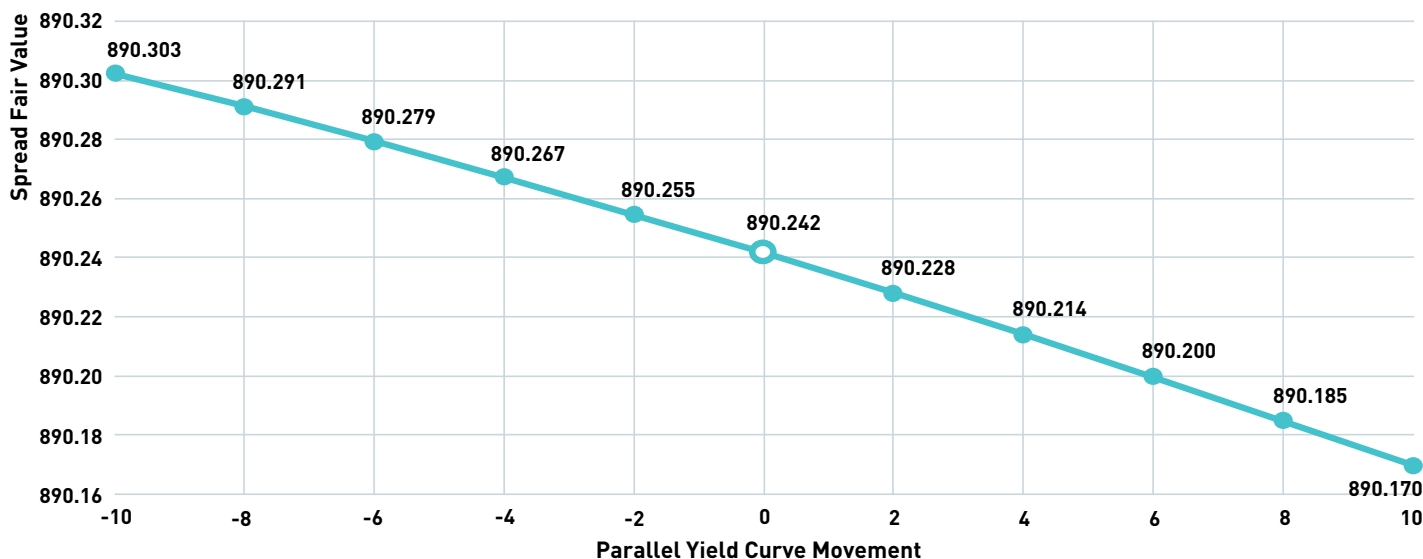
Another potential complexity to trading strategies lies in the potential for delivery of existing positions while a manager is attempting to trade out of that position via the strategy trade.

To envision this possibility, imagine a manager has the position in Figure 2 but, importantly, the date is now March 1<sup>st</sup>, and the contracts are eligible for delivery. A manager could try to sell the strategy to close their trade but, while the order is still live, be notified of delivery on the CGZ (2-year) contracts that they own. There is no link between the open order and the existing positions that a manager has, therefore, even though the manager no longer has their CGZ contracts to sell, the order remains live until its original expiration date/time. While an extreme case, early delivery for CGZ is the norm at present due to the negative carry on the contract. For very active firms or dedicated execution desks, firms executing trades during the delivery period need to be aware of this possibility.

## Change in Bank of Canada Policy Expectations

Additionally, a change in the expectations for future policy at the Bank of Canada can change the fair value of the strategy. Even though all futures contracts, and their implied repo rates, should change simultaneously given some large change in expectations, a 25 basis point decrease in the implied repo on the CGZ contract does not have the same price change on the contract as the same 25 basis point decrease in the implied repo on the CGB contract. Figure 4 shows the fair value of the same strategy we showed in Figure 2 but for an implied repo of 4.75% on the contracts instead of the initial 5% that was applicable in February 2023. The assumption of easier monetary policy in the near-term results in a decrease of about 7 cents for the fair value of the strategy.

**FIGURE 4**  
**2-10 Steepener via CGZ/CGB (11:2 ratio) Predicted Price**



## Contract Specific Issues

From time to time there can be contract specific issues that could impact the strategy price. For the most part these are inconsequential, temporal, and mean reverting but can impact the profitability of a trade, if only in small amounts. A scenario where CGZ (2-year) contracts trade rich relative to its cheapest-to-deliver bond for a few days due to some abnormal trading activity is an example of this.

However, one can also imagine a scenario where a mid-afternoon economic event is anticipated during the delivery period of futures contracts which could significantly increase the value of the wildcard option embedded in the CGB contract. That anticipation could increase the value of the 2-10 strategy since the CGZ contract contains a far less valuable version of that option. Again, these events or circumstances may be unlikely, but they are certainly possible.

# Summary of Issues

To conclude, we offer a brief summary of the issues that managers or traders may encounter when trading interest rate curve strategies in futures contracts.

ISSUE	DETAIL	SEVERITY
Nonzero DV01 - Position	Due to fixed contract sizes, the strategy DV01 may not net to zero.	Significant but easy to mitigate.
Nonzero DV01 - Trading	Fair value of the strategy changes with a parallel move in interest rates.	Significant, especially when interest rates are volatile.
Convexity	Net DV01 is sensitive to the level of interest rates.	Usually insignificant.
Delivery while order is live	Live orders are not adjusted for delivery notification.	Significant only while trading existing positions during the delivery period.
Change in policy expectations	Fair value of strategy is sensitive to changes in central bank policy expectations.	Significant to live orders.
Contract specific issues	Different contracts can trade rich or cheap relative to bonds for various reasons.	Insignificant except in extreme scenarios.

## Appendix

The following [codes and feeds](#) are now available:

CURVE SPREAD PRODUCT	RATIO OF CONTRACTS	BLOOMBERG	LSEG DATA & ANALYTICS*	MX HSVF OBF FEEDS*
5yr (CGF) vs 10yr (CGB)	2 : 1	XQCN Comdty	CGF-CGBF20	2CGFF0-1CGBF0
2yr (CGZ) vs 5yr (CGF)	3 : 1	CVXQ Comdty	CGZ-CGFF20	3CGZF0-1CGFF0
2yr (CGZ) vs 10yr (CGB)	11 : 2	CVCN Comdty	CGZ-CGBF20	11CGZH0-2CGBH0
2yr (CGZ) vs 30yr (LGB)	20 : 1	CVLGB Comdty	CGZ-LGBF20	20CGZF0-1LGBF0
5yr (CGF) vs 30yr (LGB)	7 : 1	XQLGB Comdty	CGF-LGBF20	7CGFF0-1LGBF0
10yr (CGB) vs 30yr (LGB)	7 : 2	CNLGB Comdty	CGB-LGBF20	7CGBF0-2LGBF0

\* F Character represents F for Front month Symbol and can either be H,M,U or Z. 20 (or 0) in the examples stands for 2020, but will be represented by the actual real expiry calendar year.



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