



MONTRÉAL EXCHANGE

November 2023

Cross Currency Opportunities Created by Higher Rates

We explore some developing relative value opportunities between Canadian bonds and United States treasuries while demonstrating some simple analytics that managers and analysts can use to identify similar opportunities.

Background

Coordinated zero-interest rate monetary policy combined with various quantitative easing programs during the emergency response to the COVID-19 pandemic compressed, eliminated, or even distorted beyond recognition some of the tried-and-true cross currency relative value potential between the Canadian and US yield curves. Similarly, in a reversal of the common refrain “a rising tide floats all boats”, the 2022-2023 bond selloff has “sunk all boats” and the direction of interest rates has been the prevailing factor in many fixed income opportunities.

However, with the (maybe) end of central bank policy tightening in sight, several cross-currency opportunities that investors may find attractive have been presenting themselves. For some investors wary of taking a directional bet on interest rates given the recent past, these may be opportunities to re-introduce active relative value management into their investment strategy.

Cross Currency Attractions

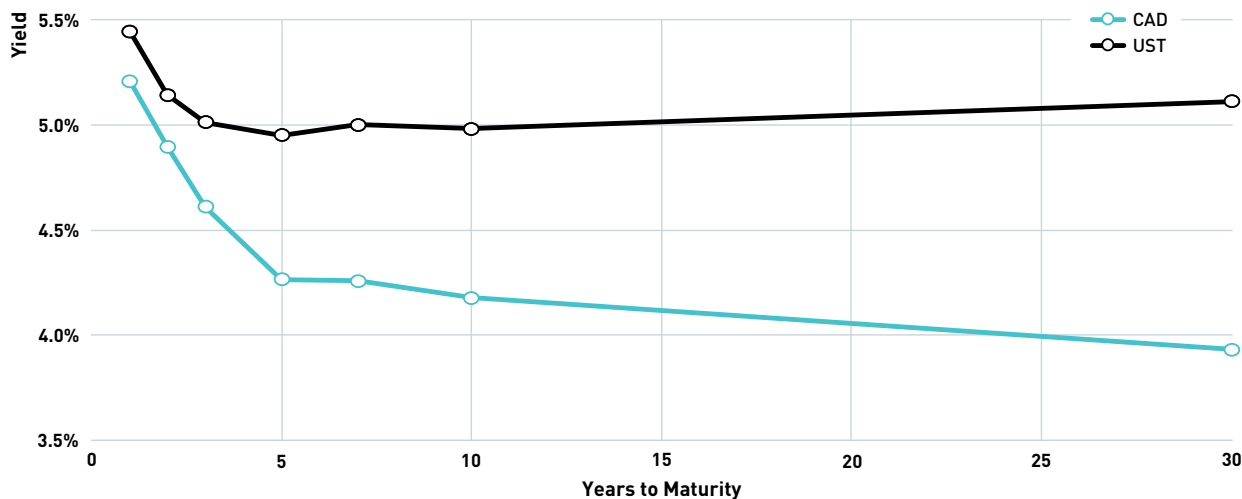
One reason investors like to exploit opportunities that arise in fixed income between the Canadian and US markets is the interconnectedness of the two economies. Both countries are each other’s largest trading partner¹ and, more importantly here, Canada’s imports and exports are massively dominated by trade with the USA linking the two economies almost inextricably, especially in the medium term and longer.

Due to the economic linkages, divergences in the two economies tend to be short-term only and monetary policy and yield curves tend to be quite closely correlated as well. Despite this, diverging trends do emerge, usually over somewhat longer periods of time which can make a cross-currency trade between the bonds of the two nations closer to the passive end of the risk scale². No greater evidence of this exists than the difference between the two countries’ bond curves today, shown below in Figure 1. Canada’s yield curve has roughly the same shape as the US curve, but remains below that of its southern neighbor by about 25 basis points at the front end and more than 125 basis points at the long end of the curve.

¹ Although Canada is followed closely by Mexico and China in the USA’s case.

² Without leverage, which magnifies the risk of any trade.

FIGURE 1
CAN, UST Bond Curves



Source: BMO Capital Markets' Fixed Income Sapphire database

Additionally, Canada/US trade structures usually benefit from similarities between the two nations; neither country is particularly foreign for each other's investors or citizens, they share similar laws, security types, and even the bond conventions differ in only small ways such as day counts. Given the almost ubiquitous understanding of US financial markets worldwide, at least one portion of a Canada/US trade occurs in a very well-known market for both domestic and international investors.

Typical Methodologies

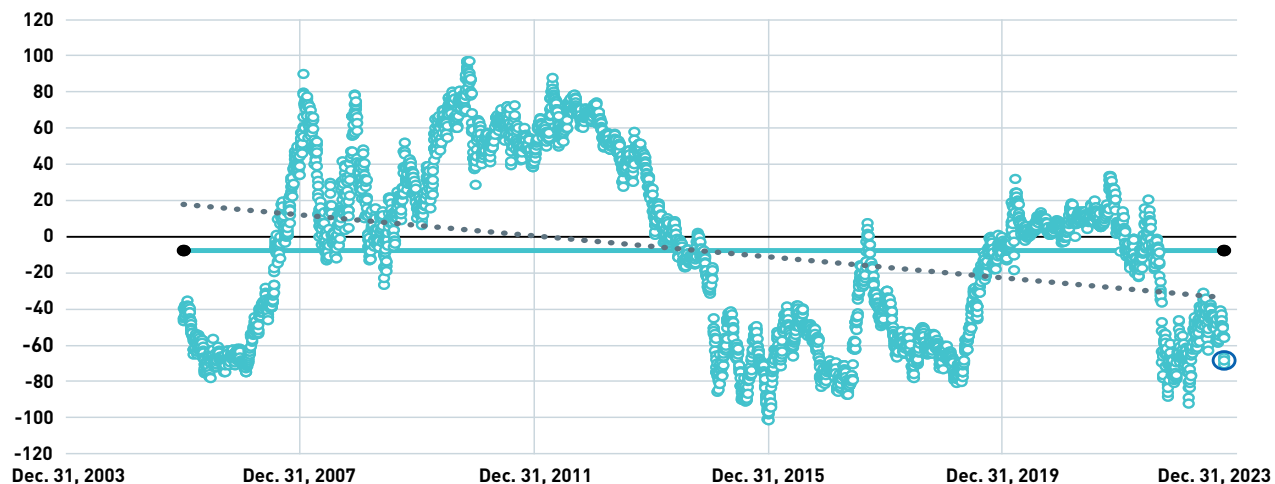
Various methods are used to evaluate the difference in interest rates, slope of yield curve segments, and even curvature measures in the two countries. We examine some of the basic analytical methods below.

Z-score

The first of two basic analytical methods often used to evaluate differences between Canadian interest rates and US interest rates is a z-score. This metric is constructed by creating a time series of, say, the difference in 10-year bond yields, calculating the average and the standard deviation of the time series, and then calculating a "score" of how many standard deviations the current observed level of the time series is from the average.

A graph of the z-score metric, to reinforce the idea visually, would be the difference between the flat average line³ in Figure 2 and the current market level, but normalized so that it is expressed in standard deviations to make it easier to compare to the same metric for other spreads.

FIGURE 2
CAD-UST 5y Spread



Source: BMO Capital Markets' Fixed Income Sapphire database

³ Ignore, for now, the sloping trend line which we will refer to later.

More often, investors looking for opportunities will create a table of z-scores rather than examining each relationship visually. An example of a basic z-score analysis for various lookback periods and the entire term structure of yield differences (spreads) between Canadian and US bonds is shown in Figure 3. In the figure, color coded to facilitate identifying the extreme values, some spreads are too high relative to history, such as the CAD-USD 1-year spread with a lookback of 1 year and some are too low relative to the historical average such as the 30-year spread with the same 1-year lookback.

FIGURE 3

Z-SCORE	CAN 1Y- UST 1Y	CAN 2Y- UST 2Y	CAN 3Y- UST 3Y	CAN 5Y- UST 5Y	CAN 7Y- UST 7Y	CAN 10Y- UST 10Y	CAN 30Y- UST 30Y
6m Zscore	0.8	0.0	-1.1	-2.7	-2.5	-3.1	-3.2
1y Zscore	1.1	0.8	0.3	-0.8	-0.8	-2.4	-4.0
2y Zscore	-0.6	-0.3	-0.6	-1.2	-1.2	-1.6	-2.3
3y Zscore	-0.8	-0.7	-1.0	-1.6	-1.6	-2.1	-2.8

One significant problem with z-score analysis is that it fails to consider any trend in the data. While it is compelling to believe that, with two intertwined economies that often revert to some long-term average, there are various demographic and economic trends that may manifest over longer periods. For example, looking again at Figure 2, but this time at the sloping trend line rather than the flat average line, we can see that the CAD-USD 5-year spread has a long-term downward trend that a more accurate analysis should account for. This trend indicates that the long-term normal level of the 5-year yield has been steadily falling relative to that of the USA. Although both 5-year yields have fluctuated by about 450 basis points during the period examined, Canadian yields, if the trend continues, should be expected to be somewhat lower than US yields in future than they have been in the past.

Regression and Standard Normal Residual

A refinement to the z-score method considers any linear (or non-linear, although we won't discuss that here) trend in the data set. In this methodology, the analyst calculates regression coefficients and uses them to predict today's spread level before calculating the difference between the predicted and observed spread. The difference is then "normalized" into a ratio by dividing it by the standard error of the regression to form a single metric for how far the current observed value is from what one would consider normal given the trend over the lookback period. In Figure 2 that would be the difference between the sloping trendline and the current observed value, but again put into terms of a standard normal residual by using the standard error of the regression.

As with z-scores, most analysis is not done visually but by constructing tables of standardized residuals for each spread being examined. In Figure 4 we show a simple standardized residual analysis for the differences in slope segments between the Canadian and US bond curves at present.

FIGURE 4

STANDARD RESIDUAL	CAN-UST 1-2	CAN-UST 1-3	CAN-UST 2-5	CAN-UST 2-10	CAN-UST 3-5	CAN-UST 5-10	CAN-UST 5-30	CAN-UST 10-30
2y Predicted Value	4.4	-1.5	-23.3	-21.9	-17.4	1.5	-20.8	-22.3
2y Standard Error of Regression	12.9	14.1	7.4	13.9	6.4	8.0	12.1	7.9
2y Standardized Residual	-0.4	-1.1	-2.8	-2.4	-1.7	-1.6	-2.3	-1.9

As with z-score analysis, and any analysis, there are still some potential issues that may be encountered with examining standard residuals.

First, and perhaps most important, the analysis is very dependent on the lookback period as the trend in the data (i.e., slope⁴ of the regression line) can be different over different periods. Generally, one should avoid examining data over inflection points or periods when obvious large changes have occurred in the relationship being examined. For this reason, we have considered here only the period during which the global economy has been recovering from the 2020 pandemic effects.

Second, residual analysis depends on the trend that was observed in the past being relevant today and, in the future, since we are predicting values using the trend. If the trend does not hold in the future, or is no longer relevant, any expectation of mean-reversion, in the case of z-scores, or trend-reversion, in the case of residuals, will be incorrect.

4 Or shape of the regression line if one chooses non-linear regression methods to do this analysis.

Potential Opportunities

As most managers will know already or will have guessed based on the yield curve differences shown in Figure 1, many of the opportunities in cross currency trades between Canada and the USA are in the 10-year and longer part of the curve. We show the results of a standard residual analysis for various points and slope segments of the cross-currency yield curve in Figure 5 and Figure 6.

FIGURE 5

STANDARD RESIDUAL	CAN 1Y- UST 1Y	CAN 2Y- UST 2Y	CAN 3Y- UST 3Y	CAN 5Y- UST 5Y	CAN 7Y- UST 7Y	CAN 10Y- UST 10Y	CAN 30Y- UST 30Y
2y Standardized Residual	1.6	1.2	0.8	0.3	0.1	-0.4	-1.7

FIGURE 6

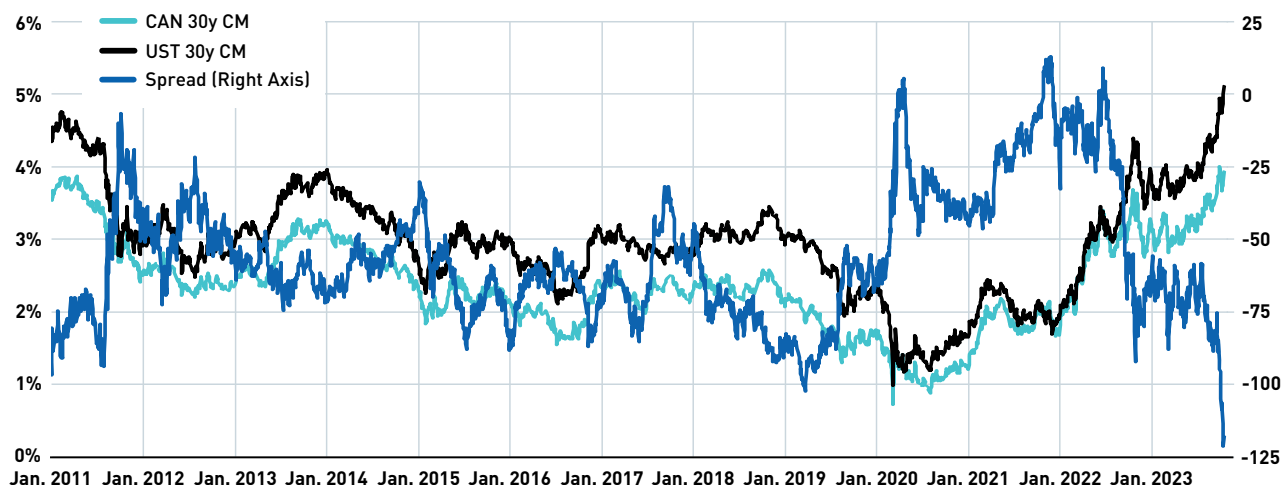
STANDARD RESIDUAL	CAN-UST 1-2	CAN-UST 1-3	CAN-UST 2-5	CAN-UST 2-10	CAN-UST 3-5	CAN-UST 5-10	CAN-UST 5-30	CAN-UST 10-30
2y Standardized Residual	-0.4	-1.1	-2.8	-2.4	-1.7	-1.6	-2.3	-1.9

Opportunity? CAD-USD 30-year Differential

In Figure 5, and also in Figure 1, an obvious standout is the 30-year yield in Canada which, in spite of an impressive 300 basis point selloff since mid-2020, has resolutely refused to rise as quickly or as far as the US curve. Currently, using a 2-year lookback period for the analysis, the -125 basis point difference between the 30-year Canada yield and the 30-year USD yield is equal to a Canadian yield that is 1.7 standard deviations too low relative to trend as well as the largest negative number this spread has reached since before 2003. The previous 12 years of the yields and spreads are shown in Figure 7.

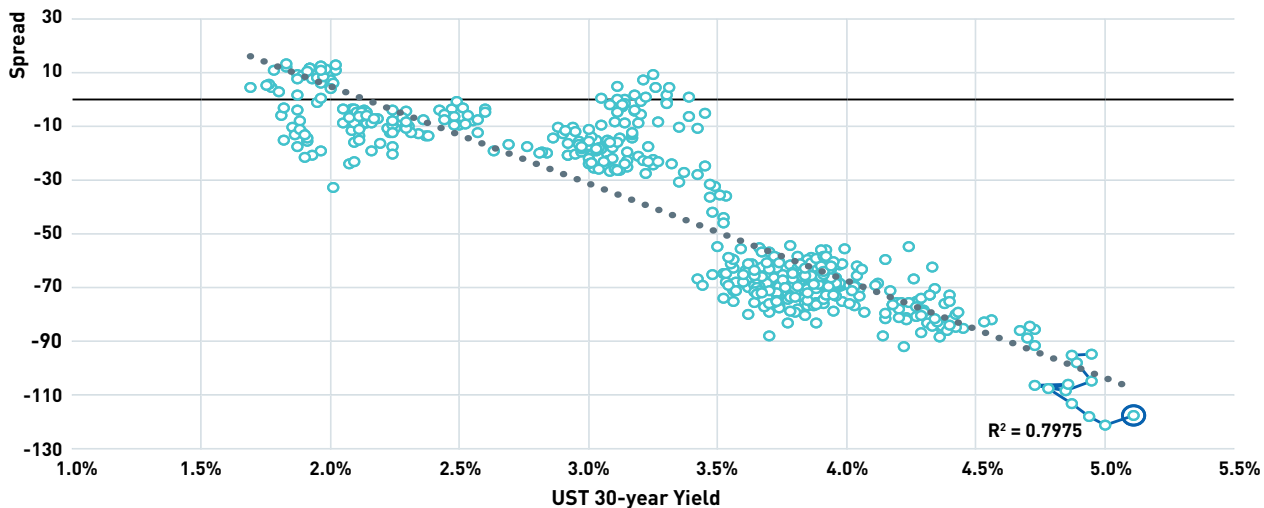
FIGURE 7

CAN, UST 30y CM Bond Yields



Source: BMO Capital Markets' Fixed Income Sapphire database

The Canada-US 30-year spread is heavily influenced by the 30-year yield, as shown by the regression of the spread on the y-axis and the US 30-year yield on the x-axis in Figure 8, which tells a similar story to (but is not the same analysis as) Figure 5. Note that the spread was slightly higher than the predicted value in this regression analysis just a few weeks ago.

FIGURE 8**CAD-UST 30y Spread versus UST 30y Yield**

Source: BMO Capital Markets' Fixed Income Sapphire database

Although there are a number of plausible explanations for the severe divergence noted in Figure 5 – Canada's long-term productivity growth is famously abysmal, and demand has nearly always outstripped supply in the long end due to risk-averse liability hedging by enormous pension and insurance funds – the current level seems extreme by any measure. For instance, if one could enter the cross currency arbitrage by borrowing at the Canadian rate, converting to USD and investing at the 30-year USD rate, then converting back to Canadian dollars at the prevailing foreign exchange rate in 30-years, one would lose money only if the Canadian dollar rose to just above parity with the US dollar⁵; an outcome almost no one finds plausible at this point.

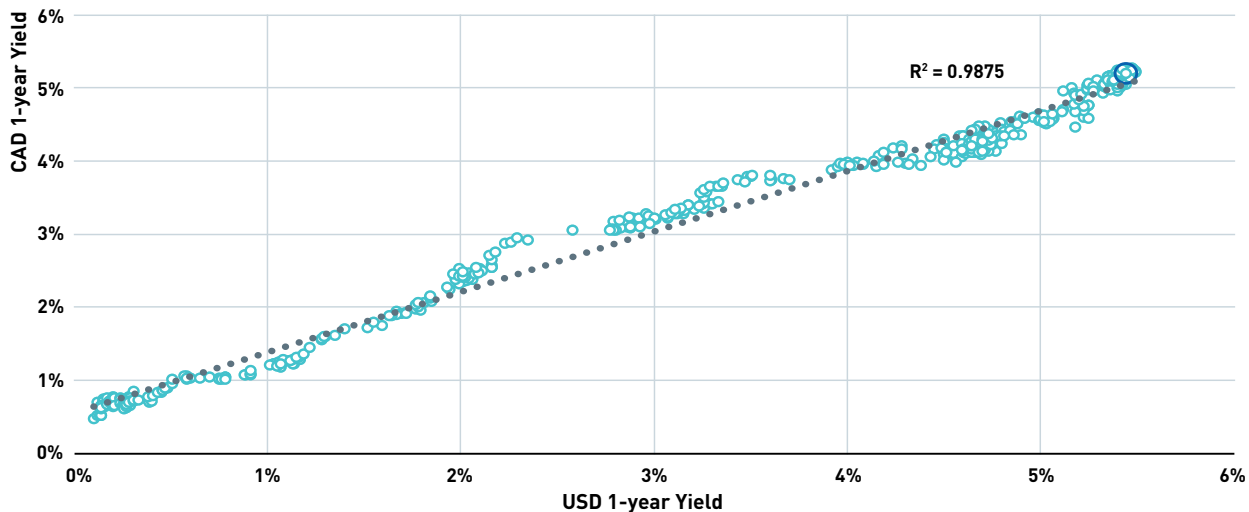
We warn interested managers that, especially in the long end of the Canadian yield curve, yield differentials can last for much longer than would seem rational. However, for this trade, futures contracts would be especially useful given the potential difficulty of borrowing long-term bonds for, perhaps, quite some time. With the 30-Year Government of Canada Bond Futures (LGB™) contract, one can easily short the contract with no additional work to fund the trade by borrowing bonds in the repo markets. Similarly, buying the CME listed 30-year Ultra futures contract would recreate, to a close degree, a trade to benefit from Canadian yields rising towards (but probably not to, given the history) the US 30-year bond yield.

Opportunity? CAD-USD 1-Year Differential

At the other end of the yield curve, there is a rather different potential opportunity, as identified in Figure 5. At the 1-year point in the respective yield curves, which have been very closely linked since the beginning of the recent inflation and monetary tightening cycles, Canadian yields are too high relative to US yields, as indicated by the standard residual which is a positive 1.6 standard deviations. Figure 9 shows a regression of the 1-year Canada yield versus the 1-year USD yield and readers can note how closely intertwined the two yields have been during the bond selloff.

⁵ Although a 30-year cross currency basis swap comes close to accomplishing this, if you can find a counterparty, no one can really borrow at the 30-year Canada interest rate except the government.

FIGURE 9
CAD-UST 1y Yield



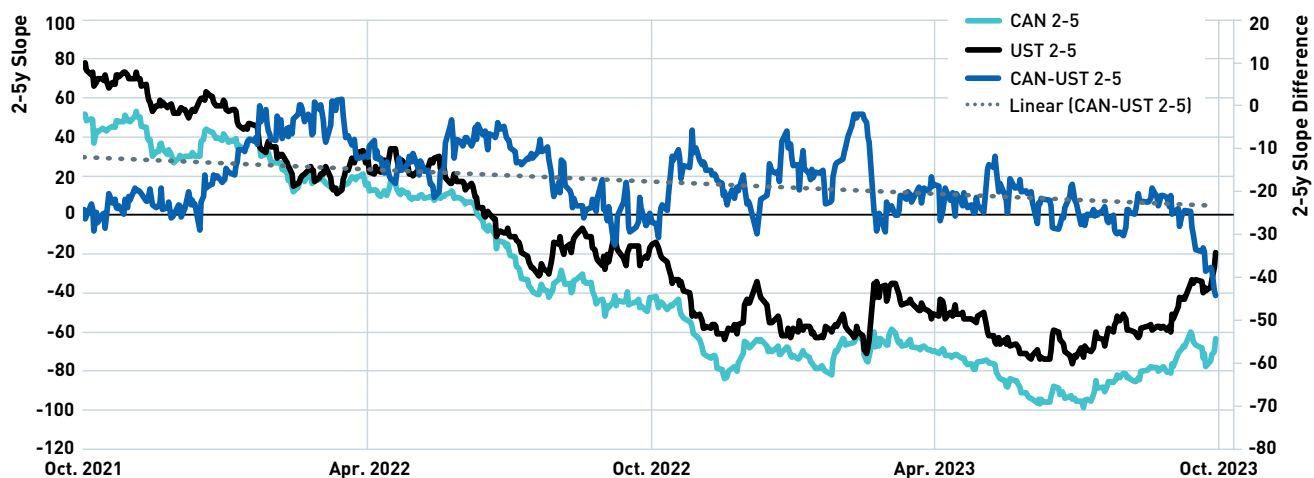
Source: BMO Capital Markets' Fixed Income Sapphire database

One issue with this opportunity is that it is very much dependent on central bank policy, being so close in term to the overnight rate. In fact, that is both the driver of the relationship as well as a reason for caution since diverging monetary policy will make or break this trade. Although the Bank of Canada often follows the cues of the Federal Reserve, sometimes for currency management reasons, it isn't unusual, nor is it very predictable, that the Canadian central bank precedes or lags the US central bank. Here, timing is probably everything, and, while a nice example of how some parts of the yield curve can be distorted in opposite directions from others, unless a manager wants to wager directly on the next rate announcement or, perhaps, a long-awaited divergence between the two economies, we caution against this opportunity.

Opportunity? CAD-USD 2-5 Slope Differential

A better potential opportunity exists in the 2-5 year portion of the Canadian yield curve versus the 2-5 year segment of the USD yield curve. As shown in Figure 6, the Canadian curve is almost 3 standard deviations too low relative to the trendline, an anomaly that has occurred relatively recently as the US curve steepened with only a little steepening occurring in Canada. The Canadian curve remains over 40 basis points less steep (more inverted) than the US curve which is almost 25 basis points below the predicted value in Figure 10.

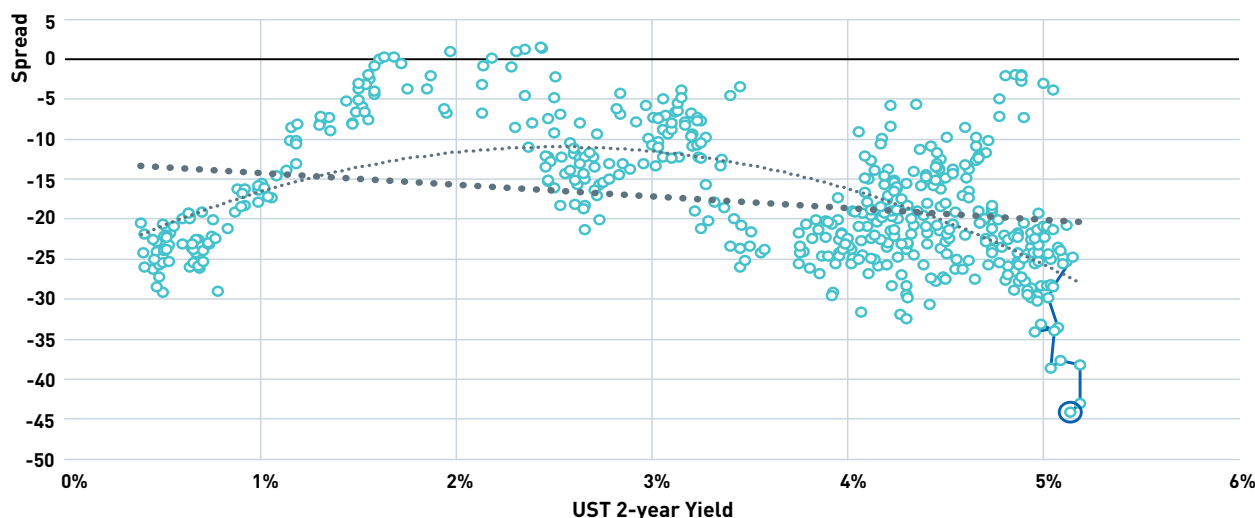
FIGURE 10
CAN, UST 2-5y CM Slope



Source: BMO Capital Markets' Fixed Income Sapphire database

Similarly, although the slope of the Canadian yield curve has shown a tendency to lag well behind that of the US curve during the selloff, the level of rates explains only part of the discrepancy. In Figure 11, which plots the Canada slope less the US slope for the 2-5 year segment of the yield curve versus the level of 2-year yields in the US, even a polynomial fit of the regression line doesn't explain the recent large deviation. The Canadian curve appears at least 20 basis points too inverted in this analysis.

FIGURE 11
CAD-UST 2-5y Slope Difference versus UST 2y Yield



Source: BMO Capital Markets' Fixed Income Sapphire database

To construct a trade to capitalize on this time series turning back towards the trendline, a manager would need to create a Canadian 2-5 slope steepener and pair it with a US 2-5 slope flattener. These portions of the yield curve in both countries are very liquid so a manager could easily construct the trade in cash bonds if they were willing to incur the additional work and associated costs of financing the trades in the repo/reverse markets. A self-financing version of the trade could also be constructed easily in futures contracts without the need for additional financing operations by buying the 2-Year Government of Canada Bond Futures (CGZ™) contract and selling the 5-Year Government of Canada Bond Futures (CGF™) contract in equal interest rate sensitivity on Montréal Exchange while simultaneously selling the TU contract and buying the FV contract on the Chicago Mercantile Exchange⁶. Although we won't explain the process of constructing such a trade due to space constraints, the trade construction using the four December expiry contracts is shown in Figure 12 using the appropriate cheapest-to-deliver bonds and trading prices from October 31, 2023.

FIGURE 12

	CGZZ23	CGFZ23	TUZ23	FVZ23
Position	Buy	Sell	Sell	Buy
Contract Price	102.085	108.700	101.211	104.531
Cheapest-to-Deliver Bond (CTD)	3%Aug01/25	3.25% Sep01/28	5% Sep30/25	4% Feb29/28
Conversion Factor	0.9608	0.8877	0.9835	0.9272
Contract DV01	1.7	4.8	3.6*	4.1
Contracts for 10k/bp in Local Currency	586.5	208.4	274.3	244.0
FX to CAD	1.0000	1.0000	1.3879	1.3879
Contracts for 10k/bp CAD	587	208	198	176
Trade DV01 CAD	10,008	-9,979	10,018	10,010

*TU contract size is \$200,000 (in local currency), representing 2x the size of the CGZ contract, hence the higher DV01.

Source: Montréal Exchange, CME

Conclusion

We believe that the end of this monetary tightening cycle, if it truly arrives, will produce many interesting opportunities for relative value fixed income markets, especially in some of the traditional spreads that have been profitable for active managers in the past.

⁶ Don't forget to account for the foreign exchange rate when constructing the trade. Less USD exposure is needed than Canadian exposure due to the CAD-USD difference.



Kevin Dribnenki writes about fixed income derivatives and opportunities in Canadian markets. He spent over 10 years managing fixed income relative value portfolios as a Portfolio Manager first at Ontario Teachers' Pension Plan and then BlueCrest Capital Management. During that time he managed domestic cash bond portfolios as well as international leveraged alpha portfolios and has presented at several fixed income and derivatives conferences. He received a BA in Economics from the University of Victoria, an MBA from the Richard Ivey School of Business, and holds the Chartered Financial Analyst designation.

For more information

irderivatives@tmx.com

m-x.ca/futures

i BMO Capital Markets is a trade name used by BMO Financial Group for the wholesale banking business of Bank of Montreal, BMO Harris Bank N.A. (member FDIC), Bank of Montreal Ireland plc., and Bank of Montreal (China) Co. Ltd and the institutional broker dealer businesses of BMO Capital Markets Corp. (Member SIPC) in the U.S., BMO Nesbitt Burns Inc. (Member Canadian Investor Protection Fund) in Canada and Asia and BMO Capital Markets Limited (authorized and regulated by the Financial Conduct Authority) in Europe and Australia. "BMO Capital Markets" is a trademark of Bank of Montreal, used under license.

Copyright © 2023 Bourse de Montréal Inc. All rights reserved. Do not copy, distribute, sell or modify this document without Bourse de Montréal Inc.'s prior written consent. This information is provided for information purposes only. The views, opinions and advice provided in this article reflect those of the individual author. Neither TMX Group Limited nor any of its affiliated companies guarantees the completeness of the information contained in this publication, and we are not responsible for any errors or omissions in or your use of, or reliance on, the information. This publication is not intended to provide legal, accounting, tax, investment, financial or other advice and should not be relied upon for such advice. The information provided is not an invitation to purchase securities listed on Montreal Exchange, Toronto Stock Exchange and/or TSX Venture Exchange. TMX Group and its affiliated companies do not endorse or recommend any securities referenced in this publication. CGF, CGZ, LGB, Montréal Exchange and MX are the trademarks of Bourse de Montréal Inc. TMX, the TMX design, The Future is Yours to See., and Voir le futur. Réaliser l'avenir. are the trademarks of TSX Inc. and are used under license.