Bond Futures Calendar Spread Trading

Part 2 – Understanding the Fundamentals

Strategy Overview

Asset to be traded: Three-month Canadian Bankers' Acceptance Futures (BAX)

Price chart of BAXH20

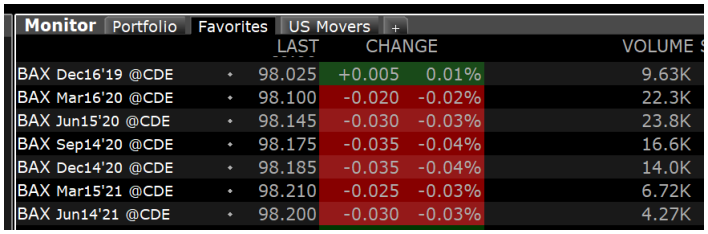
Strategy idea: Create a duration neutral (i.e. market neutral) synthetic asset and trade the mean reversion

The general idea is straightforward to most professional futures traders. This is not some market secret.

The success of this strategy lies in the execution.

Understanding Our Asset and Synthetic Asset

These are the prices and volume data of BAX as seen in the Interactive Brokers platform.



Notice that the volume decreases as we move to the far month contracts

What is BAX

BAX is a future whose underlying asset is a group of short-term (30, 60, 90 days, 6 months or 1 year) loans that major Canadian banks make to each other.

BAX futures reflect the Canadian Dollar Offered Rate (CDOR) (the overnight interest rate that Canadian banks charge each other) for a three-month loan period.

Settlement: It is cash-settled. This means that no physical products are transferred at the futures' expiry.

Minimum price fluctuation: 0.005, which equates to C$12.50 per contract. This means that for every 0.005 move in price, you make or lose $12.50 Canadian dollar.

Link to full specification details:

- https://m-x.ca/produits_taux_int_bax_en.php (Note that the minimum price fluctuation is 0.01 for contracts further out from the first 10 expirations. Not too important as we won't trade contracts that are that far out.)
- https://www.m-x.ca/f_publications_en/bax_en.pdf

Other STIR Futures

BAX are just one type of short-term interest rate (STIR) future. There are other types of STIR futures: https://en.wikipedia.org/wiki/Interest_rate_future

The less popular (not well-known to the public) the STIR future, the more profit opportunities there are. You'll see that BAX is not on the above list in the Wiki page.

Serials (Extra info)

We know that BAX futures operate on a quarterly expiry. Mar, Jun, Sep and Dec. However, there exists something known as serials. Serials operate like the usual BAX contracts, but differ in their expiration dates.

Two near-term contracts are listed at all times so there are always three consecutive front months listed

These 2 contracts are known as serials.

Eg 1. If we are on 1st Oct 2020, the next regular contract expires on Dec 2020. There will be an Oct 2020 and Nov 2020 serial.

Eg. 2 If we are on 1st Nov 2020, the next regular contract expires on Dec 2020. There will be a Nov 2020 and Jan 2021 serial.

We won't be focusing on serials so this is just extra info.

Understanding Our Synthetic Asset

Here are the names of the different kinds of synthetic assets.

This is a future: BAXU19

This is a spread: BAXU19 – BAXZ19 (Long 1 unit of BAXU19 and short 1 unit of BAXZ19)

- A spread is made out of 2 futures

This is a called a Butterfly: BAXU19 – 2 * BAXZ19 + BAXH20 (Long 1 unit of BAXU19, short 2 units of BAXZ19 and long 1 unit of BAXH20)

- A butterfly is made out of 2 spreads. The second spread is a short and starts one expiration later than the first spread. (Note that this is not related to the butterfly structure in options trading)

This is called a Double Butterfly: BAXU19 – 3 * BAXZ19 + 3 * BAXH20 – BAXM20

- A double butterfly is made out of 2 butterflies. The second butterfly is a short and starts one expiration later than the first butterfly.

This a called a Double Double: BAXU19 – 4 * BAXZ19 + 6 * BAXH20 – 4 * BAXM20 + BAXU20

- A double double is made out of 2 double butterflies. The second double butterfly is a short and starts one expiration later than the first double butterfly.

We can keep going. See the pattern?

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1 & & 6 & & 15 & & 20 & & 15 & & 6 & & 1 \\
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$$

Long vs Short

We've gone through this before but just as a reminder, to represent a short on a structure, we invert all the signs of each asset in the structure. This means that whatever was long is now short, and vice versa.

A plus sign represents a long on the individual asset, a minus sign represents a short on the individual asset.

Eg 1a. Long a double butterfly: BAXU19 – 3 * BAXZ19 + 3 * BAXH20 – BAXM20

Eg 1b. Short a double butterfly: - BAXU19 + 3 * BAXZ19 - 3 * BAXH20 + BAXM20

Eg 2a. Long a double double: BAXU19 – 4 * BAXZ19 + 6 * BAXH20 – 4 * BAXM20 + 1 *BAXU20

Eg 2b. Short a double double: - BAXU19 + 4 * BAXZ19 - 6 * BAXH20 + 4 * BAXM20 - 1 *BAXU20

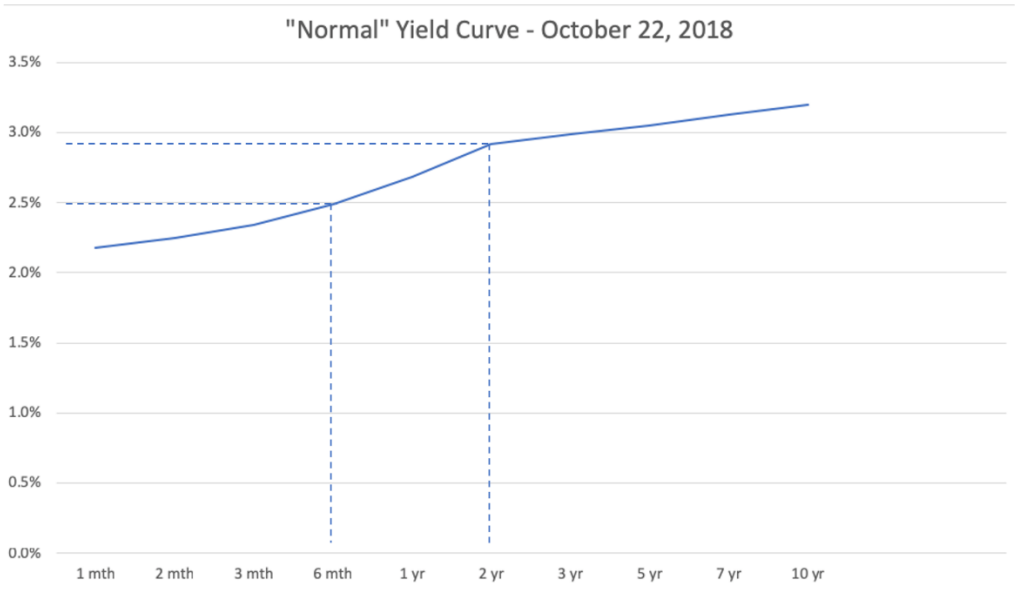
What the Spread Really Represents

Yield Curves

Let's talk about yield curves first.

Official definition from Investopedia: A yield curve is a line that plots yields (interest rates) of bonds having equal credit quality but differing maturity dates. The slope of the yield curve gives an idea of future interest rate changes and economic activity. There are three main types of yield curve shapes: normal (upward sloping curve), inverted (downward sloping curve) and flat.

In simple English: A yield curve plots interest yield, which represents your returns for holding a bond, (y-axis) vs maturity of the bonds (x-axis).



In the above chart, a bond that matures in 6 months should pay around 2.5%/annum in interest yield. Let's call this Bond A.

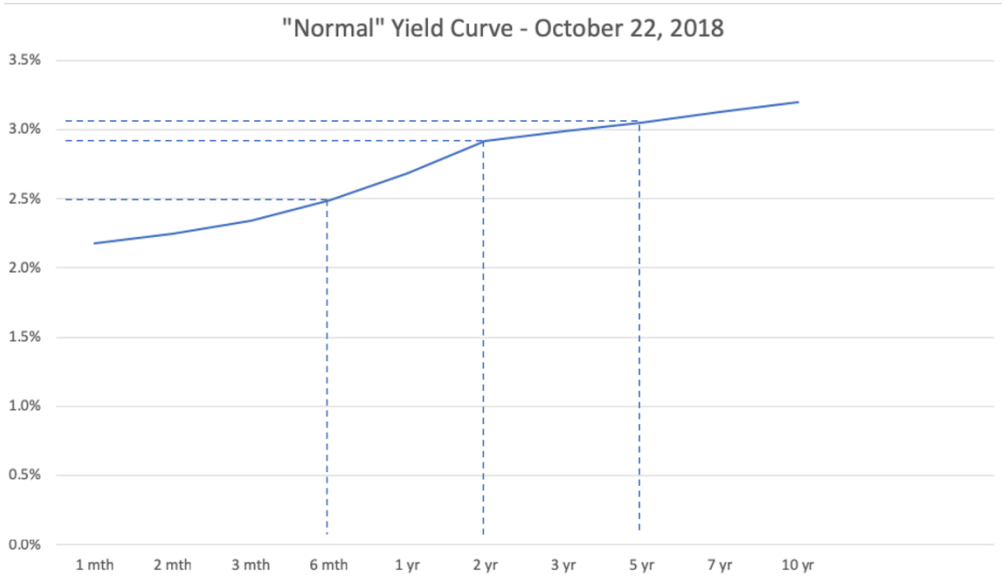
Another bond that matures in 2 years should pay about 2.9%/annum in interest yield. Let's call this Bond B.

The difference between these 2 interest yields is 2.9% - 2.5% = 0.4%.

Understand spreads and synthetic structures on the yield curves

When we run a spread of A – B, we are long A and short B. We are betting that the difference between the 2 interest yields, i.e the 0.4%, shrinks.

In macro-economic terms, we are betting that the country's interest rates will rise in 6 months relative to that 2 years later. Eg. Maybe economists are predicting a recession in 2 years and thus expects the central bank to lower interest rates then.



A bond that matures in 5 years should pay around 2.5%/annum in interest yield. Let's call this Bond C.

Let's now assume we are betting that the 2-year rate (Bond B) will rise relative to its neighbouring rates.

What I can do is to long Bond B and short Bond A and C. This is in fact a synthetic asset of – A + B – C.

Then we need to adjust the amount to short and long to account for the maturity differences.

When you long A and C, you are long a total of 5.5 years of maturity (0.5 years + 5 years of maturity).

When you short B, you are short 2 years.

Thus, you need to equalise your longs and shorts.

*One way to set up this structure: - 1*A + 2.75 * B – 1*C*

When you do this, you are long 2.75 of B. This gives us 5.5 years' worth of longs.

But of course, you can't long 2.75 contracts.

*So, we either do something like: - 10*A + 28 * B – 10*C (I rounded up 27.5 to 28 for B)*

Or we play around with the sizing of A and C.

*This works too: - 2*A + 3 * B – 1*C*

The above will give us 6 years of duration for the longs and shorts.

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Note that so far, we are equalising the number of years of maturity for the longs vs the shorts.

That is a shorthand and quick way to do it. The actual way to do it to find the duration (i.e. the sensitivity of the bond price to interest rate changes) for the longs and shorts and equalise that. This equalisation is known as duration hedging.

We will cover duration hedging in the later lectures.

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I hope you see that *- 2*A + 3 * B – 1*C* looks a bit like a short butterfly structure. This is the intuition we want you to build.

When we short a butterfly, i.e. we enter this trade - BAXU19 + 2 * BAXZ19 - BAXH20.

We are essentially betting that the Canadian rates for Z19 (Dec 2019) will be falling relative to U19 and H20.

This is true even though the maturities here refer to the expiration of the futures, and the maturities in the yield curve refer to the expiration of the actual bonds.

Understanding How Hedged the Structure is

The beauty of building synthetic assets like spreads, butterflies and double butterflies etc is that they are not just duration hedged, they are hedged to almost everything.

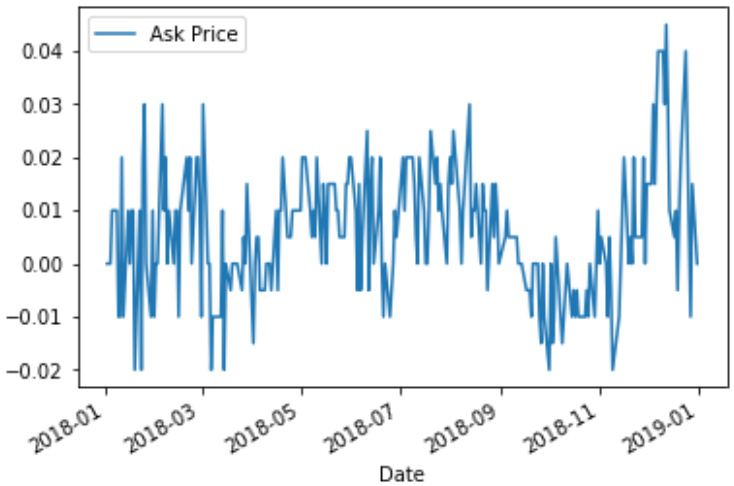
They are hedged to macroeconomic events, to stock market movements, to the country's economic condition, currency risks, corporate bonds ratings adjustment, tweets from politicians etc.

This means that you can sleep well at night.

The only thing it is not hedged to is the relative interest rate expectations of the different expirations of the futures. This is the main risk we have when trading these STIR futures structures. If all of a sudden, your central bank announces aggressive interest rate hikes or cuts in the coming year, your STIR futures structure is going to trend.

But we have a way to manage that risk. More about strategy difficulties and risks in a later lecture.

Thus, we have a very stable structure that looks like this.



BAX Double Butterfly