


Fundamentals of Fixed Income Trading

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THE YIELD CURVE

- The yield curve or interest rate term structure, is the relation between the interest rate (cost of borrowing) and the time to maturity of the debt for a given borrower in a given currency

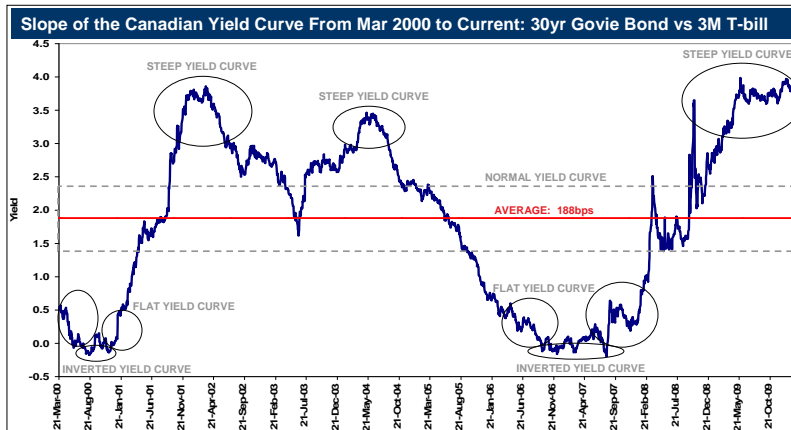
What Determines the Shape of the Yield Curve?



- Most financial professionals agree that two major factors affect the slope of the yield curve...
 - Investors' expectations for future interest rates
 - "Risk premiums" that investors require to hold long-term bonds
- Three Are 3 Prevalent Theories Explaining the Slope of the Yield Curve:
 - (1) The Pure Expectations Theory
 - The slope of the yield curve reflects only investors' expectations for future short-term interest rates
 - Most of the time investors expect interest rates to rise in the future, explaining the "normal" upward slope of the yield curve
 - (2) The Liquidity Preference Theory
 - Long-term rates not only reflect investors' assumptions about future interest rates but also include a premium for holding long-term bonds, called the *term premium* or *liquidity premium*
 - This premium compensates investors for the added risk of having their money tied up for a longer period, including the greater price uncertainty
 - This term premium explains why long-term bond yields tend to be higher than short-term yields
 - (3) The Preferred Habitat Theory
 - In addition to interest rate expectations, investors have distinct investment horizons and require a meaningful premium to buy bonds with maturities outside their "preferred" maturity, or habitat
 - Proponents of this theory believe that short-term investors are more prevalent in the fixed-income market and therefore, longer-term rates tend to be higher than short-term rates

When Does the Slope of the Yield Curve Change?

- As the theories support, a normal yield curve is one where yields rise as maturity lengthens, implying that the slope of the yield curve is positive
- The slope of the yield curve has an impressive track record as a leading indicator of economic activity. Because the curve can provide a summary of where investors think interest rates are headed in the future, it can indicate their expectations for the economy
- The 3 shapes: steep, flat, and inverted all imply very different expectations...

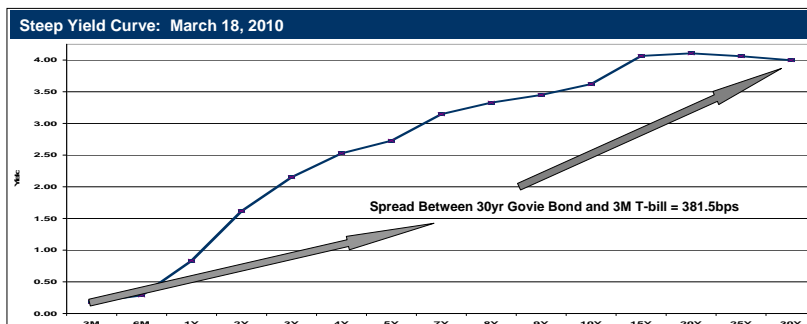


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Steep Yield Curve

- A sharply upward sloping, or *steep* yield curve, has often preceded an economic upturn
- The assumption behind a steep yield curve is interest rates will begin to rise significantly in the future
- Investors demand more yield as maturity extends if they expect rapid economic growth because of the associated risks of higher inflation and higher interest rates, which can both hurt bond returns
- Given the Central Banks inflation targeting mandate, a scenario of rising inflation is often accompanied by rate hikes from the Bank of Canada

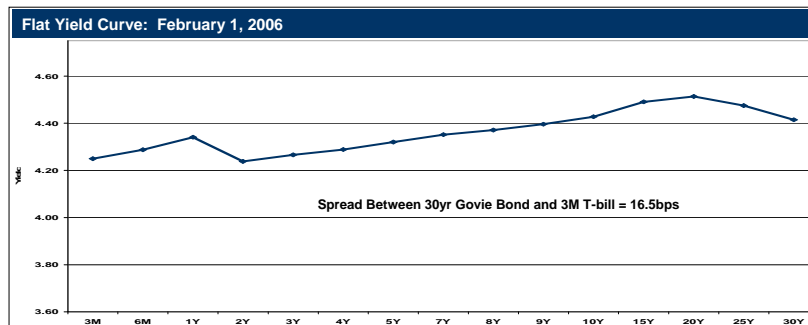


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Flat Yield Curve

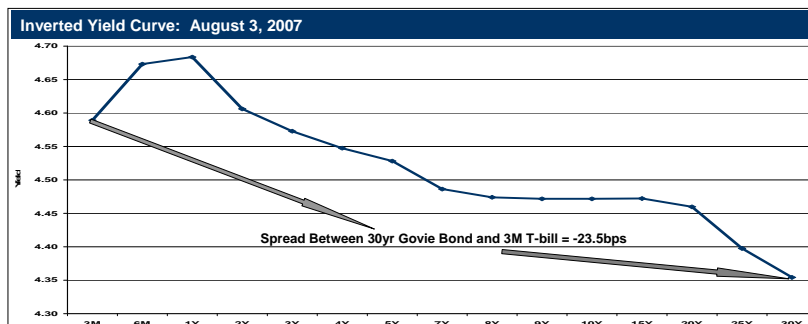
- A flat yield curve frequently signals an economic slowdown or uncertainty
- The curve typically flattens when the Bank of Canada raises interest rates to restrain a rapidly growing economy
- Short-term rates fall as expectations of inflation moderate
- A flat yield curve is unusual and typically indicates a transition to either an upward or downward slope.



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Inverted Yield Curve

- An inverted yield curve implies that long term borrowing rates have fallen below those of shorter maturities
- An inverted yield curve can be a harbinger of recession
- When yields on short-term bonds are higher than those on long-term bonds, it suggests that investors expect interest rates to decline in the future, usually in conjunction with a slowing economy and lower inflation
- The New York federal reserve regards this as a valuable forecasting tool, as an inverted curve is thought to signal that a recession is 2 to 6 quarters ahead.

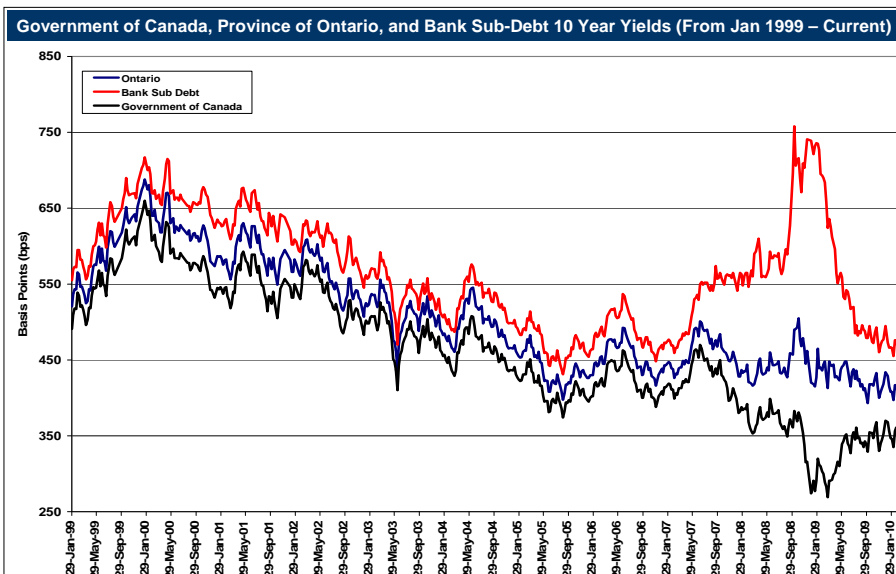


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Credit Curves

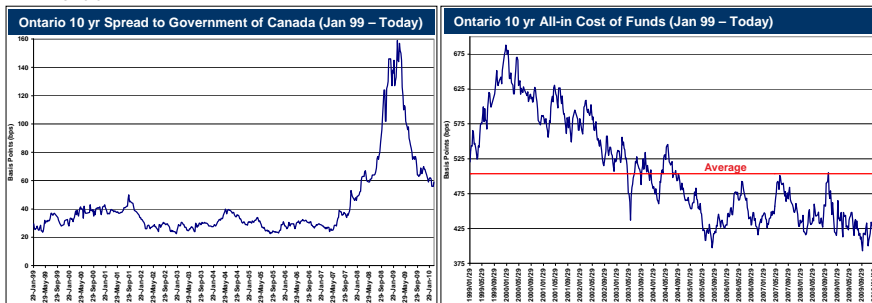
- The Canadian government curve is viewed as the “risk free” rate for each given maturity
- Possessing unlimited powers of taxation (in theory), the federal government is viewed as the safest credit in Canada and therefore enjoys the lowest yields (borrowing costs)
- A yield curve can be created for any specific segment of the bond market, from federal government debt to single-B rated corporate bonds
- Due to the perception that govies have no credit risk, the federal government curve is the most widely used and most other curves are derived as a spread to the government curve
- For example, yield curves for the following products are derived and often quoted as a spread to govies....
- Provincial Curve
 - Viewed as a step down in credit quality from the government curve in Canada and as such investors demand higher yields
 - Each province has its own curve based on the economic fundamentals of that particular province
- Bank Curve
 - Similar theory to the provincial curves, but the spreads to the government curve are wider still
 - Bank curves are influenced by economic conditions, the investing public's perception of prospects for banks, and the relative safety of the particular bank under consideration
- MFA-BC
 - Has a AAA rating and therefore trades at a tighter spread than an individual municipality
 - Viewed as a safer credit than the big 6 banks and therefore trades at a lower yield to investors

Graphical Representation of Spread Relationships



How the Shape of the Yield Curve Affects the Borrower?

- The borrower, just like the trader, must consider many facets of the yield curve
- Holding the first maturity on the curve at a constant yield, the steeper the curve, the higher the borrowing costs for each maturity
- One might be tempted to say that if the curve is steep one should borrow short term...but is this necessarily true today?....
- An interesting situation arose during the credit crisis
 - Ontario spreads widened out tremendously by any historical standard...bad for borrowing
 - But due to the Bank of Canada aggressively cutting rates and the flight to quality by investors, the all-in cost of funds to Ontario was actually below the 10 year average during the crisis
 - Thus, despite the massively wider spreads, Ontario could borrow at much lower rates than pre-crisis



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A Glimpse Into the Life of a Fixed Income Trader

- THE JOB OF A TRADER IS OFTEN DESCRIBED AS A SERIES OF NARROW ESCAPES

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I'm a Trader, What Does that Mean?

- The job of a trader is to make markets for the firm's clients, thereby acting as the liquidity provider to our customers
- When there are stable, narrow (bid-offer spread), and transparent prices, a market is said to be liquid - a trader strives to create narrow bid-offer spreads for the customer
- Fixed income traders are specialists, their areas of expertise are often very narrow
- For example, a typical mid-term Canada trader is only responsible for trading Canada bonds between 5yrs and 10 yrs
- The 2 to 5 year maturity bucket is traded by another trader specializing in that term and in similar fashion the longer maturities are traded by yet another trader
- The curve is segmented in this way to foster a situation of specialization of labour whereby each trader becomes an expert on all aspects of their portion of the curve
- The Provincial and Corporate market may be segmented even further. For example, the corporate department may have a dedicated high yield trader and the provincial department may have a trader specializing solely in Ontario bonds...
- This specialization is necessary as interest rate risk is more difficult to manage than the risk arising from market variables such as equity prices, exchange rates, and commodity price
- For example, consider the situation of the Canada mid-term trader's portfolio. The trader's portfolio is likely to consist of many bonds with different maturities. The trader has exposure to movements in the 2yr rate, 3yr rate, 4yr rate, etc. The trader must be concerned with all the ways the Canadian yield curve can change its shape through time

The Must Haves and Must Do's for a Trader...

Must Have Skills for a Successful Trader...

- Grade 12 math skills
- Ability to work in a locker room like setting
- Ability to make quick decisions
- A serious attitude/ego!
- A view on just about everything; the curve, the economy, employment, government fiscal policy, inflation, etc.
- The ability to change your mind...and fast!

A Successful Trader Knows all the Relationships in Their Sector at All Times...

- Are we cheap or expensive to the US?
- Cheap or expensive to the futures contracts?
- Is the curve too steep or too flat?
- Is a specific maturity expensive or cheap to borrow?
- Have there been any large and noteworthy flows in my area?
- What's the cost of carry of a position...positive or negative?
- Having the ability to answer all of these questions enables the trader to make narrow and competitive prices for the client...and with some luck keep their job at the same time
- Now you see why we specialize!

A Day in the Life of a Fixed Income Trader

Consider this scenario....

- Let's say a client calls up and wants a market on \$100MM 5 year bonds
- What do I think about while making my price? I think about my view of the curve, other customer flows, what is the U.S. market doing...going up or down? Are there any economic indicators looming?
- I make my price and the customer hits my bid (sells me bonds)
- I'm long 5 years and believe that they are in an expensive part of the curve
- Now what?
- Call other customers who might be buyers of the term
- That doesn't work...no buyers
- It's time to put my analysis to work try to sell the bond that is the most expensive in relation to what I own
- I decide the curve is too flat so I sell 10yr bonds against my position
- I'm now long a position with a steepening bias - ie. I make money if the yield relationship between 5's and 10's widens or steepens out. But let's not forget, I start losing money as the curve between 5's and 10's flattens!
- This cycle repeats itself all day long, on average, from 75 to 100 times per day for a Canada trader
- When I was trading short bonds, about 5 years ago, I was mandated to trade \$2BN worth of bonds daily...and volumes expectations have done nothing but go up since then!

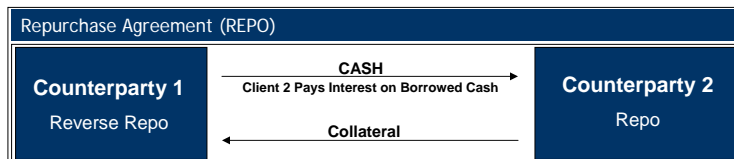
The Financial Crisis: A New Age Bank Panic

A New Age Bank Panic

- We all have a pretty good understanding of a traditional bank panic. Unfortunately we have had many throughout financial history such as 1837, 1857, 1873, 1907, etc.
...but the advent of deposit insurance dramatically reduced the frequency
- Today, we are going to discuss the “bank panic of 2007”
- In a traditional panic depositors rush en masse to their respective bank and demand their money back
- The banking system cannot possibly honour all these demands because the Banks have lent the money out or they are holding assets
- The banks must liquidate assets to honour the demands of their clients
- In 2007 we didn't witness long line ups at our local branches with customers withdrawing all of their money...but make no mistake, this is precisely what was transpiring behind the scenes in capital markets!

Repurchase Agreements (REPO)

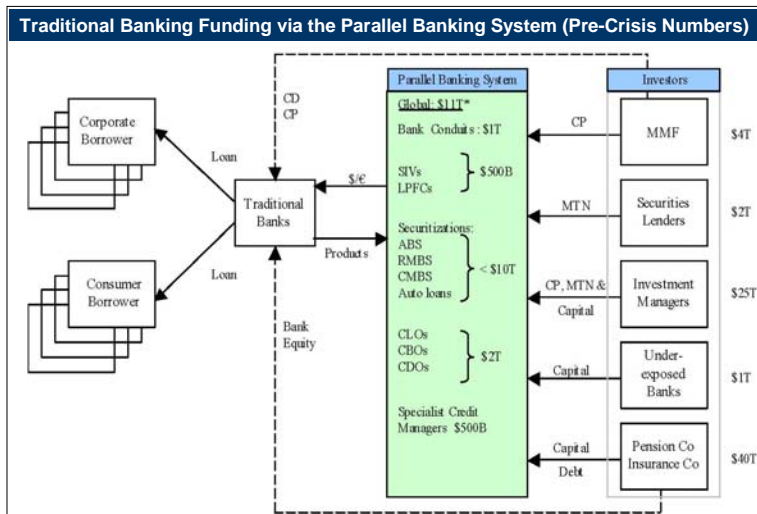
- This panic was not observed by anyone other than those trading or otherwise involved in the capital markets, because this panic was not centered on demand deposits but on the repo market
- What is a repo?
- A repo is an agreement in which one party sells a security to another party and agrees to repurchase it on a specified date at a specified price
- This short term financing tool is the grease that makes the machine of Wall Street turn. Without financing, nothing trades. This is something we must all remember!
- No one truly knows how big the repo market is as the fed only measures repo done by the 19 primary dealer banks that it is willing to deal with. Best estimates are that the repo market is at least a \$12 trillion market. That is the size of the total assets in the regulated banking sector
- Where does the demand for repo come from?
- Institutional investors have demand for checking accounts just like you and I do. But for this type of investor there is no bank account that enjoys the safety of an FDIC guarantee
- For the institutional investor that wants to earn interest and have immediate access to their money, the solution is the repo market...



Repurchase Agreements (REPO)

- Why doesn't the repo market just use treasury bonds as collateral....
- A problem with the banking system is that it depends on collateral to guarantee the safety of the deposits...the problem being that there is extensive global demand for "high quality" collateral
 - It is estimated that approximately 40% of U.S. treasury bonds, agency bonds, and corporate bonds are held by foreigners
 - Treasury and agency bonds are also needed to collateralize derivatives positions.
 - Further, they are needed as collateral for clearing and settlement systems
- Roughly speaking, the total amount of possible collateral in the U.S. bond market minus the amount held by foreigners is approx. \$16 trillion
- The amount used to collateralize derivatives positions is about \$4 trillion
- The exact amount needed for clearing and settlement systems is not known. Repo requires approximately \$12 trillion. So there is a large, but unknown, shortfall in collateral
- This demand for collateral has been largely met by securitization, a 30 year old innovation that allows for the efficient financing of loans. Repo to a significant degree is based upon securitized bonds as collateral
- So now that we know all this about repo, what does this have to do with a bank panic?

Traditional Banking Funding

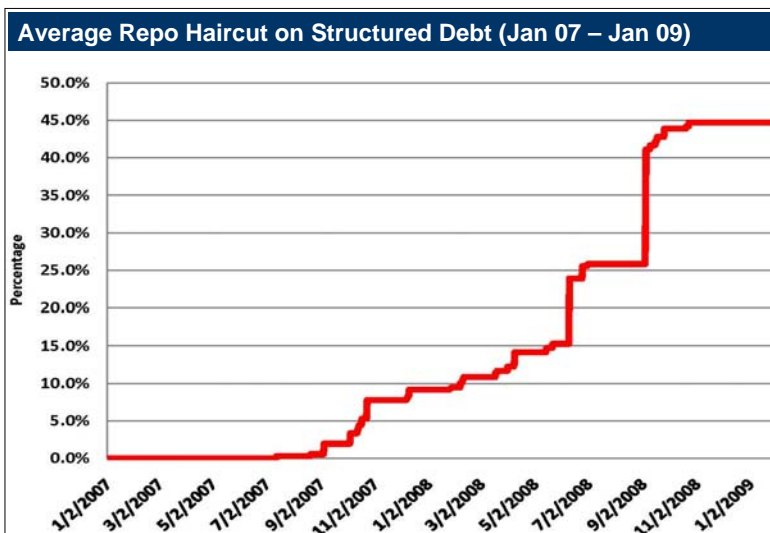


REPO HAIRCUTS: AN UNRAVELLING THREAD

- There is another aspect to repo which is very important, this is the concept of “haircuts”
- Lets assume Black Rock had \$400MM they want to invest (deposit) overnight with Goldman Sachs
 - Goldman would receive \$400MM and Black Rock would receive \$400MM market value of bonds
 - Black Rock would not care if Goldman becomes insolvent because they can unilaterally terminate the transaction and sell the bonds to get their \$400MM back (repo is not subject to Chapter 11 bankruptcy)
 - Now imagine that Black Rock wants to deposit / invest \$400MM but wants \$500MM in bonds as collateral. This would imply a 20% haircut.
 - Black Rock is now protected against a \$100MM decline in the value of the bonds, should Goldman become insolvent
- Note that each haircut requires the bank to raise money.
- In the above example, the haircut was 20% or \$100MM. This is effectively a \$100MM withdrawal from the bank
- Prior to the panic, haircuts were zero
- Now lets assume that the average haircut went from 0 to 20% over a very short period of time with the estimated size of the repo market at \$12 trillion....
- That would equate to a \$2.4 trillion withdrawal from the banking system!

THE MAGNITUDE OF THE INCREASE IN REPO HAIRCUTS

- For those who were sitting there thinking that a jump from a 0 to 20% haircut was unrealistic....



THE IMPLICATIONS & THE FIX...

- The next question is how do the banks raise the \$2.4 trillion?
- The answer....they sell assets ASAP!
- In order to minimize losses firms chose to sell assets that had retained their value relatively well
- Thus, the fire sale was not necessarily in securitized bonds, but bonds that were highly rated. For example, Aaa rated corporate bonds, treasuries, and agency bonds were up for sale in a big way!
- This explains some of the seemingly “unexplainable” pricing anomalies that were witnessed during the crisis
 - For example, we saw Aaa corp. bonds with a higher spread to the treasury curve than that of Aa bonds of the same maturity
- The severe distortions in prices were not confined to the United States....
- In Canada, we traded Canadian government bonds with significantly higher yields than swaps. Swaps had traditionally been thought of as being indicative of bank credit - this was an anomaly we had no historical precedent for
- How was it fixed?
- Well in a very short answer the Federal Reserve became the repo counterparty to Wall Street
- Through their numerous liquidity programs the Fed enabled banks and dealers to finance their inventories of securitized bonds at better prices and much lower haircuts than the open market would ever have permitted
- At it's peak the Bank of Canada had \$40 billion of repo's on its books to help Canadian banks and dealers finance these type of bond positions...