

Bonds

Bonds (T-bonds):

- maturity of 20 or 30 years
- pay a coupon every 6 months

Coupon rates generally match the overall interest rate in the economy.

Treasury sets the coupons rate close to the interest rates on purpose, so that they can sell the bonds.

Pricing Treasuries

Price is quoted per \$100 face value. A bond trading above face value trades 'above par'.

Bonds with coupons $>$ current interest rates trade above par \Rightarrow investors willing to pay more than the face value ($>$ \$100), because the coupons are large enough offset present value discount.

[And vice versa, if the coupon $<$ current interest rate, the price is going to be below 100. There has to be a discount for people to consider buying it since it pays lower interest than the current rates]

In frictionless market, you only need 2 variables:

1. Time to mature (if it matures a year from now doesn't matter if it was a newly issued 1-year t bill or if it was issued 29 years ago as a 30 year bond)
2. Coupon Rate

Newly issued treasury is on-the-run. (ex: newly issued 5-year note)

Aged treasury is off-the-run (ex: 10-year note that was issued 5 years ago)

Real-world market is not frictionless, there are frictions and liquidity issues:

- on-the-run bonds are the fresh issue and tend to have more liquidity and thus higher price.

YTM - Yield to Maturity

Price is not a good indication of which treasury to buy. Better to buy a treasury with price of 107 and a coupon rate of 6% than a treasury with a price of 95 and a coupon rate of 4%

So to consider which treasury is better use a metric that considers both price and coupon: YTM

YTM \Rightarrow Yield-to-maturity.

It's a price. (don't get confused since its written as a percentage)

Its a score (of the price) telling us how good of a price the current price is compared to other treasuries taking in account time-to-maturity and coupon.

Inverted Score: Lower the price, higher the yield.

(Here price doesn't just mean the price itself, but price accounted for coupon i.e. the better deal)

If the treasury pays a coupon (bonds, notes):

\Rightarrow Scored with YTM

otherwise, i.e. for T-bills:

\Rightarrow Scored with discount yield

It's not perfect though. You can't just compare 3 bonds by picking the highest YTM and saying this one is the cheapest, so lets long it.

Discount Yield - Only used for T-bills

The formula is odd on purpose. There's lots of approximations like:

1. Using 360 instead of 365
2. Dividing by 100, instead of original price P

This is done to make these calculations easier (so you can compute discount yield mentally)

Accrued Interest

What portion of the coupon should you pay for if you buy the treasury midway through a coupon period (in the secondary market).

A coupon is more expensive if its closer to the coupon payout date.

MIN: If the coupon was just paid out, accrued interest = 0

MAX: If you're buying the treasury one second before the coupon is paid out, accrued interest = value of coupon

Since T-bills don't pay any coupon, their accrued interest is 0.

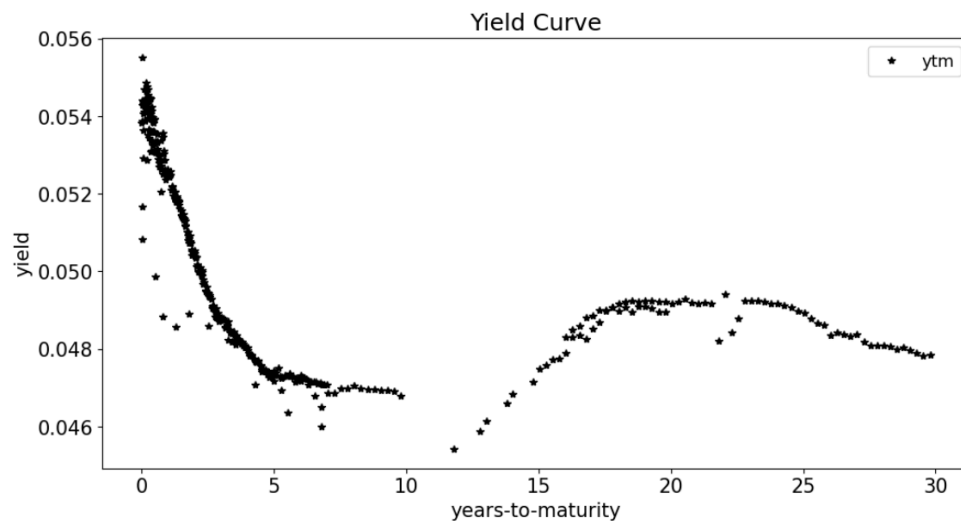
To measure 'how many days are you from the coupon payout':

- For notes and bonds: count the actual number of days until the coupon & the entire coupon period (actual / actual)
- For corporate & municipal bonds: pretend there's 30 days in a month and 360 in a year (30/360)
- For T-bill like instruments issues ≤ 1 year: actual / 360.

Clean Price: Price of treasury without accounting for accrued interest.

The dirty price is what the market actually transacts.

Yield Curve



Snapshot saying on a given date, what are the yields to maturity of the treasuries available to buy. Plot the YTM to the years-to-maturity.

Currently this is the case:

All treasuries have YTM in range of 4.5% to 5.5%.

Ideal: High YTM, meaning low price. These ones have 0 years-to-maturity: i.e. bonds with the best deals are those that mature within days and weeks. And the bonds which are the worst deal (low YTM, high price), mature in ~10 years..

Generally speaking, it should be a straight upward line, with the best deals i.e. those with high YTM (low price) have the most years-to-maturity (long dated bonds).

Currently, the yield curve is inverted. Historically, it is followed every time with a recession. Except this time (for the past 2 years)

Inflation

FED has 2 jobs: Keep prices stable, and maximise employment.

Price growth year over year is called inflation. Measure in many ways, one such way is CPI (Consumer Price Index).

For employment, most people refer to the GDP growth, and rates of unemployment.

Core CPI: Considers price of consumer goods excluding energy and food.

Used to indicate the inflation for the future.

(This part of inflation is the most indicative of the future, as energy and food usually have moving prices due to supply and demand, and not due to inflation)

TIPS: Treasury Inflation Protected Securities

It's a type of treasury.

No bills. Just tips-notes and tips-bonds. So, issued in longer terms with coupons (paid semiannually)

Protect for inflation: Like other treasuries the coupon rate is fixed, but the face value varies. Buy a \$100 face value, this face value gets incremented up every 6 months with the CPI.

Ex: If CPI grows 2%, the TIPS face value goes from 100 to 102. So if over 10 years, CPI goes up by 35%, then face value will be 135.

Really since the face value goes up with CPI, even the coupon is hedged against inflation, since you're just multiplying the coupon by the face value. Since face value, and hence coupons grow with CPI, TIPS are perfectly hedged against CPI movements (inflation)

Why not just buy TIPS: Market puts a price on the TIPS, and you might think the market has over-estimated inflation.

Buy TIPS: If you think the market is under-estimating inflation.

TIPS have a lower YTM than regular treasuries: Lower YTM = Higher Price. People are willing to pay a higher price on TIPS as they are hedged against inflation.

Non-TIPS (regular notes and bonds) are called Nominal

Difference between YTM of TIPS and Nominals: the average annualized inflation (called breakeven)

(May not be the actual inflation, but what the market thinks it is)

the 5 year break even is the one that's the most often cited