

Bonds 101 - Part 2

Why is there volatility in bonds?

Olli Investment Forum, Lou Coglianesse 10/14/2026

With thanks to Jonathan Fiechter and Tim Burniston for contributions to the content

Bonds 101 part 2 - Bond Volatility

Continuing discussions about bonds and how they might be used in retirement portfolios

- In **Part 1** Jonathan discussed how bonds can be used to lower *volatility* in a portfolio
- But we need to dig deeper,
 - Which bonds reduce volatility
 - What market condition cause volatility

Today, in **Part 2**, we will discuss

- How **Interest Rates & Credit Risk** effect bond price volatility
- The Volatility of **different types** of bonds

For simplicity, our **focus** will be:

- Individual Fixed Rate, Non-callable, US bonds & CDs

We will touch on

- Other types of bonds
- Relationship between volatility and income

What is Bond Volatility?

Fluctuations in *bond prices* in the period *between* issuance and maturity

At issuance a bond starts with:

- A **Coupon**, **Par** (Face) Value & **Maturity** Date
- This is a **contract** between the lender (us) and the borrower (the issuer)
- They are **fixed** from for the life of the bond

For example, if we buy a **new** issue bond.

- 5% coupon, \$1000 Par Value, Matures 10/14/2031
- **For the next 5 years**, we get \$50/year income
- **At maturity**, In 2031, we get our \$1,000 back

But *between* issuance & maturity:

- Every day, traders **compare our** bond to all other bonds in the world
- They ask: “What **price** would someone pay to get the **income** from *this* bond **right now**?”
- Traders calculate a **Price** that could be more or less than the par value
- If **other** bonds are a better deal, then **this** bond’s **price** goes down

Bond Prices & Interest Rates

The direct relationship:

- Bonds with a **higher coupons** are **worth more** than bonds with lower coupons

The inverse relationship:

- If **new** bonds on the market have **higher** coupons, **existing** similar bonds are worth less - their **prices fall**
- If new bonds have **lower** coupons, **prices** of existing bonds **rise**

So, how much do the prices rise and fall?

- **Prices** of existing bonds need to adjust so their **yield** is competitive in the market
- You can calculate* prices case by case using a Discounted Cash Flow formula
- You can also use a metric called duration* that predicts for a 1% change in market *rates* there is 1% *inverse* change in *price* for each year of duration
- E.g., 3yr duration bonds fall 3% when market rates rise 1%

* Note: Calculating Price, Yield to Maturity & Duration are way more complicated than what is depicted here.
The good news is it is calculated for you when you are looking to buy a bond or a bond fund. you just decide if you like what see.

Example: Pricing a 5% Coupon Bond

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- **The Scenario:** What If new 6% bonds become available
 - Why pay \$1,000 for an existing 5% bond that pays \$10/year less in income?
- **The Adjustment:** To attract buyers, the 5% bond's price must fall until its overall return delivers a **6% Yield to Maturity** (YTM).
- **Target Price Range:** Depending on time remaining until maturity, the market price might fall to between \$960 and \$990.
- **The Math:** The price equals the present value of all remaining annual interest payments plus the returned par value at maturity.
 - **Example:** A 5% bond with 3 years to maturity drops to \$973.27 when market yields rise to 6%.

This is why, for existing bonds, we talk about

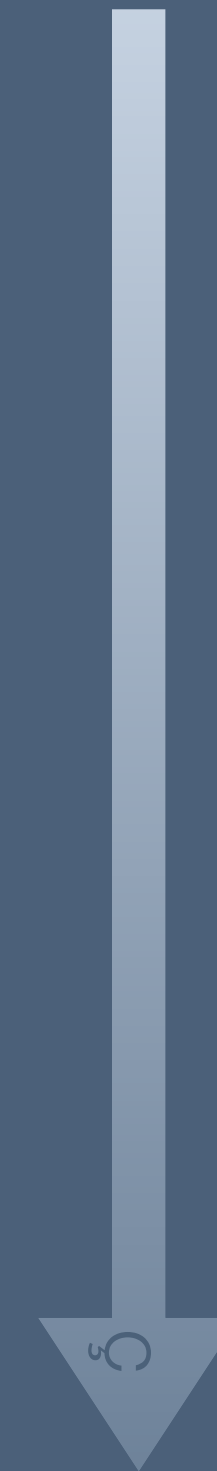
- **Price** rather than Par
- **Yield to Maturity** rather than Coupon

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Sensitivity to interest rates is mainly based on duration

1. Floating-Rate Notes (FRNs)
2. Variable Rate Preferred
3. Collateralized Loan Obligations (CLO)
4. Treasury Bills (< 1 year)
5. Bank Loans
6. Short Term Corporate IG
7. TIPS
8. Junk (<4 years)
9. Mortgage backed
10. Intermediate IG & Government
11. Long term IG & Government
12. 30 Year US Treasury
13. Fixed Rate Preferred Stocks (no maturity date)
14. Ultra long and Zero Coupon

*Less portfolio volatility
But, generally, less income*



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Bond Prices & Credit Risk

Remember: Bonds are loans

- A loan to a **shaky** borrower is worth **less** than a loan to a **stable borrower**
- The biggest risk is **default:**
 - I.E., the issuer cannot pay the interest or return the face (par) value at maturity

In good times: we see less volatility because fewer companies are in trouble

In bad times: Traders get nervous and some bond prices fall

Kinds of “bad times”

- An issuer’s customers can’t afford their products, they can’t get loans to continue operations, their supply chains get broken, ...
- It all depends on the types of businesses

Then, Traders pay less for those bonds because the company’s future is in doubt

Unfortunately, we retail investors don’t have a simple formula for estimating this

- We use Rating Agencies (Moody’s, S&P) for guidance

S&P Ratings and Probability of Default

	Rating Category	Credit Tier	Risk Description	1-Year Default Probability	5-Year Cumulative Default	10-Year Cumulative Default
Investment Grade (IG)	AAA	Prime	Exceptionally strong capacity to meet financial commitments. Safe-haven tier.	0.00%	0.07%	0.35%
	AA	High Grade	Very strong capacity to pay interest and principal; minor difference from AAA.	0.02%	0.25%	0.55%
	A	Upper Medium Grade	Strong capacity to meet commitments, but somewhat vulnerable to economic shocks.	0.05%	0.39%	1.35%
	BBB	Lower Medium Grade	Adequate protection; lowest Investment-Grade tier. Vulnerable to adverse economic conditions.	0.14%	1.36%	2.86%
Junk	BB	Non-Investment Grade	Highest High-Yield ("Junk") tier. Faces ongoing uncertainties/business exposures.	0.56%	5.75%	10.44%
	B	Highly Speculative	High risk of default; adverse business conditions will likely impair capacity to pay.	2.93%	15.60%	23.10%
	CCC / CC / C	Substantial Risk / Default Im	Currently vulnerable; relies on favorable business/financial conditions to avoid default.	26.80%	45.20%	52.40%
	D	Default	In payment default or under bankruptcy filing.	100.00%	100.00%	100.00%

Table from Gemini:

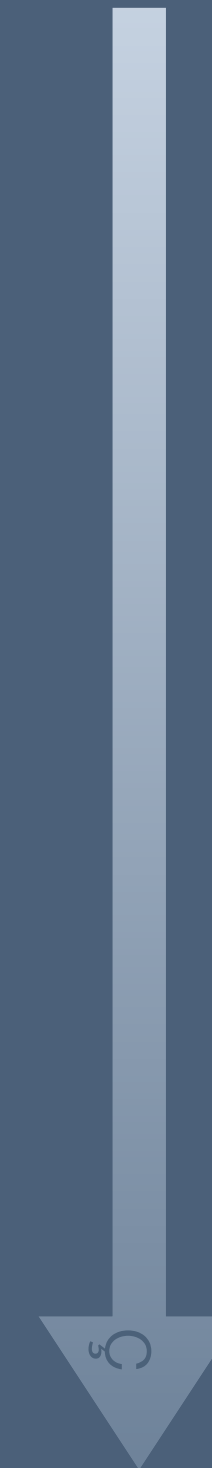
Key Details on the source data:

- **Publisher:** S&P Global Ratings (Research / Default Studies).
- **Dataset:** S&P's long-term **Global Corporate Default Study**, which tracks tens of thousands of investment-grade and high-yield corporate issuers over 10-, 15-, and 20-year trailing horizons.
- **Scope:** The cumulative figures reflect historical default rates across multiple economic cycles (including recessions, liquidity crises, and expansion periods) to capture the long-term compounding risk for each rating notch (AAA down to C).

Some bond types listed by increasing credit risk

1. US Treasuries
2. Municipal General Obligation Bonds
3. Agency Mortgage-Backed Securities (MBS)
4. Muni Revenue Bonds
5. A/AA/AAA Investment-Grade Corporates
6. Senior AAA CLOs
7. Muni Revenue Bonds
8. BBB Corporate Bonds ("Fallen Angels")
9. Emerging Market Debt (Local/USD)
10. Bank Loans
11. BB Mezzanine CLOs
12. High-Yield "Junk" Corporate Bonds
13. Additional Tier 1 & Bank subordinated debt
14. Distressed Debt & Mezzanine financing

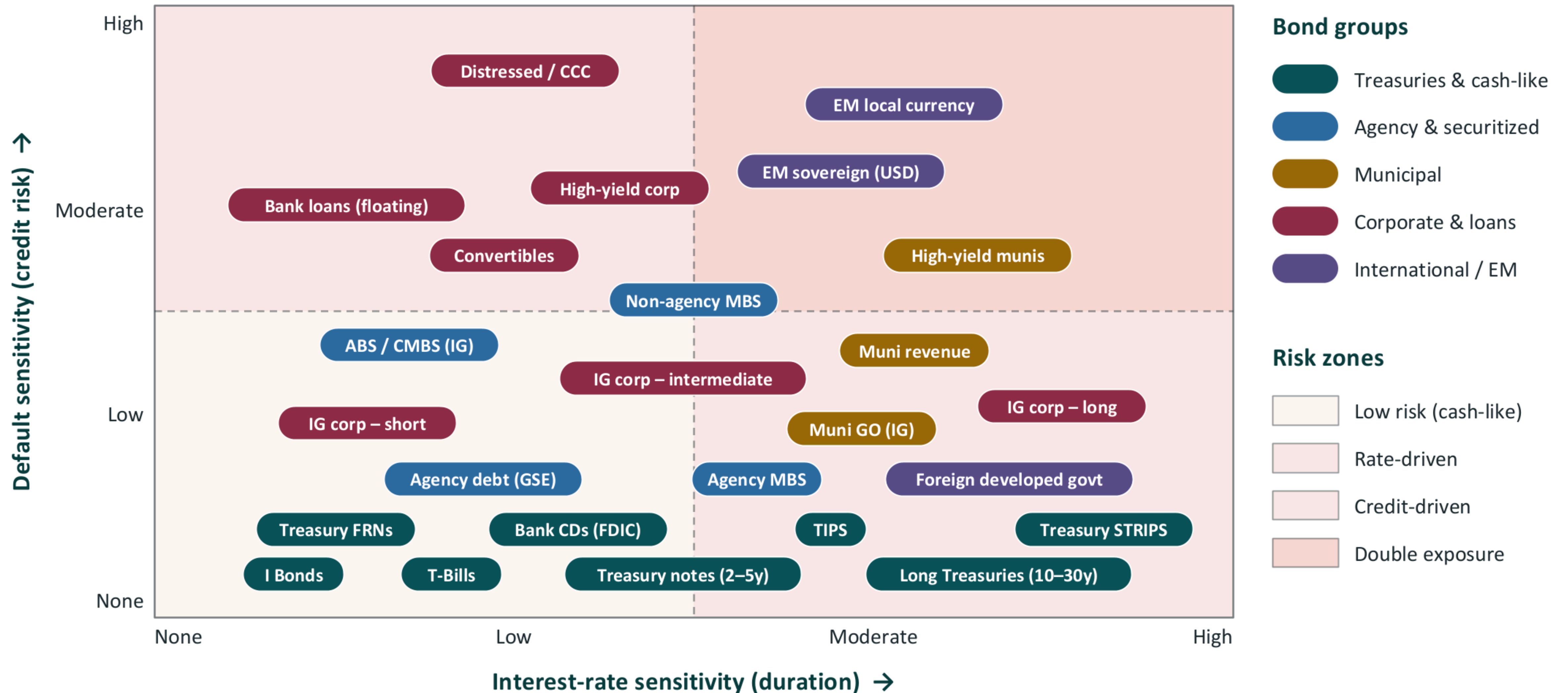
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Bond Risk Matrix

Interest-rate sensitivity vs. default sensitivity (illustrative placements)



How to Read the Matrix

Where a bond sits tells you which risk is most likely to hurt it

Horizontal axis

Interest-rate sensitivity



How far the price falls when rates rise, driven mainly by duration: price change $\approx$ $-\text{duration} \times \text{change in yield}$.

Vertical axis

Default sensitivity



How exposed you are to non-payment or credit-spread widening: issuer strength, rating, collateral and seniority.

Credit-driven

Low rate risk · High default risk

Bank loans, high-yield, distressed. Results hinge on issuer solvency more than on rate moves.

Double exposure

High rate risk · High default risk

EM local-currency and high-yield munis. Rising rates and credit stress can hit together.

Low risk (cash-like)

Low rate risk · Low default risk

T-Bills, FRNs, I Bonds, FDIC CDs. Main risks are inflation and reinvestment, not price.

Rate-driven

High rate risk · Low default risk

Long Treasuries and STRIPS. Safe from default, but prices swing sharply with rates.

- 1 Reading the grid**
Right = more rate risk; up = more credit risk. Top-right means both.

- 2 Placement is a range**
Dots are illustrative. Maturity moves a bond: 2-year and 30-year corporates sit apart.

- 3 Structure matters**
MBS prepayments, TIPS real yields and EM currency risk add nuance beyond two axes.

Examples of Higher Yields for Higher Risks

Less
Credit
Risk



More
Credit
Risk

Product type	3 month	6 month	9 month	1 year	2 year	3 year	5 year	10 year	20 year	30+ year
New issue CDs	4.15%	4.30%	4.50%	4.60%	5.05%	5.15%	5.45%	5.50%	--	--
New issue CDs - call protected	4.15%	4.30%	4.50%	4.55%	4.90%	5.00%	5.15%	--	--	--
US Treasury	4.19%	4.30%	4.45%	4.57%	4.80%	4.92%	5.03%	5.24%	5.69%	5.61%
<u>US Treasury STRIPS</u>	--	--	--	--	4.73%	4.94%	5.12%	5.34%	5.85%	5.59%
Agency/GSE	4.21%	4.36%	4.48%	4.83%	4.94%	5.13%	5.76%	6.09%	6.47%	6.39%
Corporate (Aaa/AAA)	4.23%	3.98%	4.29%	4.50%	4.73%	4.92%	4.99%	5.49%	6.14%	6.27%
Corporate (Aa/AA)	4.44%	4.44%	4.54%	4.67%	4.97%	5.22%	5.53%	6.15%	6.57%	7.48%
Corporate (A/A)	4.47%	4.64%	4.82%	4.84%	5.26%	5.45%	5.87%	6.69%	7.23%	7.44%
Corporate (Baa/BBB)	4.84%	5.11%	5.32%	5.79%	6.25%	7.35%	7.50%	7.79%	8.09%	8.51%
Municipal (Aaa/AAA)	3.64%	3.38%	3.56%	3.63%	3.98%	4.16%	4.54%	5.21%	5.29%	5.30%
Municipal (Aa/AA)	3.43%	3.61%	4.05%	4.56%	4.25%	5.12%	5.41%	5.65%	5.82%	5.65%
Municipal (A/A)	3.39%	3.70%	4.03%	4.07%	4.54%	4.93%	5.41%	5.66%	5.85%	5.76%
Taxable Municipal**	--	4.18%	4.85%	5.15%	5.36%	5.49%	5.87%	6.11%	6.07%	7.09%

AS OF OCT-10-2026 10:13 AM ET YIELDS MAY BE DELAYED UP TO 5 MINUTES.



Less Rate
Sensitivity

More Rate
Sensitivity

* Source: [fidelity.com](https://www.fidelity.com)

Summary

- The **Coupon** and the **Par** value of a bond don't change over time
- By *Volatility* we mean changes in price between issuance and maturity
- **Between** issuance and maturity, a bond's **Yield** and its **Price** rise and fall with:
 - Rising/falling interest rates
 - Changes in the issuer's credit risk
- **But at maturity** you will have received the bond's coupons and the full par value