The Bond Market

Figures current as of October 2026

The debt market — how bonds are priced, who owes what to whom, Treasuries and the curve, central banks, mortgages, corporate and private credit, municipals, securitization, the world's sovereigns, the machinery, and the crises that shaped it.

MODULE 1 — Foundations

Goal: Take a bond apart.

A loan cut into tradeable pieces; par, coupon, maturity, price, and yield; the seesaw between price and yield, priced at every maturity; the yield measures; coupon structures, calls, and puts; seniority and covenants; the vocabulary of risk.

MODULE 2 — The Mathematics

Goal: Learn the four numbers a bond desk runs on.

Duration, convexity, the dollar value of a basis point, spread duration, carry, and roll-down, all recomputed on the October 14, 2026 curve; the 2050 Treasury bond's 56% fall; a hedge, a breakeven, and a year's total return — worked.

MODULE 3 — The Size and Shape of the Market

Goal: Map the $161 trillion market and its holders.

The world's bonds by country, America's by sector, who holds each kind and why each sells, the issuance of 2025 and 2026, and the nearly two decades in which Treasuries rose to almost half of the American market.

MODULE 4 — The Yield Curve and the Risk-Free Rate

Goal: Read the reference line.

The curve in October 2026 against three earlier moments; shapes, inversions, and the record that failed after 2022; a yield taken apart into expected rates, inflation, and the term premium; 2026's bear flattening; why long yields rose, argued both ways.

MODULE 5 — US Treasuries

Goal: Learn the world's most important market in depth.

The instruments, the auction machine and a real auction, the holders, repo and the basis trade, the fiscal arithmetic and the debt limit, the Treasury's buyback 'twist', and whether to borrow long or short.

MODULE 6 — Central Banks and the Bond Market

Goal: See how the Fed and its peers move the structure.

The toolkit at its October 2026 settings, the balance sheet from 2007 to the end of quantitative tightening, the September 16 rise, the five central banks that matter, and whether central banks should steady the long end.

MODULE 7 — Mortgage-Backed Securities

Goal: Follow a mortgage pool into a bond.

Securitization layer by layer at a 7.40% mortgage rate, agency and private-label pools, TBA trading, prepayment and negative convexity worked, CMOs, 2008, and the argument over releasing Fannie Mae and Freddie Mac.

MODULE 8 — Corporate Bonds: Investment Grade

Goal: Price a company's promise.

The rating scale and its spreads, spreads as the economy's thermometer, a new ten-year bond priced, the record borrowing of the AI build-out, fallen angels, and whether the AI debt is a credit risk.

MODULE 9 — High Yield, Leveraged Loans, and CLOs

Goal: Map the speculative-grade market.

High-yield bonds and their default arithmetic at today's spread, leveraged loans, CLOs tranche by tranche, and the distressed exchanges that have multiplied the true default rate.

MODULE 10 — Private Credit

Goal: Weigh the decade's largest structural shift.

Private credit's growth to about $2.3 trillion, the insurers and the retail funds behind it, the 2026 redemption queues, record default rates on one measure, the frauds of 2025-26, and whether it is a systemic risk.

MODULE 11 — Municipal Bonds

Goal: See how states and cities borrow.

The $4.5 trillion tax-exempt market, the tax-equivalent yield worked at 4%, general obligation and revenue bonds, the default record from Orange County to Brightline, record issuance, climate, and the exemption argued.

MODULE 12 — Securitization Beyond Mortgages

Goal: Watch any cash flow become a bond.

The template and its tranches, the asset classes, subprime auto loans, commercial mortgages and the office crisis, data-center securitization, and what 2008 changed.

MODULE 13 — Inflation-Linked, Covered, Green, and the Rest

Goal: Meet the instruments a survey leaves out.

TIPS worked against a nominal Treasury, I-bonds, foreign linkers, covered bonds, green and social bonds, sukuk, catastrophe bonds at a record $65.6 billion, and the Credit Suisse write-off a Swiss court ruled unlawful.

MODULE 14 — Sovereign and Global Bonds

Goal: Survey the world outside the United States.

Japan's end of the zero era, Europe with France now paying more than Italy, British gilts at their highest since 1998, China's closed market, and the emerging markets, from Venezuela's restructuring to Senegal's reprofiling.

MODULE 15 — The Machinery

Goal: See how bonds trade, are indexed, rated, insured, and cleared.

Dealers and electronic trading, the Aggregate index and bond ETFs, the rating agencies, credit default swaps worked, and the central clearing that begins on December 31, 2026.

MODULE 16 — Bonds in Portfolios and the Economy

Goal: Connect the market to investors and everyone else.

The 60/40 record through 2026, the ways investors hold bonds, a ladder worked at 5%, the October 2026 dashboard, fiscal dominance argued both ways, and what the price of time does to everyone else.

MODULE 17 — Ten Crises

Goal: Learn how the bond market breaks.

From Volcker to the 2026 long-end selloff: each episode's trigger, mechanism, damage, resolution, and lesson, and the pattern across them.

MODULE 18 — Where Things Stand, and What to Watch

Goal: Assemble the picture and name the dates.

The argument on a page; five contradictions that run across the modules; a dated watch list from October 21, 2026 into 2028; and a last word.

A note on the sources: the course's yields come from the Treasury's daily par yield curves; its policy rates and balance sheets from the Federal Reserve and the other central banks. Its market sizes come from the Securities Industry and Financial Markets Association (SIFMA), the Bank for International Settlements (BIS), and the Federal Reserve's Financial Accounts of the United States (Z.1). Its credit spreads come from the ICE BofA indices published through the St. Louis Fed's FRED database; and its default figures from Moody's, S&P Global, and Fitch. Prices and yields are closing levels on Wednesday, October 14, 2026, unless another date is given.

Market Snapshot

The bond market at the close of Wednesday, October 14, 2026

Measure	Level	Source
Federal funds rate target; Secured Overnight Financing Rate (SOFR)	3.75-4.00%, raised on September 16; SOFR 3.88%	Federal Reserve; New York Fed
Treasury yields: 3-month, 2-year, 5-year	4.28%, 4.82%, 5.00%	Treasury par yield curve
Ten-year Treasury yield	5.19%; its 2026 peak, 5.31% on October 5, was the highest since 2002	Treasury par yield curve
Thirty-year Treasury yield	5.52%; its 2026 peak, 5.67% on October 7, was the highest since the early 2000s	Treasury par yield curve
Curve slopes: 2-year to 10-year; 2-year to 30-year	+37 basis points; +70 basis points (+71 and +137 at the end of 2025)	Treasury, derived
Ten-year inflation-protected (TIPS) yield; ten-year breakeven inflation	2.84%; 2.35%	Treasury real yield curve; FRED
Ten-year term premium, two models	1.07% (Kim-Wright, October 9); 0.82% (ACM, September 30)	Federal Reserve Board; New York Fed
Thirty-year fixed mortgage rate	7.40% (October 15), the highest since November 2023	Freddie Mac
Investment-grade corporate spread and yield	84 basis points; 5.94%	ICE BofA US Corporate index, via FRED
High-yield spread and yield; the CCC tier's spread	325 basis points; 8.20%; CCC 1,282 basis points, its 2026 high	ICE BofA US High Yield indices, via FRED
Ten-year AAA municipal yield	About 4.0%, about 78% of the Treasury yield (October 13)	Raymond James; Nuveen
Ten-year government yields abroad	Germany 3.44%; France 4.88%; Italy 4.56%; Britain 5.40%; Japan 3.00%; China 1.66%	National sources, via Trading Economics
Gross federal debt; fiscal 2026 deficit; net interest	$40.34 trillion (October 13); $1.99 trillion, 6.2% of GDP; $1.14 trillion	Treasury; Congressional Budget Office
Marketable Treasury debt; bills' share	$31.84 trillion; 22.4%, the highest since 2020 (September 30)	Treasury, Monthly Statement of the Public Debt

A basis point is a hundredth of a percentage point. The breakeven is the ten-year Treasury yield minus the ten-year TIPS yield (Module 4); the term premium is a model's estimate of the extra yield investors demand for holding a long bond rather than rolling short ones, and the two models differ (Module 4). GDP is gross domestic product.

Module 1 — Foundations

The Anatomy of a Bond

Recommended Reading / Reference

Book: Frank J. Fabozzi, ed., *The Handbook of Fixed Income Securities* (9th edition, 2021)

Reference: SIFMA, *US Fixed Income Market Structure Primer*; the CFA Institute fixed-income curriculum

1a. A Loan Cut Into Pieces

A bond is a loan that has been cut into tradeable pieces. A borrower, whether a government, a company, a city, a bank, or a pool of mortgages, promises to pay the holder a fixed interest payment (the coupon) on fixed dates. It also promises to return the principal (the face or par value, conventionally $1,000 per bond and quoted as 100) on a fixed date (the maturity).

Unlike a bank loan, the pieces can be sold to anyone, at whatever price the market sets, for the life of the loan, and the borrower neither knows nor cares who holds them. Everything else in the course, from the yield curve to the sovereign default, is a variation on three questions: who is borrowing, what exactly they promise, and what the market thinks the promise is worth today.

1b. The Parts

Term	What it means	Example
Issuer	The borrower; it sets the credit quality and the legal regime	The US Treasury; Apple; the State of California; a Fannie Mae mortgage pool; the Republic of Argentina
Par (face)	The amount repaid at maturity and the base for the coupon, quoted as 100	$1,000 per bond; a $10 million block is 10,000 bonds
Coupon	The annual interest as a percentage of par, paid twice a year in the United States and once a year in most of Europe	A 5% coupon pays $50 a year per $1,000, as $25 every six months
Maturity	The date the principal is repaid, and the term at issue	Treasury bills under a year; notes 2-10 years; bonds 20-30 years; some corporates 40-100 years
Price	What the market pays today, as a percentage of par; the clean price excludes accrued interest and the dirty price includes it	98.50 means $985 per $1,000, plus the interest accrued since the last coupon
Yield to maturity	The single discount rate that equates today's price with all the future cash flows: the annual return if the bond is held to maturity and its coupons are reinvested at that rate	A 5% coupon bond bought at 98.50 with 10 years left yields 5.19%
Accrued interest	Interest earned since the last coupon, owed to the seller at settlement	91 days into a 182-day period on a 5% bond: $25 × 91/182 = $12.50 per $1,000
Day count	The convention for counting days of accrual	Treasuries actual/actual; corporates and municipals 30/360; money markets actual/360
Settlement	When cash and bonds change hands	T+1, the next business day, in the United States (for corporates since May 2024); T+2 in Europe and Britain until October 11, 2027

Term	What it means	Example
Identifier	A CUSIP (Committee on Uniform Securities Identification Procedures) number in America, or an ISIN (International Securities Identification Number) abroad, identifies a specific issue	Each of a company's fifty bonds has its own

1c. The Seesaw, in Full

The coupon is fixed; the price is not. A bond issued at 100 paying $50 a year has a 5% coupon. If market yields for that maturity rise to 6%, no one will pay 100 for a bond paying $50 when new bonds pay $60, so its price falls until the fixed $50, plus the gain to par at maturity, delivers 6%. If yields fall to 4%, the reverse happens.

The table gives the exact prices at a 5% coupon, close to where Treasury yields stood in October 2026, and two facts stand out. The price move is larger the longer the maturity. It is also not symmetric: the gain from a one-point fall in yields is larger than the loss from a one-point rise, an asymmetry called convexity (Module 2).

Yield	2-year price	5-year price	10-year price	30-year price
3%	103.85	109.22	117.17	139.38
4%	101.90	104.49	108.18	117.38
5% (par)	100.00	100.00	100.00	100.00
6%	98.14	95.73	92.56	86.16
7%	96.33	91.68	85.79	75.06
8%	94.56	87.83	79.61	66.06

Price per 100 of par of a 5% coupon bond paying semi-annually, at each yield; computed. A rise from 5% to 6% costs the 2-year 1.86 points and the 30-year 13.84 points; a fall to 4% gains the 30-year 17.38 points.

1d. The Yield Measures

- **Coupon rate**: the fixed percentage of par. It tells you the cash, not the return.
- **Current yield**: the coupon divided by the price, $50 / $985 = 5.08%. It ignores the pull to par and is useful only for comparing income.
- **Yield to maturity (YTM)**: the internal rate of return of all the cash flows at today's price, and the standard quote. It assumes the coupons are reinvested at the same rate, which they never exactly are.
- **Yield to call and yield to worst (YTW)**: for a callable bond, the yield if the issuer redeems it on the date that is worst for the holder. It is the conservative quote for corporates and municipals, most of which are callable.
- **Spread**: the yield minus that of a Treasury of the same maturity, in basis points; the premium for credit and liquidity. The G-spread is measured to the interpolated Treasury, the I-spread to interest-rate swaps, the Z-spread over the whole zero-coupon curve, and the option-adjusted spread (OAS) after removing the value of any call or prepayment option.
- **Real yield**: the nominal yield minus expected inflation, or the quoted yield on an inflation-linked bond; the measure of a bond's return in purchasing power.

1e. Coupon Types, Calls, and Puts

Structure	Mechanics	Where found
Fixed-rate	The same coupon for life; the default	Treasuries, most corporates, municipals, sovereigns
Floating-rate	The coupon resets off a reference rate, such as SOFR or the euro interbank offered rate (EURIBOR), plus a spread; the price stays near par, so the holder bears little rate risk and all the credit risk	Leveraged loans, bank notes, Treasury floating-rate notes, collateralized loan obligation (CLO) tranches
Zero-coupon	No coupons; sold at a discount and repaid at par; the purest exposure to rates	Treasury STRIPS (Separate Trading of Registered Interest and Principal of Securities), some corporates and municipals
Step-up and payment-in-kind	The coupon rises on a schedule, or is paid in more bonds rather than cash: payment in kind (PIK)	High yield, distressed debt, private credit
Callable	The issuer may redeem early at a set price, usually after a lock-out period; the holder has sold an option and is paid a higher yield for it	Most corporates and municipals; agency debt; every mortgage bond, through prepayment
Puttable	The holder may sell the bond back at par on set dates; the holder owns an option and accepts a lower yield	Some municipals and corporates
Convertible	May be exchanged for the issuer's stock: a bond with an equity option, and a lower coupon	Growth and technology companies
Perpetual and Additional Tier 1	No maturity; callable; the coupon can be suspended and the bond written down; banks' Additional Tier 1 (AT1) regulatory capital	European and Asian banks (Module 13)

1f. Seniority and Covenants

Where a bond stands in line if the borrower fails matters as much as its coupon. Secured creditors, who hold specific collateral such as a building or a first lien on a company's assets, are paid first from that collateral. Senior unsecured bondholders come next, from the general estate; subordinated bondholders after them; preferred and then common shareholders last, usually with nothing.

Recoveries follow the ladder: first-lien loans have historically recovered 60-70 cents on the dollar in default, senior unsecured bonds about 40, and subordinated bonds 20-30. Covenants are the promises around the promise. Maintenance covenants test the borrower every quarter, for example by capping debt at a multiple of earnings; incurrence covenants bind only when the borrower acts, by borrowing more, selling assets, or paying a large dividend.

Investment-grade bonds carry few covenants, and high-yield bonds carry incurrence covenants. Leveraged loans once carried maintenance tests as well, but most now carry none: the 'covenant-lite' loan, whose consequences appear in Module 9.

1g. The Vocabulary of Risk

Risk	What it is	How it is measured	Dominant in
Interest-rate	Prices fall when yields rise	Duration and convexity (Module 2)	Treasuries, agency bonds, every long bond
Credit (default)	The borrower does not pay	Ratings, spreads, credit default swaps	Corporates, emerging markets, municipals, securitizations
Spread	Spreads widen without a default as the appetite for risk falls	Spread duration	Corporates, high yield, emerging markets
Liquidity	The bond cannot be sold quickly at a fair price	The gap between bid and offer, turnover, dealer inventory	Corporates, municipals, securitizations, small issues
Prepayment and call	Principal comes back early, when it is least wanted	OAS, negative convexity	Mortgage bonds, callable bonds
Extension	Principal comes back later than expected when rates rise	Lengthening effective duration	Mortgage bonds
Inflation	Fixed coupons lose purchasing power	Breakeven inflation, real yields	Every nominal bond
Reinvestment	Coupons are reinvested at lower rates	Horizon analysis	Long-horizon holders
Currency	A foreign bond changes value in the holder's currency	Exchange-rate volatility, the cost of hedging	Global and emerging-market bonds
Event and sovereign	A takeover, a restructuring, capital controls, a change of law	Covenants, collective action clauses, governing law	Takeover targets, emerging-market sovereigns

Module 1 Key Points

Foundations

• A bond is a loan cut into tradeable pieces: issuer, par, coupon, maturity, and a price the market sets every day.

• Prices move inversely to yields, more at longer maturities, and the gain from falling yields exceeds the loss from rising ones.

• Yield to maturity is the standard quote, yield to worst the conservative one for callable bonds, and spread the premium over Treasuries.

• Fixed, floating, zero, callable, puttable, convertible, and perpetual structures divide rate risk and credit risk differently.

• Seniority sets recovery: first-lien loans about 60-70 cents on the dollar, senior unsecured bonds about 40, subordinated 20-30.

Module 1 Quiz

Check Your Understanding

1. A bond has a 5% coupon and a par value of $1,000. What does it pay, and when?

A) $5 a year, paid with the principal at maturity
B) $50 a year, as two payments of $25 six months apart
C) $500 over its life, in one payment at the end
D) $50 a year, paid once on each anniversary

2. Why does a bond's price fall when market yields rise?

A) Its coupon is fixed, so only the price can adjust
B) The issuer lowers the coupon
C) The issuer's credit rating is cut automatically whenever market yields rise
D) Accrued interest is deducted from the price each time yields rise

3. What does a yield-to-worst quote assume about a callable bond?

A) A default on the next coupon date with nothing recovered
B) Coupons reinvested at zero for the life of the bond
C) A sale at the lowest price the bond has ever traded at
D) A redemption on the worst date for the holder

4. On the module's table, what does a rise in yields from 5% to 6% cost a 5% thirty-year bond?

A) 1.86 points, as for a 2-year bond
B) 6 points
C) 13.84 points, against 1.86 for the 2-year
D) 17.38 points, the same as the gain from a fall to 4%, since prices move symmetrically

5. Where do senior unsecured bondholders stand if the borrower fails?

A) After secured creditors, before subordinated ones
B) First, ahead of every secured creditor of the company
C) Last, behind the common shareholders of the company
D) Equal with shareholders

Module 2 — The Mathematics

Duration, Convexity, Spreads, and Carry

Recommended Reading / Reference

Book: Bruce Tuckman and Angel Serrat, *Fixed Income Securities: Tools for Today's Markets* (4th edition, 2022)

Reference: The CFA Institute readings on fixed-income risk and return

2a. Duration: How Hard the Seesaw Swings

Not every bond swings equally. A bond maturing next year will soon be repaid at par, so a change in rates barely moves its price; a bond maturing in thirty years carries thirty years of coupons that a rate change makes more or less competitive, so its price moves a great deal. Duration measures this.

Macaulay duration is the weighted-average time, in years, until a bond's cash flows arrive. For a zero-coupon bond it equals the maturity; for a coupon bond it is shorter, because the coupons arrive early. Modified duration, the number practitioners use, converts that into price sensitivity: the approximate percentage change in price for a one-percentage-point change in yield.

A bond with a modified duration of 7 loses about 7% if yields rise one point and gains about 7% if they fall one point. Three rules follow. Duration rises with maturity; it falls as the coupon rises, because more of the cash arrives early; and it falls as yields rise, because distant cash flows are discounted more. The market's term for 'rate-sensitive' is 'long duration'.

Instrument	Modified duration (years)	Price change for a one-point rise in yield
3-month Treasury bill	0.25	−0.25%
2-year Treasury note, 4.82%	1.89	−1.9%
5-year Treasury note, 5.00%	4.38	−4.4%
10-year Treasury note, 5.19%	7.73	−7.7%
30-year Treasury bond, 5.52%	14.58	−14.6%
30-year Treasury STRIPS (zero coupon)	29.2	−29%
Bloomberg US Aggregate index, through an exchange-traded fund (ETF)	5.70	−5.7%
Investment-grade corporates (iShares iBoxx $ Investment Grade Corporate Bond ETF)	7.59	−7.6%
High-yield corporates (iShares iBoxx $ High Yield Corporate Bond ETF)	3.20	−3.2%
Agency mortgage-backed securities (MBS), through the iShares MBS ETF	5.75, and it lengthens when rates rise	−5.8%, worsening as rates rise
Leveraged loan	About 0.25, because the coupon floats	About −0.25%

Treasury durations are computed for bonds priced at par at the October 14, 2026 yields. The fund figures, from iShares, are effective durations on October 15, 2026, and differ slightly from those of the indices the funds track.

Worked example — The Long Bond of 2020

The 1.25% Treasury bond due May 2050 was first sold in May 2020, when the thirty-year yield was about 1.3%. On August 4, 2020, with that yield at 1.19%, it traded at about 101.5, with a modified duration of 24.8. By October 19, 2023 the thirty-year yield had risen to 5.11%, 392 basis points higher, and the bond's price was about 44.2: a fall of 56.4%. Duration alone predicts a loss of 24.8 × 3.92 = 97%, nearly the whole bond. Adding the convexity term (Section 2b) for the bond's convexity of 701, ½ × 701 × 0.0392² ≈ 54%, cuts the predicted loss to 97% − 54% = 43%. The actual loss lies between, because for a move this large even two terms are not enough: as yields rose, the bond's duration fell, to 19.3. It set a new low of about 42.6 on October 7, 2026, and closed October 14 at about 43.8, with a duration of 17.7. The lesson: duration is a first-order estimate that works for small moves, and a large move needs the full price calculation. Prices are computed from the Treasury's par yield curves, so market prices differ slightly.

2b. Convexity and the Value of a Basis Point

Convexity is the curvature of the price-yield line: prices rise more when yields fall than they drop when yields rise, because duration itself changes as yields move. For a plain bond convexity is positive and works in the holder's favor in both directions. The correction is: percentage price change ≈ (−duration × Δy) + (½ × convexity × Δy²), where Δy is the change in yield as a decimal.

For the ten-year Treasury on October 14, 2026, with a duration of 7.73 and a convexity of 72.7, a one-point rise in yields gives −7.73% + 0.36% = −7.37%, and a one-point fall gives +7.73% + 0.36% = +8.09%; exact repricing gives −7.37% and +8.10%. Mortgage bonds and callable bonds have negative convexity, because the borrower's option to repay caps the gain, so they lose on both sides and yield more for it (Module 7).

DV01, the dollar value of a basis point, is duration in cash terms: the dollar change in a position's value for a one-basis-point move in yield. A $10 million position in the ten-year note has a DV01 of $10,000,000 × 7.73 × 0.0001 ≈ $7,730. Trading books are managed in DV01, and the ten-year's ordinary daily moves of 5-10 basis points are worth $38,650-77,300 per $10 million.

Worked example — Hedging with DV01

A dealer holds $50 million of a corporate bond with a duration of 6.5, so its DV01 is $50,000,000 × 6.5 × 0.0001 = $32,500. To hedge the interest-rate risk while keeping the credit exposure, it sells ten-year Treasury notes with the same DV01. At $77.30 per $100,000 of notes, that is $32,500 / $77.30 × $100,000 ≈ $42 million. If yields rise 10 basis points, the corporate bond loses about $325,000 and the short Treasury position gains about $325,000. The dealer is left exposed only to the corporate bond's spread, which is what it is paid to warehouse. Desks often use Treasury futures instead, sized the same way from the contract's DV01.

2c. Spread Duration and Breakeven

A corporate bond's price responds to two things: Treasury yields and its own spread. Spread duration measures the second, as the percentage price change for a one-point change in spread. For a fixed-rate bond it roughly equals modified duration, so a corporate bond with a duration of 7 loses about 7% if its spread widens 100 basis points, even with Treasury yields unchanged.

That is why a credit investor's risk is usually quoted in spread duration, and why high-yield bonds, with their shorter durations, are less sensitive to rates but far more exposed to spreads, which move much more.

Breakeven turns the spread into a cushion: the spread divided by the spread duration is the widening a bond can absorb in a year before it does worse than Treasuries.

At the October 14, 2026 index spreads and the fund durations in the table, an investment-grade bond at 84 basis points with a spread duration of 7.6 breaks even at 84 / 7.6 ≈ 11 basis points of widening. A high-yield bond at 325 basis points with a spread duration of 3.2 breaks even at about 100.

2d. Carry and Roll-Down

A bond's return over a year, if nothing changes, has two parts. Carry is the yield earned minus the cost of funding it: for an investor, the coupon plus the pull to par; for a leveraged holder, the yield minus the repo rate at which it borrows. Roll-down is the gain from the bond's aging along an upward-sloping curve.

On the October 14, 2026 curve, a five-year note bought at 5.00% becomes a four-year note a year later; at the four-year yield of about 4.96%, it is repriced at the lower yield and gains about 0.14% on top of its coupon. A two-year note rolling to one year (4.53%) gains about 0.28%. In an inverted curve, as in 2022-24, roll-down is negative: the bond reprices at a higher yield as it ages.

The curve of October 2026 has one such kink: the twenty-year yield (5.57%) is above the thirty-year (5.52%). A thirty-year bond rolling to twenty-nine years therefore reprices at a slightly higher yield, and its roll-down is about −0.07%.

Worked example — Total Return of a Ten-Year Note Over One Year

Suppose an investor buys the ten-year note at par at 5.19% on October 14, 2026, and holds it for a year without reinvesting the coupons. A year later it is a nine-year note, priced off the nine-year point of today's curve, 5.16%, plus whatever move occurs. If yields are unchanged, the return is the coupon of 5.19% plus 0.24% of roll-down: 5.43%. If yields rise 50 basis points, the return is 1.93%; if they fall 50 basis points, 9.07%; if they rise 100 basis points, −1.42%. The return is zero at a rise of about 79 basis points. The gap between the second and third cases, a loss of 3.50 points against a gain of 3.64 against the unchanged case, is convexity. A 5.19% yield is a cushion that the ten-year's 0.52% of August 2020 was not.

2e. Why This Matters for the Rest of the Course

Every later module uses these tools. The yield curve (Module 4) is a set of yields whose changes duration translates into prices. A Treasury auction that clears above the expected yield (Module 5) costs the dealers who buy it in DV01. Mortgage bonds (Module 7) are a study of negative convexity, and corporate and high-yield bonds (Modules 8-9) are priced and hedged in spread duration.

The 60/40 portfolio's failure in 2022 (Module 16) was a duration story, and the bank failures of 2023 (Module 17) were duration losses on bonds bought at the yields of 2021. A reader who can compute a duration, a DV01, a breakeven, and a carry has the four numbers a bond desk runs on.

Module 2 Key Points

The Mathematics

• Modified duration is the percentage price change for a one-point yield move: 1.89 for the 2-year, 7.73 for the 10-year, 14.58 for the 30-year.

• Convexity corrects duration for large moves: the 2050 bond fell 56% from 2020 to 2023, against 97% predicted by duration alone.

• DV01 is duration in dollars, about $7,730 a basis point on $10 million of ten-year notes, and is how positions are hedged.

• Breakeven, spread over spread duration, is the widening a bond absorbs in a year: about 11 basis points for investment grade, 100 for high yield.

• At 5.19%, the ten-year note returns 5.4% in a year if nothing changes and loses money only if yields rise about 79 basis points.

Module 2 Quiz

Check Your Understanding

1. What does a modified duration of 7.73 mean?

A) The bond matures in 7.73 years
B) The coupon is 7.73% of par
C) The price moves about 7.7% for a one-point yield change
D) The bond's price doubles in 7.73 years, if every one of its coupons is reinvested

2. Why did the 1.25% Treasury bond due 2050 fall less from 2020 to 2023 than its duration predicted?

A) The Fed bought it at par in 2022 to stop the fall in its price
B) As yields rose its duration fell, from 24.8 to 19.3, cushioning the fall
C) Its coupon was raised to 5% when yields went up
D) The Treasury repurchased it at par in 2023

3. What is DV01?

A) The yield a bond earns over a single day of trading
B) The duration of a bond that matures in one year
C) The difference between a bond's dirty and clean prices
D) The dollar change for a one-basis-point move

4. How much spread widening can a high-yield bond at 325 basis points, with a spread duration of 3.2, absorb in a year before it does worse than Treasuries?

A) 11 basis points
B) 325 basis points
C) About 100 basis points
D) About 1,040 basis points, the spread times its duration

5. Why is the thirty-year bond's roll-down slightly negative on the October 14, 2026 curve?

A) The twenty-year yields more than the thirty-year, so an aging bond reprices higher
B) Thirty-year bonds pay no coupon in the first year after they are sold
C) Roll-down is always negative for bonds of over ten years
D) The Treasury stopped issuing thirty-year bonds in 2026

Module 3 — The Size and Shape of the Market

The Full Map, With Numbers

Recommended Reading / Reference

Reference: SIFMA, *Capital Markets Fact Book* (2026 edition) and *Research Quarterly*; the Bank for International Settlements' debt securities statistics; the Federal Reserve's *Financial Accounts of the United States* (Z.1)

3a. Global

The world's bond market, meaning all debt securities outstanding, was about $160.7 trillion at the end of 2025, up 10.6% in a year. That is slightly more than the world's stock markets, $157.8 trillion. The United States is 38% of it, the euro area second, and China, mostly financed and held at home, third.

Because so much of the world's debt is denominated in dollars and priced off Treasuries, the American market's influence exceeds even its share. A rise in the ten-year Treasury yield raises borrowing costs from São Paulo to Seoul.

Market	Outstanding, end-2025	Share	Notes
United States	$61.2 trillion	38.1%	The deepest and most liquid market
Euro area (21 members)	$31.1 trillion	19.4%	Germany's Bunds are the benchmark; other members trade at spreads to them
China	$28.7 trillion	17.9%	Government, policy-bank, and local-government debt; mostly closed to foreigners
Japan	$10.8 trillion	6.7%	Government bonds dominate, and the central bank is their largest holder
United Kingdom	$6.9 trillion	4.3%	Gilts, and the pension funds' demand for long ones
Canada	$4.6 trillion	2.9%	Government and bank debt
Australia	$2.6 trillion	1.6%	Government, state, and bank debt
Other developed markets	$6.2 trillion	3.9%	Includes Switzerland, Singapore, and Hong Kong
Other emerging markets	$8.4 trillion	5.2%	Local-currency markets growing; dollar bonds priced off Treasuries
World	$160.7 trillion	100%	

SIFMA, Capital Markets Fact Book 2026, from Bank for International Settlements data. Definitions vary by source, and the totals are indicative.

3b. The United States by Sector

Sector	Outstanding	Typical duration	Who issues	Module
Treasuries (marketable)	$31.1 trillion	1-20 years	The federal government	5
Agency mortgage-backed securities	About $9.2 trillion	About 5.75, longer when rates rise	Pools guaranteed by Fannie Mae, Freddie Mac, and Ginnie Mae	7
Private-label mortgage-backed securities	About $0.5 trillion	Varies	Banks and other private issuers	7, 12
Corporate bonds	$12.1 trillion	About 7.6 investment grade; 3.2 high yield	Companies, banks, and foreign issuers in dollars	8-9
Municipal bonds	$4.5 trillion	6-9 years	States, cities, agencies, and conduit borrowers	11
Federal agency debt	$2.2 trillion	2-5 years	The Federal Home Loan Banks (60%), Fannie Mae, Freddie Mac, the Farm Credit System	5
Asset-backed bonds, commercial-mortgage bonds, and CLOs	About $2.5-3 trillion, with no single count	2-5 years	Special-purpose vehicles	9, 12
Commercial paper	$1.4 trillion	Under a year	Companies and banks	5

SIFMA, second quarter of 2026, for Treasuries, corporates, municipals, agency debt, and commercial paper; Ginnie Mae for agency mortgage pools (February 2026); Inside Mortgage Finance for private-label pools (March 2026). Private credit and leveraged loans are debt but not securities in this count (Modules 9-10).

3c. Who Holds It

The holders explain the market's behavior, because each buys for a different reason and sells under different pressure. The Federal Reserve holds for policy and does not sell; it lets bonds mature. Foreign central banks hold reserves and sell to defend their currencies. Money-market funds hold bills and roll them. Pensions and insurers hold long bonds against long liabilities and are the natural buyers of the thirty-year bond.

Banks hold Treasuries and mortgage bonds for liquidity, and since 2022 as a source of unrealized losses. Mutual funds and exchange-traded funds (ETFs) hold what their benchmarks hold and sell when their investors redeem. Hedge funds hold Treasuries against futures, on borrowed money. Households hold municipal bonds directly. A bond-market crisis is almost always the story of one of these groups forced to sell at the same time.

Holder	Treasuries	Agency and mortgage bonds	Corporate and foreign bonds	Municipal bonds	Behavior
Federal Reserve	$4.49T	$1.67T			Holds to maturity; reinvests mortgage principal in bills (Module 6)
Rest of the world	$9.27T (30%)	$1.46T	$5.20T	Small	Official holders for reserves; private holders for yield (Module 5)
Money-market funds	$3.28T, $2.32T of it bills	$1.21T		$0.15T	Roll bills; the marginal buyers of new ones

Holder	Treasuries	Agency and mortgage bonds	Corporate and foreign bonds	Municipal bonds	Behavior
Mutual funds and ETFs	$2.55T	$0.78T	$4.19T	$1.08T	Benchmark-driven; sell on redemptions
Pension funds	$1.18T	$0.51T	$1.55T	Small	Match long liabilities; buy the long end
Insurers	$0.61T	$0.52T	$4.85T	$0.38T	Hold to maturity; the largest buyers of corporate bonds and private credit
Banks	$1.80T	$2.84T	$0.82T	$0.35T	Liquidity portfolios; unrealized losses (Module 7)
Households, directly	$2.83T	$0.87T	$0.19T	$2.11T	Municipal bonds for the tax exemption; Treasuries through brokers
State and local governments	$1.65T				Cash management
Hedge funds	$0.12T on the Fed's count; about $2.0T on their regulatory filings				The basis trade and other leveraged relative-value trades (Module 5)

Federal Reserve, Financial Accounts (Z.1), second quarter of 2026; Treasuries total $30.88 trillion on this count. The Fed's own Treasuries, bills included, are from its balance sheet of July 1, 2026. The household line is a residual and includes some funds. Corporate and foreign bonds include foreign issues held by Americans, so that column is broader than SIFMA's corporate count. The hedge-fund gap is largely domicile: funds registered in the Cayman Islands and elsewhere are counted as foreign.

3d. Issuance and Growth

The market grows with borrowing. Long-term issuance in the United States was $11.5 trillion in 2025, up 9.7%: Treasury notes and bonds $4.8 trillion, corporates $2.2 trillion, mortgage bonds $1.9 trillion, agency debt $1.4 trillion, municipals $586 billion, and asset-backed bonds $517 billion. In the first nine months of 2026 it was $9.52 trillion, 10.4% more than a year earlier.

The Treasury's share of the market has risen for nearly two decades, from a fifth of American debt securities in 2008 to 46% by mid-2026. That is the structural fact behind Modules 5, 16, and 18: the market is becoming a government-debt market, and the holders who must absorb the new supply are more sensitive to price than the central banks that bought it in the 2010s.

Year-end	Marketable Treasuries	All US debt securities	Treasury share	10-year yield
2008	$5.8T	$29.4T	20%	2.25%
2012	$11.0T	$34.3T	32%	1.78%
2016	$13.9T	$38.8T	36%	2.45%
2020	$20.9T	$50.5T	41%	0.93%
2023	$26.2T	$59.2T	44%	3.88%
2025	$30.1T	$65.5T	46%	4.18%
Mid-2026	$31.1T	$67.3T	46%	5.19% (October 14)

Federal Reserve, Financial Accounts (Z.1), via FRED; mid-2026 Treasuries from SIFMA. The Fed's count of all debt securities includes foreign bonds held by Americans, so it exceeds the $61.2 trillion of Section 3a. Yields are the Treasury's par yields on the last trading day of each year.

Module 3 Key Points

The Size and Shape of the Market

• The world's bonds totaled $160.7 trillion at the end of 2025, slightly more than its stocks; the United States was 38%.

• The euro area ($31.1 trillion) and China ($28.7 trillion) follow the United States; Japan's market is $10.8 trillion.

• America's market includes Treasuries of $31.1 trillion, corporates of $12.1 trillion, agency mortgage bonds of about $9.2 trillion, and municipals of $4.5 trillion.

• Each holder buys for a different reason and sells under different pressure; a crisis is usually one group forced to sell at once.

• Treasuries rose from a fifth of American debt securities in 2008 to 46% in 2026: a government-debt market.

Module 3 Quiz

Check Your Understanding

1. How large was the world's bond market at the end of 2025?

A) $61.2 trillion, the size of the American market
B) $160.7 trillion
C) About $95 trillion, roughly world output for a year
D) About $300 trillion, double the value of the world's stocks

2. Counting the euro area as one market, which is the second-largest after the United States?

A) China's
B) Japan's, at $10.8 trillion and growing
C) Britain's, $6.9 trillion, with its gilts
D) The euro area's, $31.1 trillion

3. Who are the natural buyers of the thirty-year Treasury bond?

A) Pensions and insurers
B) Money-market funds rolling their bills
C) Foreign central banks defending currencies
D) Hedge funds running the basis trade on leverage

4. Why does the Fed's count put hedge funds' Treasuries at $0.12 trillion when their filings show about $2 trillion?

A) The Fed excludes all leveraged positions
B) The filings double the actual holdings in every case
C) Many funds are offshore and counted as foreign
D) The Fed counts only bills

5. What share of American debt securities were Treasuries in 2008, and in mid-2026?

A) About half in 2008, and a fifth by 2026
B) About 46% in both years
C) About 38% in 2008, and 61% by mid-2026
D) About a fifth in 2008, and 46% by mid-2026

Module 4 — The Yield Curve and the Risk-Free Rate

The Reference Line, and How to Read and Trade It

Recommended Reading / Reference

Reference: US Treasury, Daily Par Yield Curve Rates; the New York Fed's ACM term premium estimates and the Federal Reserve Board's Kim-Wright estimates; Campbell Harvey's research on inverted curves; the Cleveland Fed's inflation-expectations model

4a. The Curve Today and Before

Plot the yields of Treasuries against their maturities and the line is the yield curve, the most watched chart in finance and the reference from which every other bond is priced as Treasury-plus-spread. The table shows the curve on October 14, 2026 against three earlier moments: the ten-year's record low in August 2020, the inversion of 2022, and the eve of the Fed's 2025 rate cuts.

Maturity	Aug 4, 2020	Jul 29, 2022	Sep 15, 2025	Oct 14, 2026
3-month	0.09%	2.41%	4.06%	4.28%
1-year	0.14%	2.98%	3.64%	4.53%
2-year	0.11%	2.89%	3.54%	4.82%
5-year	0.19%	2.70%	3.61%	5.00%
10-year	0.52%	2.67%	4.05%	5.19%
30-year	1.19%	3.00%	4.66%	5.52%
2-year to 10-year spread	+41 bp	−22 bp	+51 bp	+37 bp
Fed funds target	0-0.25%	2.25-2.50%	4.25-4.50%	3.75-4.00%

Treasury par yields at the close. bp is basis points; the spread is the 10-year yield minus the 2-year.

The October 2026 curve slopes upward to twenty years and then dips: the twenty-year yields 5.57% and the thirty-year 5.52%. The 2-year, at 4.82%, is well above the Fed's target range, which means the market expects the policy rate to rise further. The previous peak in long yields came on October 19, 2023, when the ten-year closed at 4.98% and the thirty-year at 5.11%; the 2026 levels are above both.

4b. Shapes and What They Forecast

The curve's shape is a forecast. It steepens when long yields rise faster than short ones, a 'bear steepener' driven by inflation, supply, or fears for the public finances, or when short yields fall faster than long ones, a 'bull steepener' driven by rate cuts, which was 2025's pattern. It flattens when a central bank raises short rates faster than long yields rise: a 'bear flattener'.

That is 2026's pattern. From the end of 2025 to October 14 the 2-year rose 135 basis points, the ten-year 101, and the thirty-year 68. The curve inverts when short yields exceed long ones, which happens when the market expects cuts because a recession is coming.

The 2-year-to-10-year spread has inverted before every American recession since its series began in 1976, and inversions measured on other maturities preceded those of 1969 and 1973, with lags of six to twenty-two months. The inversion of 2022-24 was the longest on record, about 26 months, and the deepest

since 1981, but no recession followed. That is either a failure of the signal or a recession postponed by fiscal deficits and immigration, depending on the economist.

Inversion began	Deepest point (2s10s)	Length	Recession began	Lag
Dec 1968	Before the 2-year series	About a year	Dec 1969	12 months
Mar 1973	Before the 2-year series	About 1.5 years	Nov 1973	8 months
Aug 1978	−241 bp (Mar 20, 1980), the record	About 1.7 years	Jan 1980	17 months
Sep 1980	−170 bp	About a year	Jul 1981	10 months
Jan 1989	About −30 bp (monthly average)	About six months	Jul 1990	18 months
Feb 2000	About −40 bp (monthly average)	About a year	Mar 2001	13 months
Feb 2006	About −15 bp (monthly average)	On and off to Apr 2007	Dec 2007	22 months
Aug 2019	About −5 bp	Brief	Feb 2020 (the pandemic)	6 months
Jul 2022	−108 bp (Jul 3, 2023)	About 26 months, the longest	None by October 2026	

Recession dates are the National Bureau of Economic Research's. The 2-year series begins in June 1976. Monthly averages understate the daily lows of 1989-2006.

4c. The Decomposition

A nominal Treasury yield has three parts, and reading the curve means knowing which part moved. Expected real short rates are the path the market expects for the Fed's policy rate, less inflation: the part the Fed controls through guidance and action. Expected inflation is revealed by the gap between nominal Treasuries and inflation-protected TIPS, the breakeven; at ten years it has ranged between 2.18% and 2.50% in 2026.

The term premium is the extra yield investors demand for the uncertainty of holding a long bond rather than rolling short ones: the part that depends on supply, on who is buying, and on fiscal fear. It was near zero or negative from the mid-2010s, when central banks bought and inflation slept; on the New York Fed's ACM model it reached −1.34% in July 2020. A rising term premium means the market charges the government more for its debt whatever the Fed does.

Component	October 2026 (10-year)	What moves it	Who controls it
Expected real short rate	About 1.8-2.0%, the remainder	Fed guidance and action; growth	The Fed
Expected inflation (breakeven)	2.35%	Oil, wages, tariffs, credibility	The Fed, partly
Term premium	0.82% (ACM, September 30) to 1.07% (Kim-Wright, October 9)	Supply, the buyer base, fiscal fear, volatility	The market, and the Treasury
Nominal ten-year yield	5.19%		

Illustrative: the breakeven also contains a premium for inflation risk that the term-premium models count, so the parts overlap; the expected real rate is what remains. The components are model estimates, not observed prices.

4d. What Moves Each Maturity

The front end, bills and the 2-year, tracks the Fed: expectations for the federal funds rate, the odds at the next meeting, the officials' projections. The belly, around the 5-year, tracks the cycle, through growth and inflation data. The long end tracks the term premium: Treasury supply and auction demand, foreign and

pension buying, mortgage hedging (Module 7), and fiscal politics. That is why the thirty-year can rise on a weak auction or a budget headline while the front end sits still.

In 2026 the front end has led. The gap between the 2-year and the thirty-year has narrowed from 137 basis points at the end of 2025 to 70, because the 2-year rose with the Fed's turn to raising rates. The long end had its own moments: the thirty-year passed its 2007 high on September 10, and the long yields peaked on October 5 and 7 (Market Snapshot).

The ten-year is the price the world economy runs on: mortgage rates, corporate borrowing costs, stock valuations, the dollar, and emerging-market borrowing are all set off it (Module 16).

4e. Why Long Yields Rose in 2026

The case that it is fiscal

Those who see a fiscal story start with the arithmetic: a deficit of $1.99 trillion, 6.2% of GDP, in fiscal 2026, with unemployment at 4.2%, and net interest of $1.14 trillion. They point to auctions clearing at the highest yields since 2000 (Module 5), and to long-bond selloffs in Britain, Japan, and France, each with a budget story (Module 14). And they point to the term premium, below zero for most of the decade before 2025 and above 1% on one model now.

The case that it is rates

Those who see a rates story start with the shape of the move: a bear flattening led by the 2-year, which is what a central bank raising rates produces. The Fed raised its target on September 16, and futures price another increase by December. Real yields did most of the work: the ten-year TIPS yield rose from 1.93% at the end of 2025 to 2.84%, while the breakeven moved from 2.25% to 2.35%.

Demand at the auctions held, they add, even at higher yields (Module 5). And Fed Chair Kevin Warsh, explaining higher yields on September 16, cited economic strength, competition for capital, and global 'hot spots', not the debt.

The evidence

The models side with the rates case for 2026 itself. A survey of them by the University of Hawaii's economic research organization, UHERO (October 12), found that the models attribute most of this year's rise to expected short-term rates. The term premium, about 0.75 percentage points at the end of 2025 by its account, now stands at 0.8-1.1%: a rise of about 7-32 basis points, under a third of the ten-year's 101-basis-point rise.

The term premium's climb from below zero to about 0.75% came in 2024-25, before this year's rise began.

The course's reading

The 2026 rise was mostly a rates story: a Fed raising rates into an oil-driven rise in inflation, with real yields doing the work. The fiscal story is real but older; it explains why the long end began the year with a term premium near 0.75% rather than below zero. The test comes when the Fed stops raising rates: if long yields keep rising then, the fiscal reading will have been right (Module 18).

4f. Trading the Curve

• **Steepener**: buy the 2-year and sell the 10-year, matched in duration. It profits if the curve steepens, through cuts at the front or supply fears at the back. It paid in 2025 and lost in 2026.

• **Flattener**: the reverse, which profits when a central bank raises rates and long yields do not follow: the trade of 2022, and of 2026.

• **Butterfly**: buy the wings (the 2-year and 30-year) and sell the belly (the 10-year), or the reverse; a bet on curvature rather than slope, used when the belly looks rich or cheap.

• **Duration extension or shortening**: the simplest view, lengthening when you expect yields to fall and shortening when you expect them to rise.

• **Carry and roll**: hold the part of the curve where roll-down is steepest (Module 2).

Module 4 Key Points

The Yield Curve and the Risk-Free Rate

• On October 14, 2026 the curve ran from 4.28% at three months to 5.57% at twenty years, with the 2-year above the Fed's range.

• 2026 has been a bear flattening: the 2-year up 135 basis points, the 10-year 101, the 30-year 68.

• Inversion preceded every recession since 1969, but the record 26-month inversion of 2022-24 was followed by none.

• A yield is expected real rates, expected inflation, and a term premium; the premium is now 0.8-1.1%, from below zero before 2025.

• Models attribute most of 2026's rise to expected short rates; the fiscal story explains the level better than the move.

Module 4 Quiz

Check Your Understanding

1. What kind of move has the Treasury curve made in 2026?

A) An inversion
B) A bear flattening, led by the 2-year
C) A bull steepening, led by Fed cuts at the front
D) A bear steepening, led by the thirty-year bond

2. What record did the inversion of 2022-24 set?

A) Its length, about 26 months
B) Its depth
C) Its lag to a recession
D) The size of the recession that followed it within a year

3. On the module's decomposition, what was the ten-year term premium in October 2026?

A) 2.35%
B) About −1.3%, as in 2020
C) 0.82-1.07%, depending on the model
D) 5.19%, the whole of the yield

4. Which fact most supports the rates reading of 2026's rise in yields?

A) Breakevens doubled
B) The term premium rose by more than the ten-year yield itself
C) Long yields abroad fell while Treasury yields rose
D) The 2-year rose more than the 30-year

5. Besides the government's own borrowing cost, what does the ten-year Treasury yield set?

A) The Fed's target for the overnight rate
B) Mortgage rates
C) The exchange rate of the euro against the yen
D) The price of gold in dollars every morning

Module 5 — US Treasuries

The World's Most Important Market, in Depth

Recommended Reading / Reference

Reference: The Treasury's quarterly refunding statements and the Treasury Borrowing Advisory Committee's minutes; the Treasury's *Monthly Statement of the Public Debt* and *Treasury International Capital* data; the New York Fed's research on the Treasury and repo markets; the Congressional Budget Office, *The Budget and Economic Outlook: 2026 to 2036*

5a. The Instruments

Instrument	Maturities	Coupon	Outstanding, Sept 30, 2026	Auction frequency	Role
Bills	4, 6, 8, 13, 17, 26, and 52 weeks	None; sold at a discount	$7.12T (22.4%)	Weekly; the 52-week every four weeks	Cash equivalent; money funds' habitat; the Treasury's shock absorber
Notes	2, 3, 5, 7, and 10 years	Fixed, semi-annual	$16.28T	Monthly; the 10-year new each quarter and reopened in between	The benchmarks the world watches
Bonds	20 and 30 years	Fixed, semi-annual	$5.55T	New each quarter, reopened in between	The long end; pensions and insurers; the most fiscally sensitive
TIPS	5, 10, and 30 years	Fixed, on principal indexed to inflation	$2.17T	Monthly, rotating	Inflation protection; the source of breakevens (Module 13)
Floating-rate notes	2 years	Resets off the 13-week bill	$0.71T	Monthly	An alternative to bills for money funds
STRIPS	Any coupon or principal date	None	Varies	Created by dealers from notes and bonds	Pure duration for liability matchers
Savings bonds	Not marketable	Series EE fixed; Series I indexed to inflation	Small	Sold directly to households	Retail savings (Module 13)

Treasury, Monthly Statement of the Public Debt. Marketable debt totaled $31.84 trillion, with a weighted average maturity of 71 months; about a third matures within a year.

5b. The Auction Machine, Worked

The Treasury sells debt on a published calendar through auctions run by the Federal Reserve Bank of New York. Bidders submit competitive bids as yields; the Treasury accepts them from the lowest yield upward until the offering is filled, and every winner receives the highest accepted yield, which makes it a single-price auction. Non-competitive bidders, up to $10 million each, take the auction yield automatically.

The 25 primary dealers must bid at every auction and are its backstop; MUFG joined them in January 2026, and NatWest Markets withdrew on October 16. The market reads three numbers. The bid-to-cover ratio is bids divided by the amount sold. The indirect share is mostly foreign and institutional accounts bidding

through dealers. The tail is the auction yield minus the yield at which the new security traded just before the auction; a positive tail means demand was weaker than expected.

Worked example — A Real Auction: the Ten-Year Reopening of October 7, 2026

The Treasury sold $39 billion of ten-year notes at 5.300%, the highest yield at a ten-year auction since November 2000. Bids totaled 2.77 times the amount sold, about $108 billion. Indirect bidders took 80.3% and direct bidders 17.1%, leaving the dealers 2.5%, an unusually small share that signals strong demand at the price. The next day's thirty-year auction sold $22 billion at 5.618%, the highest since August 2000, with dealers left 6.8%. Contrast the thirty-year auction of June 11, 2026, when bids covered 2.33 times and the dealers took 14.7%. The October auctions found buyers; what changed was the price they demanded. A tail costs real money: 2 basis points on this $39 billion reopening costs $39 billion × 0.02% × 10 years = $78 million of interest over its life.

The scale is immense. Including the bills rolled over every few weeks, the Treasury sold $30.5 trillion of securities in 2025.

5c. Who Holds It, and the Shift

Holder	Holdings	Share	Trend
Foreign official (central banks and sovereign funds)	$3.77T (July)	12%	Down from about 36% of the debt held by the public in 2008; China from $1.32T (November 2013) to $0.62T
Foreign private (funds, banks, hedge funds)	$5.48T (July)	17%	Rising; now 59% of foreign holdings
Federal Reserve	$4.57T (October 14)	14%	Peaked at $5.77T in June 2022; quantitative tightening ended December 1, 2025
Money-market funds	$3.28T	10%	The bill buyer
Mutual funds and ETFs	$2.55T	8%	Rising with passive flows
Banks	$1.80T	6%	Rose in 2020-21; held in place by unrealized losses
Pensions and insurers	$1.79T	6%	Steady; the long end
Households and state and local governments	$4.48T	14%	Rising with higher yields
Hedge funds	About $2.0T, gross		The basis trade; much of it counted as foreign

Shares of the $31.84 trillion of marketable debt. Foreign holdings from the Treasury International Capital (TIC) data (July 2026); domestic holders from the Financial Accounts (second quarter of 2026); hedge funds from regulators' fund filings, compiled by the Office of Financial Research. Sources and dates differ, so the rows do not sum.

The largest foreign holders in July were Japan ($1,104 billion), Britain ($998 billion), China ($618 billion), Belgium ($471 billion), the Cayman Islands ($460 billion), Luxembourg ($442 billion), and Canada ($426 billion). Britain, Belgium, Luxembourg, and the Caymans are largely custodians and funds holding for others.

The shift of two decades is from foreign central banks to domestic funds and leveraged private investors. China has sold more than half its holdings since 2013, and private foreigners, such as London hedge funds, Japanese life insurers, and Cayman-registered funds, now hold most of the foreign total. The result is a buyer base that is more sensitive to price, more leveraged, and quicker to sell.

5d. Repo and the Basis Trade, With Numbers

Beneath the Treasury market is the repurchase, or repo, market: a dealer sells Treasuries and agrees to buy them back the next day at a slightly higher price, which makes it a one-day loan secured by the bonds. Its benchmark rate, SOFR, tracks the Fed's policy rate, and about $5.4 trillion a day of repo is cleared through its main segments, financing dealers' inventories, money funds' cash, and hedge funds' leverage.

The basis trade is that leverage's largest use. A hedge fund buys a cash Treasury, sells a Treasury futures contract against it, and finances the cash bond in repo at 50-100 times leverage. Estimates of its size range from about $830 billion (a Fed staff note, for September 2025) to $1.2 trillion (Morgan Stanley, September 24, 2026). It supplies the market with a buyer for tens of billions of Treasuries a month, and it unwinds violently when repo rates spike or futures margins rise, as in March 2020 (Module 17).

Worked example — The Basis Trade

A hedge fund buys $1 billion of a five-year note, the one cheapest to deliver into the futures contract, and sells futures against it. The futures price already reflects the note's carry, its yield of about 5.00% against a repo rate of 3.88%. The profit is the gap between the financing rate implied by the futures price and the rate the fund actually pays: the net basis, typically a few basis points a year. Suppose the implied rate is 3.95%: 7 basis points a year on $1 billion is $700,000. With $20 million of the fund's own capital and $980 million borrowed, that is a 3.5% return on capital before fees. If repo rates jump 100 basis points and stay there, the financing costs about $9.8 million a year more. If the exchange raises margins, the fund must post cash it may not have, and if it must sell $1 billion of notes into a falling market, so must every other fund in the trade. Multiply by a trillion dollars and you have March 2020.

The Fed's standing repo and reverse repo facilities set a ceiling and a floor for repo rates (Module 6). Repo seized in September 2019, when overnight rates spiked to about 10% and the Fed had to intervene. It strained again in late 2025 as the Fed's shrinking balance sheet drained reserves: banks borrowed a record $74.6 billion from the standing facility on December 31, 2025 (Module 6).

5e. The Fiscal Arithmetic

Fiscal year	Gross federal debt	Debt held by the public (% of GDP)	Deficit	Net interest	Interest as % of revenue
2019	$22.7T	79%	$984B	$375B	11%
2020	$26.9T	99%	$3.13T	$345B	10%
2021	$28.4T	98%	$2.77T	$352B	9%
2022	$30.9T	96%	$1.38T	$475B	10%
2023	$33.2T	97%	$1.70T	$659B	15%
2024	$35.5T	98%	$1.83T	$882B	18%
2025	$37.6T	About 100%	$1.78T	$1.03T	20%
2026	$40.3T (October 13)	100.6% (projected)	$1.99T (6.2% of GDP)	$1.14T	21%

Treasury and Congressional Budget Office data; fiscal years end September 30. The 2026 figures are from the Congressional Budget Office (CBO), its Monthly Budget Review of October 8, 2026; the debt ratio is its February 2026 projection.

Gross federal debt crossed $40 trillion on August 18, 2026 and rises about $2.5 trillion a year. The deficit runs above 6% of GDP in an economy near full employment, a combination without peacetime precedent, and net interest of $1.14 trillion exceeds defense spending. The average interest rate on all of the Treasury's

interest-bearing debt reached 3.53% in September, the highest since April 2009, as cheap debt sold in 2020-21 is refinanced.

The debt limit, the statutory ceiling Congress must raise, produced near-defaults in 2011, 2013, and 2023; the standoffs of 2011 and 2023 were followed by downgrades from S&P and Fitch. Moody's cut its rating to Aa1 on May 16, 2025, citing the deficits, and Fitch affirmed its AA+ on August 13, 2026. The budget law of July 2025 raised the limit by $5 trillion, to $41.104 trillion, and the National Taxpayers Union projects that it will bind again around May 2027.

5f. Borrow Long or Short?

Issuance is set at the quarterly refunding, advised by the Treasury Borrowing Advisory Committee of dealers and investors. The August 5, 2026 refunding sold $125 billion of 3-, 10-, and 30-year securities and promised steady coupon sizes 'for at least the next several quarters', so new borrowing has fallen on bills. Bills reached 22.4% of marketable debt on September 30, the highest share since 2020, against the committee's long-standing guide of 15-20%.

On August 19 the Treasury went further, raising its buybacks of 10- to 30-year securities from $2 billion to at least $4 billion per operation from September 9 to November 4. Treasury Secretary Scott Bessent called it 'a version of a Treasury twist', after the Fed's Operation Twist of 1961 and 2011, though no central bank is involved: the Treasury retires long bonds and funds the purchases with bills. Long yields rose again within days.

The case for borrowing long

Those who would term out the debt point to the rollover arithmetic. With about a third of $31.8 trillion maturing within a year, a one-point rise in short rates adds about $106 billion to annual interest within twelve months. Locking in long rates makes the budget predictable. It also takes pressure off the Fed, because a Treasury that funds itself in bills has a direct stake in every rate decision.

The case for bills

Those who favor bills point to the price. Bills cost about 3.9% on average in September, against 5.19% for ten years and 5.52% for thirty, and a positive term premium means long debt has usually cost more over time. Demand for bills is deep, from money funds holding nearly $8 trillion and from dollar stablecoins, which hold their reserves largely in bills. Selling more long bonds into a market already demanding the highest yields since 2000 would push those yields higher still.

The evidence

History supports the cost case on average: rolling bills has usually been cheaper because the term premium is usually positive. It also shows the exception, which is a fast rise in short rates, as in 2022-23, when the Treasury's interest bill grew from $475 billion to $882 billion in two years. The long bonds sold at 1-2% in 2020-21 have been a windfall for taxpayers: the 1.25% bond of 2050 trades near 44 cents on the dollar (Module 2).

The course's reading

The Treasury's tilt to bills is a defensible cost decision at today's term premium, and a 22% share is not itself dangerous. The risk is the direction: each refunding that holds coupons steady and each buyback funded with bills shortens the debt, tightening the link between the Fed's rate and the budget. The November 4 refunding, which also decides the buybacks after that date, will show whether the drift continues.

Module 5 Key Points

US Treasuries

• Bills, $7.12 trillion, are 22.4% of marketable debt, the highest share since 2020; notes are $16.28 trillion and bonds $5.55 trillion.

• The October 2026 auctions cleared at the highest yields since 2000 with strong demand: dealers took 2.5% of the ten-year.

• Foreign official holders fell from about 36% of the public debt in 2008 to 12%; private foreigners now hold 59% of foreign holdings.

• The basis trade, $0.8-1.2 trillion, earns a few basis points at 50-100 times leverage and unwinds violently when repo or margins spike.

• Gross debt is $40.34 trillion, the deficit 6.2% of GDP, and net interest $1.14 trillion, 21% of revenue.

Module 5 Quiz

Check Your Understanding

1. What did the dealers' 2.5% share of the October 7, 2026 ten-year auction signal?

A) Dealers were barred from bidding at that auction
B) Strong demand from other bidders at the price
C) A failed auction
D) The Treasury cut the offering after the auction closed

2. Who holds most of the foreign total of Treasuries in 2026?

A) Foreign central banks, with about three-quarters
B) China, with more than half
C) Private investors, with 59%
D) Japan's central bank alone

3. Where does the basis trade's profit come from?

A) The note's coupon
B) Rising Treasury prices over the life of the trade
C) Fees paid by the Treasury to dealers
D) The implied repo rate exceeding the actual repo cost

4. What did the Treasury announce on August 19, 2026?

A) Bigger buybacks of long bonds
B) A cap on the thirty-year yield, enforced by the Fed
C) The end of the thirty-year bond
D) A new fifty-year bond, first sold in the October refunding

5. What is the main argument for terming out the debt?

A) Bills always cost more than bonds
B) Long bonds are exempt from tax
C) Less rollover risk
D) The Fed buys only long bonds

Module 6 — Central Banks and the Bond Market

The Mechanics by Which the Fed and Its Peers Move the Structure

Recommended Reading / Reference

Book: Ben S. Bernanke, *21st Century Monetary Policy* (2022)

Reference: The Federal Reserve's statements, minutes, and Summary of Economic Projections; the weekly H.4.1 balance-sheet release; the Bank of Japan's and the Bank of England's statements on their bond holdings

6a. The Toolkit

A central bank directly controls only the overnight rate. The Fed's target range for the federal funds rate is enforced not by trading bonds but by administered rates: interest on reserve balances (IORB), the rate below which banks will not lend; the overnight reverse repo rate, the floor at which money funds can lend to the Fed; and the standing repo facility, a ceiling on repo.

Everything longer than overnight is set by the market's expectation of that rate's path plus the term premium; the 2-year's premium over the policy rate (Module 4) embeds further increases. The Fed reaches the long end indirectly, through guidance about the path, and directly, through its balance sheet. Its policy travels through the bond market: an increase raises bill yields at once, note yields through expectations, and mortgage and corporate rates through the ten-year plus their spreads.

Tool	October 2026 setting	What it does
Federal funds target range	3.75-4.00%, raised September 16; effective rate 3.88%	The policy rate, set at eight meetings a year
Interest on reserve balances (IORB)	3.90%	Banks will not lend reserves below it
Overnight reverse repo	3.75%	The floor: money funds can park cash with the Fed at this rate
Standing repo facility	4.00%	The ceiling on repo: dealers can borrow against Treasuries
Discount window (primary credit)	4.00%	Emergency borrowing for banks
Balance sheet	$6.748T (October 7): Treasuries $4.566T, mortgage-backed securities $1.898T	Quantitative easing adds; quantitative tightening sheds
Guidance and projections	No forward guidance in the statement; the September median projects 4.1% for the end of 2026	Shapes the expected path priced into the 2-year

6b. The Balance Sheet, 2007-2026

Quantitative easing (QE) is the central bank buying long bonds with newly created reserves to push long yields down once the short rate is at zero. Quantitative tightening (QT) is letting them mature without reinvesting, so the private market must absorb the supply. The Fed's balance sheet went from under $1 trillion to nearly $9 trillion across two waves of easing, in 2008-14 and 2020-22, and has since shrunk by a quarter.

The legacy is a market that had its largest single buyer, one indifferent to price, for most of a decade and no longer does. The Fed's share of marketable Treasuries has fallen from its 2022 peak to about 14%.

Period	Program	Balance sheet	What happened
2007	Before the crisis	$0.9T	Treasuries of all maturities; no mortgage bonds
2008-14	Three rounds of QE and Operation Twist	$0.9T → $4.5T	Bought Treasuries and agency mortgage bonds; long yields fell; the 2013 'taper tantrum' when the end was signaled
2017-19	The first QT	$4.5T → $3.8T	Run-off ended August 1, 2019; repo seized on September 17; bill purchases resumed in October
2020-22	Pandemic QE	$4.2T → $8.965T (April 13, 2022)	The fastest buying ever in March-April 2020, then $120 billion a month until the taper of November 2021
2022-25	The second QT	$8.97T → $6.54T (December 3, 2025)	Monthly caps of $47.5B, then $95B (September 2022), $60B (June 2024), and $40B (April 2025); ended December 1, 2025 as reserves grew scarce
2026	Reserve management, then a hold	$6.75T (October 7)	Bill purchases of about $40 billion a month from December 12, 2025, tapered to zero by August 14; mortgage principal reinvested in bills

Federal Reserve, H.4.1 releases.

6c. The 2022 Shock and the 2026 Decision

The Fed raised rates from zero to 5.25-5.50% between March 2022 and July 2023, the fastest tightening since 1980, while beginning quantitative tightening, and bonds had their worst year in modern records (Module 16). The cuts of September, October, and December 2025 brought the range down to 3.50-3.75%.

Kevin Warsh was sworn in as chair on May 22, 2026, and in June set up five task forces, one on the balance sheet, to report by the end of the year. The Fed held through the summer as the war with Iran lifted oil prices; three officials voted for an increase in July. At Jackson Hole on August 28 Warsh said that forward guidance 'has outstayed its welcome'.

On September 16 the committee voted 12-0 to raise the range to 3.75-4.00%, its first increase since July 2023, and the statement dropped its guidance about the path. The minutes of October 7 said most officials saw another increase as likely appropriate by year-end. Futures briefly put the odds of an increase at the meeting of October 27-28 above 40% after the September consumer price report on October 14. Two days later, after Warsh told the annual meetings of the International Monetary Fund (IMF) in Bangkok that he does not 'prejudge meetings', they were about 1 in 6, against about 9 in 10 for an increase by December.

The institutional backdrop is contested. President Trump said on September 16 that rates 'should be 1 per cent, or less'. In Trump v. Cook (June 29, 2026), the Supreme Court ruled 5-4 that Governor Lisa Cook could stay, because removal requires cause, notice, and a hearing. Warsh, who has called for a new accord between the Fed and the Treasury to replace that of 1951, wants a smaller balance sheet; the long-bond buybacks of 2026 are the Treasury's, not the Fed's (Module 5).

6d. The Peers

Central bank	Policy rate	Balance sheet	10-year yield	Direction	The 2026 story
Federal Reserve	3.75-4.00%	$6.75T, a quarter below its 2022 peak	5.19%	Raised September 16; one more priced	Warsh's first increase; the Treasury's buybacks; Trump v. Cook
Bank of Japan	1.25% (raised September 18, 7-2)	¥644.7T (August), 16% below its August 2024 peak	3.00%, near its highest since 1996	Raising; next meeting October 29-30	Purchase reductions stop in April 2027 (Module 14)
European Central Bank (ECB)	2.50% deposit rate (raised June and September 10)	€5.95T, a third below its June 2022 peak	Germany 3.44%	Raising; next meeting October 29	An unused backstop as French yields pass Italy's
Bank of England	3.75% (held 6-3 in September, three votes for 4%)	Asset Purchase Facility £488bn	5.40%	Leaning toward an increase; next decision November 5	Gilt sales paused; the Budget on October 28
People's Bank of China	1.40% (7-day reverse repo)	A record 50.5 trillion yuan (CNY)	1.66%	On hold	Consumer prices up 0.9%; producer prices rising again since March

Settings as of October 14-16, 2026. The ECB's balance sheet is the Eurosystem's; the Bank of England's is its Asset Purchase Facility.

After diverging in 2024-25, the major central banks have converged on tightening: the Fed, the Bank of Japan, and the ECB have all raised rates in 2026 as oil prices rose, the Bank of England leans toward doing so, and China holds. Japanese investors, who funded Treasuries and Bunds when their own yields were zero, can now earn 3% at home on ten-year bonds.

Yet Japanese investors still bought a net ¥7.59 trillion of Treasuries in 2025, so the repatriation feared for a decade has not yet appeared in the flows. That is why 'where is the Bank of Japan going' is half the question for the American long end.

6e. Should Central Banks Steady the Long End?

The case for intervening

Those who favor intervention argue that long-bond selloffs can turn disorderly and self-reinforcing when leveraged holders are forced to sell, as pension funds were in Britain in 2022 and basis traders in America in 2020. A central bank's balance sheet can restore order quickly: the Bank of England's purchases in 2022 stopped the spiral within weeks and were later sold (Module 17). Mispriced long yields raise borrowing costs for everyone, from homebuyers to companies.

In Japan the government has made the case directly: on May 22, 2026 Prime Minister Sanae Takaichi urged Bank of Japan Governor Kazuo Ueda to buy government bonds 'if necessary' to curb long rates, according to the news agency Jiji.

The case against

Those opposed argue that buying long bonds to hold yields down while inflation is above target contradicts the rate increases themselves. Such buying rewards deficits and blurs the line between monetary and fiscal policy. The Bank for International Settlements warned in its annual report (June 28, 2026) that central-bank intervention in sovereign markets comes 'with side effects for market and fiscal discipline'.

The evidence

The record separates two kinds of operation. Temporary buying to restore market function, as by the Fed in March 2020 and the Bank of England in 2022, has worked and been reversed. Buying to control yields, as by the Bank of Japan from 2016 to 2024, ended with the central bank owning about half the market.

In 2026 no major central bank has bought long bonds to cap yields. The Bank of England has paused its gilt sale auctions instead, and the Bank of Japan decided in June to stop reducing its purchases from April 2027, saying the decision was unrelated to the prime minister's request. The ECB's Transmission Protection Instrument, its backstop for spreads, has never been used; Bank of France Governor Emmanuel Moulin said on October 7 that 'current conditions do not justify' intervention.

The course's reading

Intervention to restore market function is likely again if a selloff turns disorderly, and it has worked. Buying to hold yields down while inflation is above target would contradict the central banks' own rate increases, and in 2026 they have chosen to slow their selling rather than buy. The line to watch is in Japan, where the government asked for purchases and the central bank holds nearly half the market.

Module 6 Key Points

Central Banks and the Bond Market

• The Fed sets only the overnight rate, 3.75-4.00% since September 16, through administered rates: reserves 3.90%, reverse repo 3.75%, standing repo 4.00%.

• The Fed's balance sheet rose from $0.9 trillion to $8.97 trillion in 2008-22 and shrank to $6.54 trillion before tightening ended December 1, 2025.

• Warsh's Fed raised rates 12-0 on September 16, the first increase since 2023, and futures price another by December.

• The Fed, the Bank of Japan, and the ECB have all raised rates in 2026; the Bank of England leans that way; China holds.

• Central banks have slowed their bond selling rather than buying to cap yields; the Treasury, not the Fed, is buying back long bonds.

Module 6 Quiz

Check Your Understanding

1. Which administered rate sets the floor under overnight rates in the United States?

A) The discount rate
B) The standing repo facility's rate, 4.00%
C) The effective federal funds rate, 3.88%
D) The overnight reverse repo rate, 3.75%

2. Why did quantitative tightening end on December 1, 2025?

A) The Fed's holdings had all matured
B) Reserves grew scarce and repo rates strained
C) Congress ordered the Fed to stop selling
D) Inflation had returned to its 2% target

3. What did the Fed's statement of September 16, 2026 drop?

A) Its forward guidance
B) The 2% target
C) Its dot plot
D) Its commitment to cut rates by the end of 2026

4. In which country did the head of government urge the central bank to buy bonds in 2026?

A) Japan
B) The United States, through the Fed
C) Britain, after its gilt sales
D) France, through the ECB in Frankfurt

5. What does the module conclude about central-bank buying of long bonds?

A) Central banks should buy whenever long yields rise faster than the policy rate
B) Buying to restore market function works; buying to cap yields contradicts rate increases
C) Buying long bonds has always caused inflation within two years
D) Only the Treasury may buy long bonds under American law

Module 7 — Mortgage-Backed Securities

A Mortgage Pool Becomes a Bond, With the Numbers

Recommended Reading / Reference

Book: Michael Lewis, *Liar's Poker* (1989), on the market's invention, and *The Big Short* (2010), on its failure

Reference: The Federal Housing Finance Agency's reports; Ginnie Mae's monthly *Global Market Analysis*; SIFMA's mortgage-backed securities statistics

7a. Securitization, Walked Through

A mortgage is a thirty-year loan to one household, impossible for an investor to hold or value at scale. Securitization pools them. A lender originates 1,000 conforming mortgages averaging $350,000 at 7.40%, the national average rate in mid-October 2026. It sells them to Fannie Mae or Freddie Mac, the government-sponsored enterprises (GSEs), or, for federally insured loans, into a pool guaranteed by Ginnie Mae.

The agency guarantees timely payment of principal and interest for a guarantee fee of about 0.65% a year, the servicer keeps 0.25%, and the agency issues a pass-through security paying investors the remaining 6.50% from the borrowers' monthly payments. The $350 million pool becomes a bond that trades in the most liquid market after Treasuries, and because the agency bears the default risk, the investor bears only the risk that borrowers repay early or late.

Agency pools of single-family mortgages totaled about $9.2 trillion in early 2026: Fannie Mae 37.8%, Freddie Mac 33.1%, and Ginnie Mae 29.1%. Private-label pools added about $0.5 trillion, so the agencies hold about 94% of the market. That machinery is why American homeowners can borrow for thirty years at a fixed rate, which almost no other country's banking system offers.

Layer	Rate	Who receives it
Borrower's mortgage rate	7.40%	Paid by 1,000 homeowners
Servicing fee	0.25%	The servicer that collects the payments
Guarantee fee	0.65%	Fannie Mae or Freddie Mac, for bearing default risk; 0.10% of it has gone to the Treasury since 2012 under a 2011 law, through 2032
Pass-through coupon	6.50%	The investor in the mortgage-backed security
Ten-year Treasury (reference)	5.19%	
Coupon over the ten-year	1.31%	The investor's spread
Mortgage rate over the coupon	0.90%	The servicing and guarantee fees

Illustrative October 2026 structure. Since 2019 Fannie Mae and Freddie Mac have issued a single Uniform Mortgage-Backed Security (UMBS), and this pool backs a 'UMBS 6.5'. The mortgage rate's gap over the ten-year is 7.40% − 5.19% = 2.21 points, the sum of the last two rows; the Boston Fed (May 2026) notes that it exceeded 3 points in 2007-09; in 2021 it was about 1.5 points. The guarantee fee is the Federal Housing Finance Agency's 2024 average.

7b. Agency, Private-Label, and To-Be-Announced

Agency mortgage bonds carry the credit of the US government: explicitly for Ginnie Mae, implicitly for Fannie Mae and Freddie Mac, which have been in federal conservatorship since 2008. Private-label pools hold the loans the agencies will not buy, such as jumbo loans above the conforming limit, investor

properties, and loans with imperfect documentation. Banks and specialty firms package them with no guarantee, and the credit risk is borne by tranches.

Most agency bonds trade 'to be announced' (TBA): a buyer agrees to purchase, say, $100 million of 6.5% thirty-year pools for delivery next month without knowing which pools, because the securities are similar enough that the seller may choose. Agency mortgage bonds trade about $369 billion a day. The TBA market is how lenders hedge loans not yet closed, and why a homebuyer can lock a rate weeks before closing.

7c. Prepayment and Negative Convexity, Worked

The mortgage bond's peculiarity is that the borrower can repay at any time without penalty, and does so when it suits the borrower, not the lender. When rates fall, homeowners refinance and the bondholder gets principal back early, just when reinvesting it earns less. When rates rise, homeowners stay put and the bondholder is stuck with a low coupon for longer, just when that hurts most.

The prepayment 'S-curve' plots this. Speeds, measured as the conditional prepayment rate (CPR), the annualized share of the pool repaid, are low when the borrower's rate is below the market's. They rise sharply once refinancing saves 0.50-1.00 point and then plateau. In February 2026, with mortgage rates near 6%, agency pools prepaid at about 9-12% a year. The consequence is negative convexity.

Worked example — A 6.5% Pool as Rates Move

A UMBS 6.5% pool trades at 99 with an effective duration of 5.5, and mortgage rates are 7.40%. A Treasury with the same duration would move about 5.5 × 1% × 99 ≈ 5.4 points for a one-point move in yields, to 104.4 or 93.6. If rates fall one point, refinancing at 6.40% saves the pool's borrowers a full point, the CPR jumps from 6% to 30%, and the pool's expected life shortens from about eight years to three. Its price rises only to about 101.5, because the investor is being repaid at par just as the bond became valuable. If rates rise one point, the CPR falls to 3%, the duration lengthens to 7, and the price falls to about 92, worse than the Treasury's 93.6. Gains capped and losses amplified: that is negative convexity, and it is why the pool yields about 6.5% when the ten-year Treasury yields 5.19%. The extra 1.3 points pay for the option the homeowner holds. The speeds and prices are illustrative.

Two consequences ripple through the whole bond market. First, when rates rise, mortgage-bond durations extend and their holders find themselves longer than they wanted; those who hedge sell Treasuries or pay fixed in swaps to shorten, which pushes Treasury yields higher still. This 'convexity hedging' amplified the selloff of 2022-23 and is a standing feature of every rate spike.

Second, banks that bought mortgage bonds with 2-3% coupons in 2020-21 saw their durations extend and their prices fall 20-25% in 2022, the losses that sank Silicon Valley Bank (Module 17). American banks still carried about $327 billion of unrealized losses on their securities at the end of June 2026, a figure that higher yields will have raised since.

7d. Collateralized Mortgage Obligations and Tranching

Because different investors want different exposure to prepayment, Wall Street re-slices pass-throughs into collateralized mortgage obligations (CMOs). Sequential tranches receive principal in order, so the first takes all early prepayments and is short while the last is long and stable. Planned amortization classes are shielded from prepayment within a band by 'support' tranches that absorb it. Interest-only strips gain when rates rise and prepayments slow; principal-only strips do the reverse.

The CMO market lets a pension fund buy a stable long tranche and a hedge fund buy an interest-only strip to bet on rates. Its complexity was the template for the collateralized debt obligations (CDOs) that failed in 2008.

7e. 2008, the Conservatorship, and the Release Question

Private-label mortgage bonds grew from a niche to more than $2 trillion by 2006, sliced into tranches rated from AAA down to equity by rating agencies paid by the packagers, and held by banks and investors worldwide who believed the AAA tranches were as safe as Treasuries. Subprime defaults wiped out the lower tranches and then the AAA ones, the CDOs built from them collapsed, and the losses produced the crisis of 2008 (Module 17).

The government put Fannie Mae and Freddie Mac into conservatorship in September 2008 and injected about $190 billion. For years it swept their profits; since agreements of 2019 and 2021 they have retained their earnings. The Treasury holds senior preferred stock and warrants on about 80% of their common shares. Eighteen years on, both remain in conservatorship, overseen by Bill Pulte, director of the Federal Housing Finance Agency since March 2025.

The administration has also used the companies as instruments of housing policy: in January 2026 President Trump ordered them to buy up to $200 billion of mortgage bonds, and Freddie Mac's survey rate dropped about 0.10 point, to 6.06%.

The case for release

Those who favor release argue that conservatorship was meant to be temporary and has lasted eighteen years. The companies are profitable, and selling shares would put private capital ahead of taxpayers. The government's warrants could be worth hundreds of billions of dollars: Pulte values the companies at $500-700 billion. Pulte has proposed starting with a sale of 2.5-5% of the shares and said in February that a 2026 sale was 'more likely than not'.

The case against

Those opposed point to the guarantee. Investors, foreign central banks among them, price agency mortgage bonds on federal backing; a release that weakened it would widen their spreads by tens of basis points and raise every American mortgage rate by the same amount, at a time when the rate is 7.40%. Treasury Secretary Bessent has said any sale must 'do no harm' to mortgage rates. And companies ordered to buy mortgage bonds to lower rates are hard to run as private businesses.

The evidence

The plan has narrowed. No explicit guarantee has been proposed; President Trump said in May 2025 that the implied backing would stay, and Pulte said in November 2025 that the companies would remain under federal control. Trump said on June 5, 2026 that 'it's not a rush'. Advisers were hired in January but no underwriters, the shares were then about half below their September 2025 peaks, and talk of an announcement after the November 3 elections is speculation.

The course's reading

A small sale under continued federal control would change little for the bond market, because the guarantee would stay implicit and the companies would remain instruments of policy. The market risk lies in a fuller release without an explicit guarantee, which nothing now in prospect proposes.

Module 7 Key Points

Mortgage-Backed Securities

• A 7.40% mortgage becomes a 6.50% bond after the servicing fee (0.25%) and the guarantee fee (0.65%).

• Agency mortgage bonds total about $9.2 trillion, 94% of the market, and trade forward as TBAs, about $369 billion a day.

• Negative convexity: when rates fall homeowners refinance and cap the bond's gain; when rates rise its duration extends.

• Convexity hedging amplifies rate spikes, and duration losses on 2020-21 coupons left banks about $327 billion of unrealized losses.

• Fannie Mae and Freddie Mac remain in conservatorship; a 2.5-5% stake sale is floated, with no explicit guarantee proposed.

Module 7 Quiz

Check Your Understanding

1. On the module's layering, what coupon does a pool of 7.40% mortgages pay its investors?

A) 7.40%
B) 5.19%, the ten-year Treasury yield
C) 6.50%, after 0.90% of fees
D) 8.30%, after the fees are added

2. Why does a mortgage pool gain less than a Treasury when rates fall?

A) The guarantee lapses
B) Servicers stop paying
C) The Fed sells its holdings of mortgage bonds whenever rates fall
D) Homeowners refinance and repay at par

3. What is convexity hedging?

A) Buying mortgage bonds whenever homeowners refinance
B) Insuring mortgage pools against default with the agencies
C) Selling Treasuries or paying fixed in swaps as mortgage durations extend
D) Locking a mortgage rate weeks before closing on a house

4. What first step for Fannie Mae and Freddie Mac has the housing finance agency's director proposed?

A) A full release with an explicit guarantee by Congress
B) A merger with Ginnie Mae under the Treasury
C) Liquidation of both by the end of 2026
D) A 2.5-5% stake sale

5. Who bears the default risk on an agency mortgage-backed security?

A) The investor
B) The agency that guarantees it
C) The servicer
D) The homeowner's state government, under federal law

Module 8 — Corporate Bonds: Investment Grade

How Companies Borrow and How the Market Prices Their Risk

Recommended Reading / Reference

Reference: Moody's and S&P Global rating methodologies and default studies; the ICE BofA corporate indices, via the St. Louis Fed's FRED database; the Federal Reserve's *Financial Stability Report* (May 2026); the International Monetary Fund (IMF), *Global Financial Stability Report* (October 2026)

8a. The Ratings Scale

Moody's	S&P and Fitch	Grade	Meaning	10-year default rate (historical)	Index spread, Oct 14, 2026 [2026 tightest]
Aaa	AAA	Investment grade	Highest quality; S&P rates only two American companies AAA, Microsoft and Johnson & Johnson, above the government's AA+	About 0.3%	40 bp [31]
Aa	AA	Investment grade	Very strong; Apple and Alphabet at S&P	About 0.8%	60 bp [44]
A	A	Investment grade	Strong; most large industrials, utilities, and the big banks	About 1.5%	70 bp [59]
Baa	BBB	Investment grade, the lowest tier	Adequate; the cliff edge; Oracle at BBB- since July 2026	About 4%	104 bp [92]
Ba	BB	High yield	Speculative; the best of the junk market	About 14%	199 bp [150]
B	B	High yield	Highly speculative; most leveraged buyouts	About 30%	329 bp [270]
Caa-C	CCC-C	High yield	Distressed; default likely	About 50% or more	1,282 bp [838], its 2026 high
D	D	Default	In default		Trades on expected recovery

Cumulative ten-year default rates are approximate, from Moody's long-run studies. Spreads are the option-adjusted spreads of the ICE BofA US corporate indices by rating, over Treasuries, via FRED.

American companies owe about $12.1 trillion in bonds, about $1.5 trillion of it high yield. The rating drives everything: which funds may hold the bond, since most pension and insurance mandates require investment grade; how much capital a bank or insurer must hold against it; and the spread.

The BBB tier has grown since 2008 to nearly half the investment-grade market, because companies have borrowed up to the edge of the grade and the agencies have been reluctant to push large issuers over it. BBB bonds are 11.5% of the Aggregate index, nearly half of its corporate bonds (Module 15). JPMorgan counted $932 billion of bonds rated BBB- by at least one agency in April 2026, a quarter of them on negative watch. That tier is the fault line every downturn tests.

8b. Spreads as the Economy's Thermometer

Date	Investment-grade spread	High-yield spread	Context
December 2008	About 600 bp	More than 1,900 bp	After Lehman; the widest on record
March 23, 2020	About 400 bp	About 1,090 bp	The pandemic; the Fed announces corporate-bond facilities
November 2024	77 bp	260 bp	The post-election tights
April 2025	121 bp (April 9)	461 bp (April 7)	The tariff shock
2026 tightest	73 bp (January and late May to mid-June)	260 bp (August 28)	Among the tightest spreads in decades
March 2026	94 bp (March 16)	346 bp (March 30)	The closing of the Strait of Hormuz
October 14, 2026	84 bp	325 bp	Widening since the Fed's increase, led by the weakest credits

Option-adjusted spreads of the ICE BofA US Corporate and US High Yield indices, via FRED; levels before 2023 are approximate.

Corporate spreads are the market's real-time reading of default risk and of the economy. In calm expansions they compress to 70-100 basis points for investment grade; in crises they blow out, to about 600 in 2008 and about 400 in March 2020, as investors flee anything that can default. The spread tells more than the yield, because it strips out what Treasuries are doing.

A corporate yield can rise because Treasury yields rose, a rate story that hurts the holder but not the company, or because the spread widened, a credit story that hurts both. Through most of 2026, spreads stayed near their tights while Treasury yields rose: the market treated the rise as a matter of rates, not of default. Since the Fed's increase the weakest credits have cracked: the CCC spread has risen 444 basis points this year, while BB and B spreads remain near their lows.

8c. The New-Issue Process and Pricing, Worked

A company borrows by hiring banks to run a bookbuild. The banks announce a deal in the morning with 'initial price talk', a spread over Treasuries; collect orders through the day; tighten the spread as the book grows; and allocate to investors at the final spread. The bond prices that afternoon and settles a few days later. The banks earn an underwriting fee of 0.2-0.9% and make markets in the bond afterward.

Companies issue bonds rather than borrow from banks because bonds are cheaper at scale, longer (30-year and even 100-year corporates exist), lighter in covenants, and a way to diversify funding. Foreign companies issue 'Yankee' bonds in dollars, and American companies 'reverse Yankees' in euros; the dollar corporate market is where the world's largest companies borrow.

Worked example — Pricing a New Ten-Year Bond

An A-rated technology company launches a $2 billion ten-year bond at initial price talk of 'T+110', 110 basis points over the ten-year Treasury, which yields 5.19%. Orders reach $9 billion, 4.5 times the deal; the banks tighten guidance to T+90 and launch at T+85, which includes about 5 basis points of 'new-issue concession' over where the company's existing bonds trade. The reoffer yield is 5.19% + 0.85% = 6.04%. The coupon is set at 6.00%, so the bond is priced at 99.70, a little below par, to yield 6.04%. On its first day it tightens to T+80, and with a duration of 7.4 the investors allocated gain about 7.4 × 0.05 ≈ 0.37 points. After a 0.45% fee, the company receives 99.25 and pays an all-in 6.10% for ten years. A bank loan would have cost SOFR plus 1.25%, 3.88% + 1.25% = 5.13% today, but floating, for five years, and with covenants.

8d. The Issuers and the 2026 Surge

The largest issuers are banks, which fund themselves in the bond market as much as through deposits; utilities, which are capital-intensive and regulated; drug and technology companies; and, since 2025, the hyperscalers building data centers for artificial intelligence. The five largest issued $121 billion of American bonds in 2025, against $28 billion a year in 2020-24.

Morgan Stanley expects AI-related borrowers to raise nearly $570 billion of debt worldwide in 2026, and Goldman Sachs counted almost $600 billion by late September, across bonds, loans, and private credit. Their four largest spenders have guided to capital spending of about $720-745 billion this year. American investment-grade issuance, most of 2025's $2.2 trillion of corporate bonds (Module 3), set monthly records in four of 2026's first eight months and is running ahead of the record year, 2020.

Borrower	Deal	Note
Amazon	$37 billion in 11 tranches (March 10, 2026), then €14.5 billion	$53.8 billion across currencies, the largest corporate bond sale ever; about $126 billion of orders for the dollar deal
Verizon	$49 billion (2013)	Still the largest in dollars alone
Oracle	$25 billion (February 2026)	A record $129 billion of orders; cut to BBB- by S&P on July 9
Meta	$30 billion (October 2025); $25 billion (April 30, 2026)	The second priced at wider spreads amid what the press called investor 'fatigue'
Alphabet	About $32 billion (February 2026); $25 billion (August 6)	About $115 billion of orders for the second
Nvidia and SpaceX	$25 billion each (June 2026)	

Deal sizes from Bloomberg, International Financing Review, and Reuters reports.

8e. Is the AI Debt a Credit Risk?

The case that it is

Those who see a risk start with the scale: debt raised in one year at more than twice 2025's pace, to build assets such as chips that wear out in a few years, financed in bonds maturing as late as 2076. They point to Oracle, cut to the edge of junk on July 9 after S&P counted $260 billion of leases as debt and projected a free-cash-flow deficit of about $42 billion in its 2027 fiscal year.

And they point to the circularity the IMF described on October 13: fourteen deals have put $300 billion of equity and $650 billion of debt into weaker AI firms in exchange for $1.4 trillion of revenue commitments. About $320 billion of that debt sits with the firms receiving the commitments, so a lender's revenue depends on its own borrower, which the IMF calls wrong-way risk.

The case that it is not

Those who see no systemic risk point to who is borrowing. Microsoft is rated AAA, Alphabet AA+, Amazon AA, and Meta AA- by S&P; they fund most of their spending from operating cash flow, and their bonds are about a tenth of global investment-grade issuance. Demand has been enormous, with order books three to five times the deals, and the investment-grade spread, 84 basis points, sits near its tights. The Fed's staff judged that most technology firms can absorb the debt.

The evidence

The stress has not been evenly spread. The Fed's May report found speculative-grade technology spreads had 'widened more notably' than the rest, and the CCC spread is at its 2026 high while the hyperscalers' bonds trade near Treasuries. Oracle and the newer cloud companies are financed partly through private credit and data-center securitizations (Modules 10 and 12).

The course's reading

The hyperscalers' own bonds are not where the AI credit risk lies; their balance sheets can carry the debt. The risk sits with the weaker borrowers financed through circular deals, private credit, and securitization, and with Oracle, the likeliest fallen angel of the cycle. The test will be a slowdown in AI revenue, which those borrowers would feel first.

8f. Covenants, Fallen Angels, and the 2020 Precedent

Investment-grade bonds carry light covenants, such as a change-of-control put at 101 and a limit on liens, because the rating is the protection. The risk that matters is downgrade. A 'fallen angel' cut from BBB to BB drops out of the investment-grade indices and must be sold by funds whose mandates forbid junk, which is why the BBB tier is watched.

On March 25, 2020, S&P cut Ford to BB+, pushing $35.8 billion of bonds out of the investment-grade indices, the largest fallen angel ever. About $200 billion of bonds fell across the line by mid-2020, and the Fed announced, for the first time, that it would buy corporate bonds, fallen angels included. Its facility bought only about $14 billion, because the announcement alone reopened the market.

The fallen angels of 2025-26 have been smaller: the satellite operator SES, Paramount after its deal for Warner Bros. Discovery, the business development company FS KKR Capital, and the insurer Centene, with about $14 billion of index bonds. The market assumes the Fed would again backstop investment grade in a crisis; whether it would do so under Chair Warsh, while raising rates against inflation, is untested.

Module 8 Key Points

Corporate Bonds: Investment Grade

• Spreads on October 14 ran from 40 basis points for AAA to 1,282 for CCC, which is at its 2026 high.

• Spreads compress to 70-100 basis points in expansions and blow out in crises: about 400 in March 2020, about 600 in 2008.

• A $2 billion ten-year launched at T+110 priced at T+85 on a 4.5-times book: a 6.00% coupon, all-in about 6.10%.

• AI-related borrowing reached almost $600 billion by late September 2026; Amazon's $53.8 billion across currencies was the largest corporate bond sale ever.

• Fallen angels must be sold by funds that hold only investment grade; Ford's $35.8 billion in 2020 is the record.

Module 8 Quiz

Check Your Understanding

1. What was the CCC spread on October 14, 2026?

A) 1,282 bp, a 2026 high
B) 84 bp
C) 325 bp, the high-yield average
D) About 2,000 bp, as in December 2008

2. Why did the module's new ten-year bond price at 99.70 rather than 100?

A) Its 6.00% coupon is just below its 6.04% reoffer yield
B) The banks deducted their 0.45% fee from the price
C) The bond is callable at a discount to par
D) Investors paid less because the orders were weak

3. Where does the module locate the AI-related credit risk?

A) In Microsoft's bonds
B) In weaker borrowers and in Oracle
C) In the Treasury market
D) Evenly across every investment-grade issuer in the index

4. Which company was the largest fallen angel ever?

A) Oracle, cut to BBB- in July 2026
B) Centene, cut to BB+ in April 2026
C) Paramount, after its Warner deal
D) Ford, in 2020

5. What was the largest corporate bond sale ever, counting all currencies?

A) Meta's $30 billion
B) Verizon's $49 billion, sold in 2013
C) Amazon's $53.8 billion
D) Oracle's $25 billion, with record orders

Module 9 — High Yield, Leveraged Loans, and CLOs

The Speculative-Grade Market in Full

Recommended Reading / Reference

Book: Connie Bruck, *The Predators' Ball* (1988)

Reference: Moody's and Fitch default reports; the Loan Syndications and Trading Association (LSTA) and PitchBook's loan data; Kroll Bond Rating Agency (KBRA) and Trepp research on CLOs

9a. High Yield

Bonds rated below BBB-, 'junk' to critics and 'high yield' to the industry, are issued by companies too indebted, too small, or too new for investment grade, and they pay for it: spreads of about 300 basis points in calm markets and over 1,000 in crises. On October 14 the index yielded 8.20%, a spread of 325. Michael Milken's Drexel Burnham Lambert built the new-issue market from 1977 and used it in the 1980s to finance takeovers.

The American market is now about $1.5 trillion, populated by companies from telecoms to cruise lines to the portfolio companies of private equity. Maturities run 5-10 years, call protection 2-4 years, and durations about 3, because the coupons are high and the bonds are callable. The riskiest borrowers have migrated to loans and private credit since 2008, which makes the bond market look healthier than speculative-grade borrowing as a whole.

Issuance has revived: $64.1 billion in the first quarter of 2026 and $100.2 billion in the second, up 31% on a year earlier.

Measure	Rate	What it counts
Moody's, US speculative-grade issuers (August)	5.3%; forecast 4.3% by December	All issuers, distressed exchanges included
Moody's, global speculative-grade issuers (August, preliminary)	4.5%, against a long-run average of 4.2%	All issuers worldwide
Fitch, US high-yield bonds (12 months to July)	About 2.7%	Bonds only
Fitch, US leveraged loans (12 months to July)	About 3.8%	Loans, distressed exchanges included
LSTA loan index, payment defaults (August)	0.87%	Missed payments and bankruptcies only

The gap between the last two rows shows how much of today's default cycle consists of distressed exchanges (Section 9d).

Default rates run 1-3% in expansions and 10-13% at recession peaks, and holders of senior unsecured bonds have recovered about 40 cents on the dollar on average (Module 1). Those numbers have made high yield a respectable long-run asset and a terrible one in the year the cycle turns.

Worked example — What the Spread Pays For

At a spread of 325 basis points and a recovery of 40%, every point of defaults costs 0.60 point of return. At Fitch's 2.7% bond default rate, the expected loss is 2.7% × 60% = 162 basis points, leaving 163 of excess spread. At Moody's forecast of 4.3%, the loss is 258 and the excess 67. At Moody's August rate for all issuers, 5.3%, the loss is 318, an upper bound since distressed exchanges recover more than outright defaults, and the excess 7. The spread covers bond defaults with room to spare but barely covers the rate for all speculative-grade issuers. At August's tightest spread, 260, the excess over that rate was negative: 260 − 318 = −58 basis points.

9b. Leveraged Loans

The same borrowers also take leveraged loans: floating-rate bank loans, senior and secured by the company's assets, and syndicated to investors. The American market is about $1.5 trillion, as large as high-yield bonds. A loan pays SOFR plus a spread, about 3.50 points for a B-rated borrower, or roughly 7.4% today; it resets quarterly, can be prepaid at par, and has the first claim on collateral, which is why loans recover more in default than bonds.

Because the loans float, they gained when rates rose in 2022-23 while fixed-rate bonds lost; because the borrowers are leveraged, the same rise squeezed their interest cover, and the Fed reports that median coverage for speculative-grade firms sits in the bottom quarter of its history. More than 90% of new loans were 'covenant-lite' by 2021, a record share, so lenders have no maintenance tests that let them intervene before a default.

The buyers are collateralized loan obligations, which hold about 65% of the loans, plus loan funds and banks; the borrowers are overwhelmingly owned by private equity. Syndicated issuance was $207.8 billion in the first quarter of 2026 and $165.8 billion in the second.

9c. CLOs, in a Table

Most leveraged loans are bought by CLOs: vehicles that pool 200-300 loans from different borrowers and industries and issue tranches from AAA to equity, paying each in order from the loans' interest. It is the same waterfall as the mortgage CDOs of 2008, applied to corporate loans, and it has performed far better: the loans are diversified, senior, and secured, and CLOs are not forced to sell when prices fall. No AAA-rated CLO tranche has defaulted in the agencies' records.

The American market is about $1 trillion. Its AAA buyers are banks and insurers, and its equity buyers hedge funds and the managers themselves. New issuance reached a record $209 billion in 2025; in 2026 it is running about 20% behind that pace, at over $111 billion through August, as managers spend their effort refinancing and resetting existing deals instead.

Tranche	Share of structure	Rating	Spread over SOFR, 2026	Loss position	Buyers
Class A	About 62%	AAA	About 122 bp (new issue, September)	Last	American and Japanese banks; insurers
Class B	About 11%	AA	About 160-180 bp		Insurers, asset managers
Class C	About 7%	A	About 200-230 bp		Asset managers
Class D	About 6%	BBB	About 300-350 bp		Asset managers, hedge funds

Tranche	Share of structure	Rating	Spread over SOFR, 2026	Loss position	Buyers
Class E	About 5%	BB	About 550-800 bp	Second	Hedge funds
Equity	About 9%	Unrated	The residual, targeting 12-15% a year	First	Managers, hedge funds, family offices

A typical $500 million American CLO of broadly syndicated loans. The AAA spread is Trepp's; the others are indicative ranges.

9d. Distressed Exchanges and the 2026 Picture

Corporate credit moves in cycles: cheap money, rising leverage, loosening standards, a shock, defaults, tightening, repair. The rate rise of 2022-23 was expected to produce a default wave and largely did not, because companies had locked in long debt at low rates and refinanced the maturities of 2025-26 as spreads tightened.

What rose instead was distressed exchanges. In these transactions a borrower, short of a formal default, persuades some lenders to accept new debt at a discount, or to be pushed down the line by new senior debt. Covenant-lite documents permit these 'liability management exercises', which pit lenders against one another. They made up 94% of S&P's downgrades to default ratings in the year to February 2026.

The agencies count them as defaults, which is why the default rate including them, 3.8% for loans, is more than four times the payment-default rate of 0.87%. Outright failures have risen too: 372 American companies filed for bankruptcy in the first half of 2026, the most for a first half since 2010. The riskier half of corporate borrowing is now larger, floating-rate, covenant-lite, and increasingly private (Module 10), so the next cycle's losses will be less visible and less liquid than the last one's.

Module 9 Key Points

High Yield, Leveraged Loans, and CLOs

• High yield, about $1.5 trillion, yielded 8.20% on October 14, a spread of 325 basis points.

• At 325 and 40% recovery, the spread covers Fitch's 2.7% bond default rate easily but barely covers Moody's 5.3% all-issuer rate.

• Leveraged loans, about $1.5 trillion, pay about SOFR plus 3.5 points, are mostly covenant-lite, and are 65% owned by CLOs.

• CLOs, about $1 trillion, pool hundreds of loans into tranches; no AAA tranche has defaulted in the agencies' records.

• Distressed exchanges make the default rate more than four times the payment-default rate: 3.8% against 0.87% for loans.

Module 9 Quiz

Check Your Understanding

1. On the module's arithmetic, how much excess spread does high yield earn at Fitch's 2.7% default rate?

A) About 163 basis points
B) 7 bp
C) 325 bp
D) About 1,282 basis points, the CCC spread

2. Why do leveraged loans recover more than bonds in a default?

A) They float
B) The Fed guarantees loans held by CLOs
C) Their covenants force an early default before losses mount
D) They are senior and secured

3. What does a distressed exchange do?

A) Converts bonds into shares on a fixed schedule
B) Swaps debt for new debt at a discount, short of a formal default
C) Pays coupons in more bonds rather than cash
D) Moves a loan from one CLO to another without a sale

4. Who buys about 65% of leveraged loans?

A) Banks, which hold them to maturity
B) Money-market funds, as cash
C) CLOs
D) The Federal Reserve, since 2020

5. Why has the CLO structure performed better than the mortgage CDOs of 2008?

A) Its loans are diversified, senior, and secured
B) Its loans are insured
C) It holds only bonds
D) Its managers must buy back any loan that defaults within a year

Module 10 — Private Credit

The Decade's Largest Structural Shift

Recommended Reading / Reference

Reference: The Federal Reserve's *Financial Stability Report* (May 2026); the IMF's *Global Financial Stability Report* (October 2026); Moody's, Fitch, and Lincoln International research on private-credit defaults

10a. What It Is

Private credit is lending that never becomes a bond or a syndicated loan. Funds run by Apollo, Blackstone, Ares, Blue Owl, HPS (bought by BlackRock in July 2025), KKR, and hundreds of smaller managers lend directly to companies, usually owned by private equity and increasingly large. They hold the loans to maturity in vehicles financed by institutions, insurers, and, through business development companies (BDCs) and interval funds, individuals.

The market has grown from about $0.5 trillion in 2014 to about $2.3 trillion worldwide at the end of 2025, by Preqin's count; the Fed puts the American market at about $1.4 trillion, a tenth of nonfinancial corporate debt. It took business from banks constrained by the capital rules adopted after 2008, and from public markets that are slow, demand disclosure, and shut in bad weeks.

Its appeal to borrowers is speed, certainty, and privacy. To investors it offers yields of about 8.5-10% for what is described as senior secured risk, without the daily swings of a traded price. Direct lending to companies owned by private equity is about half of it.

Segment	What it lends	Typical yield	Notes
Direct lending	First-lien and 'unitranche' loans to companies owned by private equity	SOFR plus about 4.5-5.5 points, roughly 8.5-9.5%	The core, about half the market; competes with syndicated loans
Asset-based finance	Loans against receivables, equipment, royalties, aircraft	8-11%	Fast-growing; where the 2025-26 frauds occurred
Opportunistic and distressed	Rescue and special-situation lending	12-15% or more	Cyclical
Infrastructure and real-estate debt	Project and property loans	7-10%	Driven by insurers
Investment-grade private placements	Large, bespoke loans to big companies, such as Intel's chip-plant venture with Apollo and Meta's data-center venture with Blue Owl	6-7%	The frontier: private credit for investment-grade borrowers

A unitranche loan combines senior and junior debt in one loan at one rate. Yields are indicative for October 2026.

10b. The Insurers and the Retail Channel

Two funding sources have made private credit a question for the whole system. The first is insurers, above all life and annuity companies owned by or partnered with the alternative managers, such as Apollo's Athene and KKR's Global Atlantic. American life insurers held $807 billion of private credit in 2026, a fifth of their $4 trillion of fixed-income assets, after growth of more than 20% in 2025.

They match thirty-year annuities with private loans that the managers themselves value. The Fed reports that the largest life insurers' leverage is in the top quarter of its history.

The second is individuals, sold access through non-traded BDCs and interval funds that promise quarterly liquidity the underlying loans do not have. These semi-liquid funds hold about $425 billion of assets, and most cap redemptions at 5% a quarter. In the first quarter of 2026 withdrawals exceeded new money for the first time, and the caps began to bind.

Fund	Requests, second quarter of 2026	Requests, third quarter of 2026	Outcome
Blackstone Private Credit Fund (BCRED), $77.2 billion	About 10% ($4.5 billion)	About 10% ($4.3 billion)	5% paid each quarter
HPS Corporate Lending Fund (HLEND)	13.3%	11.5%	Prorated
Cliffwater Corporate Lending Fund	17%	16%	Prorated
Blue Owl's funds	Payouts capped at 5% on April 2, after requests for 22% of the flagship fund and 41% of its technology fund		Capped

Fund reports via Reuters and PitchBook. Blue Owl's technology fund lends heavily to software companies, whose businesses investors fear AI will disrupt.

10c. Defaults, and the Blowups of 2025-26

The industry's default rate depends on who measures it. Proskauer's index of senior loans showed 2.5% in the second quarter of 2026. Fitch's measure of the private credit it rates reached a record of about 6.1% in July, after records of 5.8% in January and 6.0% in April. Lincoln International's 'shadow' default rate, which counts borrowers that switch to paying interest in kind, was 6.4% at the end of 2025.

By Lincoln's count, 11% of borrowers paid interest in kind, with more debt rather than cash, against 7% in 2021, and 58.3% of that was 'bad PIK', adopted under stress rather than agreed at the outset. The Fed's May report also noted 'elevated usage' of such terms. The loans' marks have moved little, which is either resilience or the absence of a market to mark them to.

The plumbing failed first. In September 2025 First Brands, an auto-parts maker financed partly through off-balance-sheet receivables facilities, filed for bankruptcy amid allegations that the same receivables had been pledged to several lenders; its founder was indicted on January 29, 2026, and the case moved to liquidation on September 1. Tricolor, a subprime auto lender, collapsed in September 2025 amid similar allegations, and its chief executive was indicted in December 2025.

JPMorgan chief executive Jamie Dimon warned on October 14, 2025 that when you see one cockroach, there are probably more. The next came in February 2026, when Market Financial Solutions, a British bridging lender, collapsed with an estimated £930 million collateral shortfall on about £2 billion of loans, again with alleged double-pledging. HSBC took a $400 million charge and Barclays about $300 million, and Apollo's Atlas SP had about £400 million of exposure. In March, Moody's cut FS KKR Capital, one of the largest BDCs, to junk.

10d. Why It Matters for the Bond Market

Private credit is the bond market's shadow: the same borrowers, the same leverage, and a growing share of the same insurers' balance sheets, without the prices, the disclosure, or the liquidity. Its growth has drawn the riskiest borrowers out of the public markets (Module 9).

Its losses, when they come, will surface through three channels: insurer capital, redemption gates at retail funds, and the banks that lend to the funds. American banks' loans to non-bank financial firms reached $2.08 trillion on September 30, 2026, and the Fed reports that commitments to private equity, BDCs, and private-credit funds rose 17% in 2025. The IMF warned on October 13 that 'rising leverage and contingent liquidity risks in private credit could amplify stress.'

10e. Is Private Credit a Systemic Risk?

The case that it is

Those who see a systemic risk point to opacity: loans valued by their owners, a record default rate on one measure while the marks barely move, and frauds in which the same collateral was pledged twice. They point to layered leverage, from banks lending $2.08 trillion to non-banks to insurers, their leverage in the top quarter of its history, holding $807 billion of the loans. And they point to the liquidity mismatch in retail funds, where requests of 10-17% a quarter have met caps of 5%.

The case that it is not

Those who see no systemic risk point to the structure: most of the capital is locked up for years, so the funds cannot suffer a run like a bank's, and the gates of 2026 worked as designed, with withdrawals prorated rather than assets dumped. The losses fall on investors who accepted illiquidity, not on depositors. At a tenth of corporate debt, the market is large but not dominant, and the 2025-26 frauds hit banks' receivables lending as much as the funds.

The evidence

So far the stress has been absorbed: the gates held without fire sales, and the bank losses from the frauds were hundreds of millions of dollars at banks with capital in the tens of billions. But the measures disagree by a factor of two or more, which is itself the problem, and the channels to the regulated system are growing: bank commitments up 17% in 2025, and insurers' holdings up 20%.

The course's reading

Private credit is not yet a systemic risk, but its links to banks and insurers are growing faster than anyone's view into them. The test is a recession: that is when the insurers' $807 billion and the banks' $2 trillion of loans to non-banks would show whether a private problem becomes a public one.

Module 10 Key Points

Private Credit

• Private credit, about $2.3 trillion worldwide and $1.4 trillion in America, lends directly and holds loans to maturity, yielding about 8.5-10%.

• Life insurers hold $807 billion of it; semi-liquid retail funds hold $425 billion and cap quarterly redemptions at about 5%.

• In 2026 requests reached 10-17% a quarter at the largest retail funds, and 22-41% at two of Blue Owl's, against 5% caps.

• Default rates depend on the measure: 2.5% on Proskauer's index, a record 6.1% on Fitch's, 6.4% including 'shadow' defaults.

• First Brands, Tricolor, and Market Financial Solutions exposed collateral pledged twice; banks lend $2.08 trillion to non-banks.

Module 10 Quiz

Check Your Understanding

1. Why did the largest retail private-credit funds prorate withdrawals in 2026?

A) Regulators ordered the funds to close
B) Their loans had all defaulted
C) Interest rates fell, so investors left for bonds
D) Requests of 10-17% a quarter exceeded their 5% caps

2. How much private credit do American life insurers hold?

A) $2.3 trillion, the whole market
B) $425 billion, as the retail funds do
C) $807 billion
D) About $40 billion, less than 1% of their assets

3. What is 'bad PIK'?

A) A late payment
B) Interest paid in more debt by struggling borrowers
C) A loan sold at a discount to a hedge fund in a secondary trade
D) Interest paid in cash ahead of schedule by borrowers

4. What did the collapses of First Brands, Tricolor, and Market Financial Solutions have in common?

A) Fed loans
B) All three were rated AAA by two agencies
C) Collateral allegedly pledged twice
D) All three were Chinese property developers

5. What does the module conclude about private credit's systemic risk?

A) Systemic already, and the main cause of 2026's rise in Treasury yields
B) Not yet systemic, but its links to banks and insurers outpace the view into them
C) Harmless, because its losses fall only on wealthy investors
D) Irrelevant to bond markets, which it never touches

Module 11 — Municipal Bonds

How States and Cities Borrow, With the Tax Math Worked

Recommended Reading / Reference

Reference: The Municipal Securities Rulemaking Board's Electronic Municipal Market Access (EMMA) data and market summaries; Moody's municipal default studies; the Joint Committee on Taxation's tax-expenditure estimates; *The Bond Buyer*

11a. The Tax-Exempt Market

States, cities, counties, school districts, and their agencies, some 50,000 issuers in all, owe about $4.5 trillion in municipal bonds. The market's defining feature is that the interest is exempt from federal income tax, and usually from the tax of the issuing state. That exemption is a federal subsidy for state and local borrowing, worth about $40 billion a year in forgone revenue on the Joint Committee on Taxation's estimates.

The exemption shapes who buys. It is worth most to individuals in high tax brackets and nothing to pension funds, foreigners, and the Fed, which pay no American income tax anyway. Households hold about $2.1 trillion of municipal bonds directly and more than $1 trillion through mutual funds, exchange-traded funds, and money funds (Module 3).

Worked example — The Tax-Equivalent Yield

A Californian in the top brackets pays 37% federal income tax, 3.8% net investment income tax, and 13.3% state tax: a combined marginal rate of 54.1%, since high earners can no longer deduct state taxes at the margin. She compares a ten-year California bond yielding 4.0% tax-free with a ten-year investment-grade corporate yielding 5.94% taxable. The municipal bond's tax-equivalent yield is 4.0% / (1 − 0.541) = 8.7%, and the corporate nets her only 5.94% × 0.459 = 2.73% after tax. A Texan, with no state income tax and a combined rate of 40.8%, values the same bond at 4.0% / 0.592 = 6.8%, still a clear win. A pension fund, paying no tax, gets 4.0% against the corporate's 5.94%, so the corporate wins. The break-even marginal rate is 1 − 4.0 / 5.94 = 33%: anyone taxed above it prefers the municipal bond.

Maturity	AAA municipal yield	Treasury yield	Ratio
5 years	3.65%	About 5.0%	73%
10 years	4.10%	About 5.3%	78%
30 years	5.24%	About 5.6%	94%

The AAA municipal scale (MMD) and the ratios to Treasuries for the week of October 2-8, 2026, via Nuveen; Raymond James put the ten-year AAA yield near 4.00% on October 13. Below about 80% municipal bonds are called 'rich'; above 100%, 'cheap'.

The ratio of municipal to Treasury yields is the market's key measure of relative value. It rises above 100% in crises, when municipal funds are forced to sell; in March 2020 ten-year municipal bonds briefly yielded far more than Treasuries. In 2026 the ratio is low at ten years and high at thirty, and the municipal index has lost 4.2% this year (to October 8) as open-end municipal funds suffered 21 straight weeks of withdrawals while municipal ETFs took in money.

11b. General Obligation and Revenue

Type	Backed by	Typical use	Risk profile
General obligation (GO)	The issuer's full faith and credit: its taxing power	Schools, roads, general operations	Among the safest instruments in finance for solvent states; pensions can rank ahead in a bankruptcy (Detroit)
Revenue	The income of a specific project or system	Toll roads, water and sewer systems, airports, hospitals, universities, housing	Depends on the project: utility revenue bonds are strong, hospital and project bonds weaker
Conduit (private activity)	A nonprofit or private borrower using a government issuer to borrow tax-exempt	Universities, hospitals, charter schools, private projects such as Brightline's railway	The credit of the underlying borrower; most municipal defaults are here
Taxable municipal	As above, without the exemption	Projects that do not qualify, pension bonds, some refinancings	Bought by pensions, insurers, foreigners; 5.7% of 2025's issuance

11c. Defaults

Municipal defaults are rare. On Moody's study of 1970-2022, the ten-year cumulative default rate for rated municipal bonds was 0.15%, 0.09% for investment grade, against 10.72% for global corporates. They are also consequential when they happen, because they are political, and because the market's rating and disclosure standards remain weaker than the corporate market's.

Case	Year	Debt	What happened	Lesson
Orange County, California	1994	A $1.7 billion loss	The treasurer's leveraged bets collapsed as rates rose; Chapter 9 bankruptcy; bondholders eventually paid in full	Rate risk in a county treasury; recovery possible
Jefferson County, Alabama	2011	$4.2 billion	Sewer bonds with swaps and corruption; then the largest Chapter 9	Revenue bonds depend on the project, and on the officials
Stockton, San Bernardino, Harrisburg	2011-12	Under $1 billion each	Recession-era filings (Harrisburg's was dismissed)	Pensions protected again
Detroit	2013	$18 billion	The largest municipal bankruptcy; general-obligation holders recovered between about a third and three-quarters while pensions were cut far less	GO bonds are not always senior to pensions
Puerto Rico	2017	$72 billion plus $50 billion of pensions	The largest default in the market's history; a federal oversight board; years of restructuring	Territories are not states; disclosure failed for a decade
Brightline Florida's parent companies	2026	$2.5 billion of $7.1 billion	Seventeen companies filed for Chapter 11 on September 24 after missed payments; $4.4 billion of operating and affiliate bonds are not part of the filing	Private-activity bonds carry a private company's risk

The oversight board was created by the Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA) of 2016.

11d. The Market in 2026

Issuance set a record of $586 billion in 2025, up 14.1% on LSEG's count, as governments borrowed for infrastructure after pandemic aid ran out; California and Texas each sold more than $80 billion. In the first nine months of 2026 it reached $473.8 billion, up 7.3%, and the market is on pace for about $600 billion, another record. State and local finances, flush through 2023, have tightened as revenues normalize and federal transfers, Medicaid above all, are cut.

Climate is the newest credit factor. Research on school districts finds that one standard deviation more projected wildfire risk adds about 14 basis points to new-issue spreads and 26 in secondary trading. The withdrawal of private insurers from Florida and California is a municipal credit story in the making, because a city whose houses cannot be insured is a city whose tax base cannot be valued: California's FAIR Plan (Fair Access to Insurance Requirements), the insurer of last resort, covers about 4% of homeowners, and Florida's Citizens over 10%.

Moody's has recorded no rated default caused by a natural disaster; an unrated agency of the town of Paradise, California, which burned in 2018, defaulted in June 2023. The Fed's Municipal Liquidity Facility of 2020, which lent little, established the precedent, as with corporate bonds, that the market expects a backstop in a crisis.

11e. The Exemption, Argued

The case for the exemption

Its defenders argue that it lowers the cost of schools, water systems, roads, and hospitals: at ten years, a AAA issuer borrows at about 78% of the Treasury yield. They see it as part of the federal bargain that lets states and cities finance themselves without federal permission, and note that it survived the budget law of July 2025 intact, private-activity bonds included.

The case against

Its critics argue that it is a costly and poorly aimed subsidy: about $40 billion a year, much of which reaches high-bracket investors rather than the issuers. They would replace it with a direct federal payment to issuers, as the Build America Bonds of 2009-10 provided, paying 35% of the interest. And they object to private-activity bonds, which lend the exemption to private ventures such as Brightline's railway.

The evidence

The yield ratios measure who gets the subsidy. At ten years an issuer saves about a fifth of the Treasury yield, and at thirty years only about 6%, while a top-bracket holder avoids a 40.8% federal tax; the difference is the part of the subsidy captured by investors. The direct alternative has its own weakness: the federal payments on Build America Bonds were cut by the budget sequester from 2013, leaving issuers exposed to Washington's politics.

The course's reading

The exemption works reasonably well at short and middle maturities and poorly at the long end, where most of the subsidy goes to holders. Its survival in the 2025 law makes repeal unlikely before the next major tax bill, so the live question for investors is whether the ratios hold as issuance runs at records.

Module 11 Key Points

Municipal Bonds

• Municipal bonds, about $4.5 trillion, pay interest exempt from federal tax, a subsidy costing about $40 billion a year.

• At a 54.1% marginal rate, a 4.0% California bond equals 8.7% taxable; to a Texan it is worth 6.8%.

• Rated municipal bonds' ten-year default rate is 0.15%, against 10.72% for global corporates, but defaults are political when they come.

• Issuance set a record of $586 billion in 2025 and is on pace for about $600 billion in 2026.

• Brightline's parent companies filed for Chapter 11 on September 24; climate risk is entering municipal spreads.

Module 11 Quiz

Check Your Understanding

1. What is the tax-equivalent yield of a 4.0% municipal bond to a Californian at a 54.1% marginal rate?

A) About 8.7%
B) About 4.0%, the same as its yield
C) About 6.2%, after state tax only
D) About 2.7%, the corporate's after-tax yield

2. Why do municipal bonds yield less than Treasuries of the same maturity?

A) They are safer
B) The Fed buys them
C) States guarantee each other's bonds through a federal fund
D) Their interest is exempt from federal tax

3. Why does the module find the exemption inefficient at the long end?

A) Long municipal bonds default more often than short ones
B) Long municipal bonds cannot be called
C) Issuers save about 6% of the yield while top-bracket holders avoid a 40.8% tax
D) The Treasury taxes long municipal bonds at a higher rate than short ones

4. What happened to Brightline Florida's parent companies on September 24, 2026?

A) They filed for Chapter 11
B) A merger
C) They repaid all of their municipal bonds early
D) They won a federal grant to finish the Tampa line

5. On Moody's study of 1970-2022, what is the ten-year default rate for rated municipal bonds?

A) 10.72%, as for corporates
B) 0.15%
C) About 2%, the investment-grade corporate rate
D) About 6.8%, the speculative-grade rate

Module 12 — Securitization Beyond Mortgages

The Machinery That Turns Any Cash Flow Into a Bond

Recommended Reading / Reference

Reference: SIFMA's asset-backed securities statistics; Trepp's reports on commercial mortgage-backed securities; the Commercial Real Estate Finance Council's data-center primer (2026); Fitch's auto-loan indices

12a. The Template, With Numbers

The mortgage bond's template, pooling loans and selling their cash flows as tranched bonds, works on any predictable stream of payments, and since the 1980s it has been applied to nearly all of them. An originator sells receivables to a special-purpose vehicle, a trust protected from the originator's bankruptcy, which issues bonds in tranches of descending seniority. The senior tranche is paid first and rated AAA, the mezzanine tranches absorb losses next and pay more, and the equity tranche, often kept by the originator, absorbs the first losses.

The originator gets cash now and moves the loans off its balance sheet; investors get a bond matched to their appetite for risk; and the credit risk of thousands of borrowers is transformed, through diversification and subordination, into securities safer than any single loan. That holds until the losses are correlated, as they were in 2008.

Tranche	Size	Rating	Coupon	Absorbs losses	Buyers
Class A (senior)	$850M (85%)	AAA	SOFR + 0.60	Only after 15% of the pool is lost	Money funds, banks, insurers
Class B	$60M (6%)	AA	SOFR + 1.10	After 9% is lost	Insurers, funds
Class C	$40M (4%)	A	SOFR + 1.70	After 5% is lost	Funds
Class D	$25M (2.5%)	BBB	SOFR + 3.00	After 2.5% is lost	Funds, hedge funds
Equity	$25M (2.5%)	Unrated	The residual cash	First	The originator, hedge funds

An illustrative $1 billion prime auto-loan deal. If the pool loses its historical 1-2%, only the equity is at risk and everything above it is well protected. If losses reached 10%, as on subprime mortgages in 2008, Classes D and C would be wiped out and Class B impaired.

12b. The Asset Classes

Asset class	Collateral	The 2026 reading
Auto loans	Prime and subprime car loans and leases	Fitch's subprime 60-day delinquency index reached a record 6.90% in January and was 6.13% in July; prime, 0.49%
Credit cards	Revolving balances of the major issuers	Charge-offs 3.82% (second quarter), down from 4.69% in 2024; the 2009 peak was 10.54%
Student loans	Private and older federal loans	A shrinking market
Equipment and fleet	Leases on trucks, railcars, aircraft	Stable
Commercial mortgages (CMBS)	Loans on office, retail, hotel, and apartment buildings	Office delinquency near its record (Section 12c)
CLOs	Leveraged corporate loans	About $1 trillion (Module 9)

Asset class	Collateral	The 2026 reading
Private-label residential mortgages	Jumbo, investor, and non-standard mortgages	$546 billion (March 2026)
'Esoteric' assets	Cell towers, fiber, data centers, solar loans, music catalogs, franchise royalties	The growth frontier; data centers the largest new category (Section 12d)

Fitch; the Federal Reserve's charge-off series via FRED; Inside Mortgage Finance; Trepp.

Issuance of asset-backed securities was $390.3 billion in the first nine months of 2026, about level with 2025. The subprime auto market has had its own shocks: the lender Tricolor collapsed in September 2025 (Module 10), its noteholders' suit against the banks that financed it was dismissed on June 10, 2026, and the failures of Tricolor and then PrimaLend (October 2025) set off indiscriminate selling of auto bonds, prime included.

12c. CMBS and the Office Crisis

Commercial mortgage-backed securities are backed by loans on office towers, malls, hotels, and apartment buildings, either in 'conduit' deals of dozens of loans or in 'single-asset, single-borrower' deals on one large property. They are the sector under most stress. Office values fell steeply after 2019 as remote work emptied buildings, and loans written at 3-4% in 2019-21 matured into refinancing rates near 7% against lower values.

Borrowers handed back the keys. Office delinquency in CMBS was 12.16% in September 2026, against a record 12.34% in January, and a record 15.7% of office loans were with special servicers; even some AAA tranches of single-building office deals have taken losses, among the first since 2008. Overall CMBS delinquency, 8.02%, is the highest since late 2020; in August multifamily stood at 7.69%, retail 7.20%, hotels 5.84%, and industrial 1.14%.

The workout is slow because servicing rules give the 'special servicer' years to resolve a loan, which has kept losses from arriving at once and kept buildings from clearing. New lending has not stopped: $76.2 billion of CMBS were sold in the first seven months of 2026, more than three-quarters in single-asset deals, including $17.3 billion on offices and $5.7 billion on data centers.

12d. The Frontier and What 2008 Changed

The growth is in 'esoteric' securitization, and its largest new category is data centers: developers and their tenants finance the AI build-out by securitizing the leases. Issuance rose from $11.4 billion in 2024 to about $26 billion in 2025, about $15 billion of it asset-backed and $11 billion commercial-mortgage bonds, and Morgan Stanley expects about $28 billion in 2026. The largest single deals, for QTS and Switch, have each been $3.5 billion.

The same build-out is financed three ways at once, through corporate bonds (Module 8), private credit (Module 10), and securitization. The crisis of 2008 produced rules that survive: sponsors must keep 5% of the risk ('skin in the game'), rating agencies face liability and disclosure rules, banks hold more capital against securitizations, and the most complex structures, such as CDOs built from other CDOs, have vanished.

It did not change the template, which is sound, or end the market. What it changed is where the risk lives: less on bank balance sheets and more in funds, insurers, and private vehicles, the same migration that produced private credit. The next correlated loss will surface somewhere less regulated and less visible than a bank.

Module 12 Key Points

Securitization Beyond Mortgages

• Securitization sells receivables to a bankruptcy-remote vehicle that issues tranches; subordination makes the senior tranches safer than any loan.

• Subprime auto delinquencies hit a record 6.90% in January 2026; card charge-offs, at 3.82%, are below their 2024 level.

• Office CMBS delinquency is 12.16%, near January's record 12.34%; overall CMBS delinquency is the highest since 2020.

• Data-center securitization rose from $11.4 billion in 2024 to about $26 billion in 2025: the AI build-out financed three ways.

• Since 2008, sponsors keep 5% of the risk and the riskiest structures are gone; the risk has moved toward funds and insurers.

Module 12 Quiz

Check Your Understanding

1. In the module's $1 billion auto deal, when does the AAA class lose money?

A) At any default
B) After 2.5%
C) Whenever the originator's own credit rating falls below investment grade
D) Only after 15% of the pool is lost

2. What record did Fitch's subprime auto delinquency index set in January 2026?

A) 0.49%, the prime-loan rate
B) 12.16%, as for office loans
C) 6.90%
D) 3.82%, the card charge-off rate

3. Which CMBS sector had the highest delinquency rate in 2026?

A) Industrial
B) Lodging, at 5.84% in August
C) Retail, at 7.20% in August
D) Office, at 12.16%

4. What did the crisis of 2008 change in securitization?

A) Securitization of mortgages was banned
B) Sponsors keep 5% of the risk; CDOs of CDOs vanished
C) Rating agencies were replaced by the Fed
D) All tranches now carry a federal guarantee

5. How is the AI build-out financed through securitization?

A) Through leases on data centers
B) Through chip loans
C) Through AI ETFs
D) Through government grants to the hyperscalers under the CHIPS Act

Module 13 — Inflation-Linked, Covered, Green, and the Rest

The Instruments a Survey Leaves Out

Recommended Reading / Reference

Reference: The Treasury's TIPS and I-bond documentation; the UK Debt Management Office's quarterly reviews; the European Covered Bond Council's fact book; the International Capital Market Association's Green Bond Principles; Artemis's catastrophe-bond market reports

13a. TIPS, Worked

Treasury Inflation-Protected Securities, $2.17 trillion outstanding, pay a fixed real coupon on a principal that is adjusted each month for the consumer price index. At maturity the holder receives the adjusted principal, or the original amount if deflation has reduced it. The quoted yield is a real yield, and the gap between a nominal Treasury and a TIPS of the same maturity, the breakeven, is the market's inflation forecast (Module 4).

Worked example — A Ten-Year TIPS Against a Nominal Treasury

On October 14, 2026 the ten-year TIPS yielded 2.84% real and the ten-year nominal Treasury 5.19%, a breakeven of 2.35% (2.29% on the exact calculation, which compounds the two rates rather than subtracting them). Suppose an investor buys $100,000 of TIPS at a 2.84% coupon. If inflation averages 3% over the decade, the principal grows to $134,392, the coupons grow with it, and the realized nominal return is 1.0284 × 1.03 − 1 = 5.93%, beating the nominal bond's 5.19%. If inflation averages 2%, the principal grows to $121,899 and the return is 4.90%, which loses. The TIPS is a bet on inflation relative to the breakeven, not on inflation itself. Two cautions follow. The principal adjustment is taxed every year although it is paid only at maturity, which is why many holders keep TIPS in tax-deferred accounts. And their prices fall when real yields rise: with a duration of about 8.65, a one-point rise in the real yield costs about 8.2% once convexity is counted. In 2022 the ten-year real yield went from −0.97% to 1.56%, and the iShares TIPS Bond ETF lost about 12%: protection against inflation, not against the rate rise that inflation caused.

13b. I-Bonds and Global Linkers

Series I savings bonds, sold directly to households up to $10,000 a year each, pay a fixed rate plus the inflation rate and cannot lose value. They paid 9.62% for six months in 2022, the best risk-free return available anywhere; on October 28, 2022, the last day to lock in that rate, buyers bought $979 million. They pay 4.26% from May to October 2026, a 0.90% fixed rate plus inflation.

The rate resets on November 1. Inflation alone will contribute 4.08%, and the new fixed rate, which the Treasury sets that day, has been projected at 1.2-1.3%, which would make the composite rate about 5.3-5.4% for six months.

Britain began issuing index-linked gilts in 1981, the first G7 country to do so, and they were 23.8% of the gilt stock on June 30, 2026. Through the pension funds that held them with leverage, that concentration was the mechanism of the 2022 gilt crisis (Module 17). France, Italy, Germany, Canada, Australia, Japan, Brazil, and Mexico also issue linkers; Brazil's averaged real yields of 7.64% in June 2026, near record levels.

13c. Covered Bonds

Europe's alternative to securitization is the covered bond: a bond issued by a bank and secured by a ring-fenced pool of mortgages or public-sector loans that stays on the bank's balance sheet. The holder has a claim on both the bank and the pool. Invented in Prussia in 1769 as the Pfandbrief, the market's largest mortgage segments at the end of 2024 were Denmark's (€436 billion), where the whole mortgage system runs on it, France's (€376 billion), and Germany's (€297 billion).

Covered bonds are rated AAA almost universally and have no default in modern history. Their safety comes from dual recourse and from regulators who require the pool to be over-collateralized and topped up. Their cost is that the loans never leave the bank, so the bonds do not free capital the way securitization does, which is precisely why European regulators prefer them.

13d. Green, Social, and Sustainability Bonds

A green bond is an ordinary bond whose proceeds are earmarked for environmental projects under a framework, such as the Green Bond Principles or, since December 2024, the EU Green Bond Standard; social and sustainability bonds extend the label to housing, health, and development. Issuance across the labels grew from almost nothing in 2007 to nearly $1 trillion a year in 2021-24, then cooled as a political backlash in America and scrutiny of 'greenwashing' in Europe reduced the label's appeal.

Moody's forecasts about $900 billion for 2026, slightly above 2025, and green bonds set a quarterly record of $193 billion in the second quarter. The 'greenium', the lower yield green bonds command, is small: about 2 basis points for advanced-economy sovereigns and about 13 for emerging markets, on a 2025 study. The bonds' real function has been to let investors with sustainability mandates buy what they would have bought anyway, with a label attached.

Sustainability-linked bonds, whose coupons step up if the issuer misses a target, are the more demanding variant and the more criticized; their issuance has fallen to about $3 billion a quarter, down 63% this year.

13e. Sukuk, Catastrophe Bonds, and Contingent Capital

- **Sukuk**: Islamic-finance instruments structured as ownership shares in an asset's cash flows rather than as loans bearing interest, which Islamic law prohibits. More than $1 trillion was outstanding by the end of 2025, after record issuance of about $300 billion that year, from Gulf sovereigns, Malaysia, Indonesia, and Saudi Aramco; conventional investors increasingly buy them for the yield.
- **Catastrophe bonds**: bonds issued by insurers, reinsurers, and governments whose principal is forfeited if a defined hurricane, earthquake, or other disaster occurs. They reached a record $65.6 billion outstanding in mid-2026, paying an average spread of 6.83% on top of the collateral's yield of about 4%. Jamaica's bond paid out its full $150 million after Hurricane Melissa in October 2025, and Jamaica sold a new $200 million bond in 2026.
- **Contingent convertibles and Additional Tier 1 bonds**: bank capital instruments that pay high coupons and convert to equity or are written off if the bank's capital falls below a trigger or a regulator declares it non-viable. Banks and insurers sold a record of about €47 billion of such bonds in 2025, in euros, dollars, and sterling.

In March 2023 the Swiss Financial Market Supervisory Authority (FINMA) wrote about 16 billion Swiss francs (CHF) of Credit Suisse's AT1 bonds to zero in its forced sale to UBS, while shareholders received CHF 3 billion in UBS shares, inverting the capital structure's ordinary priority. In October 2025 Switzerland's

Federal Administrative Court ruled that the write-off 'lacked a sufficient legal basis' and revoked it, without ordering a remedy.

FINMA and UBS appealed, and on December 10, 2025 the Federal Supreme Court let the write-off stand while it hears the case, so the bonds remain worthless for now. A New York court dismissed a separate suit against Switzerland in September 2025. The legality of the most consequential write-off in the market's history is unresolved, and the ECB has been reviewing how such bonds are designed.

Module 13 Key Points

Inflation-Linked, Covered, Green, and the Rest

• TIPS, $2.17 trillion, yield 2.84% real; the 2.35% breakeven is the inflation rate at which they match nominal Treasuries.

• I-bonds pay 4.26% through October; the November 1 reset is projected at about 5.3-5.4% for six months.

• Index-linked gilts are 23.8% of the gilt stock; covered bonds, led by Denmark's €436 billion, have no modern default.

• Labeled sustainable issuance is forecast near $900 billion in 2026; green bonds set a quarterly record of $193 billion.

• Catastrophe bonds reached a record $65.6 billion; a Swiss court ruled Credit Suisse's AT1 write-off unlawful, under appeal.

Module 13 Quiz

Check Your Understanding

1. When does a ten-year TIPS bought at 2.84% beat a nominal Treasury at 5.19%?

A) Always
B) If inflation averages more than about 2.35%
C) If rates fall
D) If the Fed raises its target rate at every meeting for ten years

2. What does the I-bond pay from May to October 2026?

A) 9.62%, as in 2022
B) 2.84%, the TIPS real yield
C) 5.19%, the ten-year Treasury yield
D) 4.26%

3. What share of Britain's gilts is index-linked?

A) 2%
B) About half, by market value
C) About 23.8%
D) About 80%, as in Japan

4. What did Switzerland's Federal Administrative Court rule in October 2025?

A) That the Credit Suisse AT1 write-off lacked a sufficient legal basis
B) That UBS must repay Credit Suisse's shareholders
C) That AT1 bonds are illegal in Switzerland
D) That FINMA must pay the bondholders CHF 16 billion at once

5. Why are covered bonds safer than a bank's ordinary bonds?

A) Federal guarantees
B) They pay no coupon and are held to maturity by banks
C) Dual recourse to the bank and a pool
D) Their coupons rise when the issuing bank's rating is cut

Module 14 — Sovereign and Global Bonds

The World Outside the United States, in Depth

Recommended Reading / Reference

Book: Carmen M. Reinhart and Kenneth S. Rogoff, *This Time Is Different: Eight Centuries of Financial Folly* (2009)

Reference: The IMF's *Fiscal Monitor* and debt-restructuring reviews; Japan's Ministry of Finance data on government bonds; the UK Debt Management Office; the European Commission's reports on EU borrowing

14a. Japan: The End of the Zero Era, in a Table

Japan has one of the world's largest bond markets and the advanced world's largest government debt, about 200% of GDP gross on the IMF's measure, held mostly at home. From 2016 to 2024 the Bank of Japan pinned yields near zero through 'yield-curve control', and Japanese savers bought Treasuries and Bunds instead, making Japan the silent subsidizer of cheap borrowing worldwide. That era ended in 2024-26.

	September 2016 (yield-curve control begins)	2021	2024	October 2026
Bank of Japan policy rate	−0.1%	−0.1%	0.25%	1.25% (raised September 18)
Ten-year government bond (JGB) yield	About 0% (capped)	About 0.1%	About 1.1%	3.00%, near its highest since 1996
Thirty-year JGB yield	About 0.5%	About 0.7%	About 2.2%	A record 4.25%
Bank of Japan balance sheet	About ¥480T	About ¥720T	¥764.8T (the August peak)	¥644.7T (August), 16% below the peak
Gross government debt, % of GDP (IMF)	202%	223%	214%	199% (projected)
Japanese holdings of Treasuries	$1.1T	$1.3T	$1.1T	$1.10T (July)

Year-end values except as dated. The IMF's debt series has been revised down since earlier editions, so older published ratios run higher.

The Bank of Japan has raised rates six times since March 2024 and slowed its bond purchases. At the end of June 2026 it held 46.7% of government bonds excluding bills, and it carried a record ¥45.4 trillion of unrealized losses on them at the end of March. In June it decided to stop reducing its purchases from April 2027, keeping the right to respond to sharp moves (Module 6); even so, its holdings will fall about ¥47 trillion a year. Foreign investors hold 7.9% of the bonds, but more than half of the bills.

The fiscal pressure is rising. The 2026 budget, ¥122.3 trillion, was a record, ministries have requested ¥143.1 trillion for 2027, and the requests put debt service at a record ¥36.64 trillion, at an assumed interest rate of 3.8%, the highest in 29 years. Prime Minister Sanae Takaichi's Liberal Democratic Party won 316 of the 465 lower-house seats in February.

The long end has lost its natural buyers. Life insurers, which hold super-long bonds against annuities and moved to a new solvency regime at the end of March 2026, were net sellers in May after buying in April. One asset manager, BNP Paribas Asset Management, has argued they could turn sellers if the thirty-year passes

about 4.5%. The global consequence is that every Japanese purchase of Treasuries or Bunds now depends on a narrowing gap with yields at home.

14b. Europe: The Bund and the Spreads

The euro area's bond market is 21 national markets sharing one currency and one central bank, Bulgaria having joined on January 1, 2026, and that is its defining problem. Germany's Bund is the euro's risk-free benchmark, and every other member's bonds trade at a spread to it that measures the market's doubt about the solvency of a member that cannot print its currency.

In the crisis of 2010-12, Greek, Italian, Spanish, and Portuguese spreads exploded, and Greece's 2012 restructuring, a 53.5% cut in face value, became the largest in history. It ended only when ECB President Mario Draghi promised on July 26, 2012 to do 'whatever it takes', and the ECB's bond-buying tools have existed since to cap spreads. In 2026 the map has inverted.

Country	10-year yield	Spread to the Bund	Gross debt, % of GDP (IMF)	The 2026 story
Germany	3.44%		65%	The 2025 reform exempts defense spending above 1% of GDP from the debt brake and adds a €500 billion infrastructure fund; federal issuance €521.5 billion in 2026
France	4.88%	+144 bp	119%	The ten-year passed 5% on October 2 for the first time since 2002, and the spread reached the widest since the euro crisis; a minority government under Prime Minister Sébastien Lecornu; Moody's (Aa3, negative) reviews on October 23, S&P (A+) on November 27
Italy	4.56%	+112 bp	138%	Its spread ranged from about 55 to 133 basis points this year; now below France's
Spain	4.05%	About +63 bp	98%	Its 4.14% on September 28 was the highest since January 2014
Greece	4.33%	About +90 bp	136%	From default in 2012 to investment grade in 2023, and below France
Netherlands	3.51%	About +9 bp	45%	The core
European Union (joint bonds)		About level with a German-French blend		About €849 billion of common debt by September; the 2026 funding target, €180 billion, is the highest yet

Yields on October 14 for Germany, France, and Italy and October 16 for the others; IMF Fiscal Monitor ratios for 2026.

The core and the periphery have traded places. France, with a deficit of 5.4% of GDP and a parliament that passed its 2026 budget only by the constitutional shortcut of Article 49.3, pays more than Italy, Spain, and Greece; it plans a record €340 billion of borrowing in 2027. Germany's spending reform has lifted Bund yields and with them the whole European curve.

The ECB's Transmission Protection Instrument, its standing promise to cap any spread it deems unjustified, has never been used (Module 6). The EU's joint borrowing, begun in 2020 for the pandemic recovery fund and extended to defense and to a €90 billion loan for Ukraine, is building a common European bond that some see as the euro's future safe asset.

14c. The Gilts

Britain gave the decade's clearest demonstration of what a bond market can do to a government in the gilt crisis of 2022 (Module 17), when leveraged pension funds sold gilts to meet margin calls and a prime minister fell.

Four years on, gilt yields are higher still. On October 8, 2026 the thirty-year reached 6.047%, the highest since 1998, and the ten-year 5.527%, the highest since 2007; a 2056 gilt sold on September 8 at 5.8168%, the highest auction yield since the Debt Management Office was created in 1998. On September 17 the Bank of England announced a plan to wind down its £488 billion of gilts by 2034 at a slower pace, and paused its sale auctions until it publishes details by April 2027.

Chancellor John Healey presents his Budget on October 28, with debt interest already £110 billion a year and the Debt Management Office planning about £250 billion of gilt sales.

14d. China

China's bond market, CNY 196.7 trillion at the end of 2025, is the second-largest single-country market (Module 3). It consists of central government bonds, the bonds of three policy banks, local-government bonds, and the hidden debts of local-government financing vehicles, the country's largest financial risk, which the IMF puts at CNY 58 trillion. Beijing's CNY 10 trillion swap program of 2024 refinances part of that debt over three years rather than retiring it.

Property developers defaulted on dollar bonds in 2021-24. Evergrande was ordered liquidated in 2024; Country Garden's $17.7 billion offshore restructuring took effect on December 30, 2025; and Vanke's bondholders accepted a staged repayment in January 2026, with the company rated CCC- by S&P. The market is mostly closed to foreigners, who hold 1.8% of it, and mostly held by state banks.

The ten-year yield, 1.66%, is down 18 basis points this year and close to its record low of about 1.61% in 2025, although producer prices have been rising since March after more than three years of declines. China is the one major market moving opposite to the rest of the world.

14e. Emerging Markets and Sovereign Default

Emerging markets borrow in two currencies. Dollar bonds are priced as Treasuries plus a country spread, are governed by New York or English law, and are vulnerable to a strong dollar and high American rates; the spread on J.P. Morgan's Emerging Markets Bond Index (EMBI) Global Diversified was 235 basis points at the end of June, historically tight after a selloff in the war's first weeks. Sovereigns sold $191.5 billion of such bonds through August.

Local-currency bonds are larger and increasingly the norm for big economies such as Brazil, Mexico, India, Indonesia, and South Africa. They carry currency risk for foreign buyers and inflation risk for everyone, but a government that prints the currency can inflate them away rather than default. Ten-year yields less current inflation are about 8.5% in Brazil, 5.9% in Mexico, and 4.5% in South Africa.

Country	Default	What was restructured	Status in October 2026	Lesson
Argentina	2001, 2014, 2020	About $100 billion in 2001; $65 billion in 2020	A $1 billion local-law dollar bond at 9.26% (December 2025), its first in about eight years; country risk 655 bp on October 2	A serial defaulter: 2020 was its ninth

Country	Default	What was restructured	Status in October 2026	Lesson
Greece	2012	Privately held bonds, at a 53.5% cut in face value	Investment grade since 2023	A euro member cannot devalue
Ukraine	2015; 2022-24	$20.5 billion by September 2024	GDP warrants swapped for $3.5 billion of 2032 bonds on December 24, 2025	Restructuring under fire
Zambia, Sri Lanka, Ghana	2020-22	Bonds and official loans	Restructured in 2023-25, Zambia and Ghana under the Common Framework (below)	China's role as a creditor slowed the process
Ethiopia	2023	A $1 billion Eurobond and official loans	A 12% nominal haircut agreed June 29, 2026; official creditors validated it August 22	Light relief, slowly
Venezuela	2017	Claims estimated at $150-200 billion	Maduro captured January 3, 2026; a $170 billion restructuring launched May 13; a US license of May 5 covers advisers' work but not a settlement; bonds near 60 cents by May	Politics first
Senegal	Distress since 2024	Debt found to have been misreported	An IMF staff-level deal for $2.2 billion in September; a planned 'reprofiling' rather than a restructuring; Moody's Caa2	Hidden debt

Sovereign default has no bankruptcy court. A defaulting state negotiates with bondholder committees under collective action clauses, which let a supermajority bind holdouts; their absence let 'vulture' funds litigate Argentina for fifteen years. It negotiates with official creditors through the Paris Club and, since 2020, with China, now the largest official lender to developing countries, through the Common Framework set up by the Group of Twenty (G20), whose slowness every debtor in it has complained of.

The defaults of 2020-23, driven by pandemic borrowing, a strong dollar, and rising American rates, were mostly settled with haircuts of 20-45%. The newest cases break the pattern: Ethiopia's 12% falls below that range after its official creditors rejected a first deal, Senegal invokes an 'enhanced' framework to avoid a restructuring at all, and Venezuela's, perhaps the largest awaiting settlement anywhere, depends on Washington's permission.

Module 14 Key Points

Sovereign and Global Bonds

• Japan's zero era is over: the policy rate is 1.25%, the ten-year 3.00%, and the thirty-year a record 4.25%.

• In the euro area France now pays more than Italy and Greece; its ten-year passed 5% on October 2.

• Britain's thirty-year gilt reached 6.047% on October 8, the highest since 1998; the Bank of England has paused gilt sales.

• China's ten-year yields 1.66%, down this year; foreigners hold 1.8% of its CNY 196.7 trillion market.

• Venezuela launched a $170 billion restructuring in May; Ethiopia settled at a 12% haircut; Senegal plans to reprofile.

Module 14 Quiz

Check Your Understanding

1. What did Japan's thirty-year government bond yield reach in October 2026?

A) 1.25%
B) A record 4.25%
C) 3%
D) About 0.5%, the level when yield-curve control began in 2016

2. Which euro-area government pays more than Italy to borrow for ten years in October 2026?

A) France
B) Germany, the benchmark
C) The Netherlands, a core member
D) Spain, after its September high

3. What drove the 2022 gilt crisis?

A) A downgrade of Britain to junk
B) The Bank of England selling gilts
C) Foreign central banks dumping sterling reserves
D) Leveraged pension funds selling gilts to meet margin calls

4. What share of China's bond market do foreigners hold?

A) Half
B) 30%
C) About 1.8%
D) About 46.7%, as Japan's central bank holds of its market

5. What did Venezuela launch on May 13, 2026?

A) A new currency
B) A default on its bonds issued under New York law
C) A bid to join the euro area as its twenty-second member
D) A $170 billion restructuring

Module 15 — The Machinery

How Bonds Trade, Are Indexed, Rated, Insured, and Cleared

Recommended Reading / Reference

Reference: The Trade Reporting and Compliance Engine (TRACE) of the Financial Industry Regulatory Authority (FINRA); the Group of Thirty, *US Treasury Markets: Steps Toward Increased Resilience* (2021); the Treasury clearing rule (2023) of the Securities and Exchange Commission (SEC) and the readiness surveys of the Depository Trust and Clearing Corporation (DTCC); the Bank for International Settlements' derivatives statistics

15a. Over the Counter

Stocks trade on exchanges; most bonds do not. A company has one common stock but may have fifty bonds of different maturities and coupons, most of which trade rarely, so the market is over the counter: investors ask dealers for prices, dealers quote from their own inventory, and the dealers' balance sheets are the market's liquidity.

Treasuries are the exception, trading continuously on electronic platforms among dealers and high-speed trading firms in the deepest market on earth; primary dealers alone have traded about $1.2 trillion a day in 2026. Even there, the rules adopted after 2008 limited how much inventory dealers would hold, just as the debt they must intermediate grew more than fivefold. Regulators loosened the main constraint, the enhanced supplementary leverage ratio, with effect from April 1, 2026; its effect on dealers' capacity is not yet measurable.

Electronic trading has grown in corporate bonds: in June 2026 three platforms, Tradeweb, MarketAxess, and Trumid, carried about 46% of reported investment-grade and high-yield volume, and 'portfolio trading' lets a fund trade hundreds of bonds in one transaction. TRACE, the reporting system run by FINRA, has published corporate-bond prices since 2002, within 15 minutes since 2005, which cut dealers' margins and made the market far more transparent.

15b. Indices and ETFs

Bond indices define what most investors own, because most bond money is indexed or benchmarked. The Bloomberg US Aggregate, 'the Agg', tracks investment-grade, dollar-denominated, fixed-rate taxable bonds and is the benchmark for most American bond funds; its composition is the market's default portfolio.

Aggregate index sector	Weight, October 15, 2026	Note
Treasuries	46.8%	The Agg has become largely a Treasury index
Agency mortgage-backed securities	22.8%	Negative convexity inside every index fund (Module 7)
Investment-grade corporates	24.7%	The ratings are discussed in Module 8
Other government-related, commercial-mortgage, and asset-backed	4.9%	Small
Total	99.2%, the rest in cash	Yield to maturity 5.39%; duration 5.70; excludes high yield, municipal bonds, TIPS, floaters, and anything below investment grade

Weights and characteristics of the iShares Core US Aggregate Bond ETF, which tracks the index.

American bond ETFs passed $2 trillion of assets in June 2025 and drew about $300 billion of new money in the first half of 2026, a record pace. They changed the market's liquidity: an investor can sell an ETF share in seconds even when the bonds inside would take days to sell, which works until everyone sells at once. In March 2020 the largest bond ETFs traded at discounts of 5% or more to their holdings, and for a week the ETF price was the market's only real-time bond price (Module 17).

15c. The Rating Agencies

S&P Global, Moody's, and Fitch, the three largest of the ten firms registered with the SEC, dominate the business and are paid by the issuers they rate. They determine which index a bond enters, which investors may hold it, and what capital it requires.

Their 2008 failure, AAA ratings on subprime tranches that defaulted within two years, produced the Dodd-Frank reforms: legal liability, disclosure, SEC oversight, and an end to some regulatory reliance on ratings. It did not produce competition. The three remain embedded in bank capital rules, insurance regulation, fund mandates, and central-bank collateral frameworks worldwide, and they grade even the sovereign at the system's center (Module 5). Their judgments move slowly and lag the market; credit default swap prices move first.

15d. Credit Default Swaps, Worked

A credit default swap (CDS) is insurance against a borrower's default, traded between institutions. The buyer pays an annual premium, the CDS spread in basis points, and receives, if the borrower defaults, the difference between par and the recovery value of its bonds. The market's notional value was $11.0 trillion at the end of 2025, against about $60 trillion before 2008, when AIG's uncollateralized sales of protection nearly destroyed the company; central clearing was imposed afterward.

CDS prices credit risk more continuously than bonds do, because protection can be bought or sold in size without finding a particular bond.

Worked example — A Five-Year CDS

A fund holds $10 million of a BBB-rated retailer's five-year bonds and worries about the holiday season. Five-year protection on the retailer trades at 250 basis points, so the fund buys $10 million of protection for $250,000 a year. If the retailer defaults and its bonds settle at 35 cents on the dollar, the fund receives $10 million × (100% − 35%) = $6.5 million, offsetting its loss on the bonds. If the retailer survives, the fund has paid $1.25 million over five years for insurance it did not use. But it can sell the protection at any time: if the spread widened to 500 basis points after a bad quarter, the extra 250 basis points, $250,000 a year for about four more years, would be worth about $0.8-0.9 million once discounted for time and for the chance of default. CDS indices, CDX in America and iTraxx in Europe, bundle 100-125 names and are the most traded credit instruments in the world: the way a macro fund sells 'credit' in one trade.

15e. Clearing and the Fed's Backstop

The dash for cash of March 2020 (Module 17) established that the Treasury market's liquidity depends on the Fed's willingness to backstop it, and it produced the largest reform since the 1980s: mandatory central clearing.

Under the SEC's rule of December 2023, cash Treasury trades must be cleared through a central counterparty from December 31, 2026, and repo trades from June 30, 2027. Clearing moves the risk of a counterparty's failure to a clearinghouse and, its designers hope, frees dealers' balance sheets. In DTCC's survey of July 2026, more than $1.2 trillion a day of cash Treasury trades were already cleared through its Fixed Income Clearing Corporation, with $300-400 billion a day still to come, and 79% of the firms surveyed had accounts.

The question the reform leaves is what happens in a crisis the Fed cannot or will not backstop: under a chair raising rates against inflation, with a president pressing for cuts, and with a debt stock half again as large as in 2020.

Module 15 Key Points

The Machinery

• Bonds trade over the counter through dealers; Treasuries trade about $1.2 trillion a day, and three platforms carry about 46% of corporate volume.

• The Aggregate index is 46.8% Treasuries, 22.8% mortgage bonds, and 24.7% corporates, yielding 5.39% at a duration of 5.70.

• Three agencies dominate ratings, are paid by issuers, failed in 2008, and remain embedded in capital rules; CDS prices move first.

• CDS notional is $11.0 trillion; $250,000 a year protects $10 million of bonds and pays $6.5 million at a 35% recovery.

• Central clearing of Treasury trades begins December 31, 2026 for cash trades and June 30, 2027 for repo.

Module 15 Quiz

Check Your Understanding

1. Why do most bonds trade over the counter rather than on exchanges?

A) Exchanges are banned from listing bonds by law
B) Issuers have many separate bonds, most of which trade rarely
C) Dealers own all bonds until they mature
D) Bond prices are set by the rating agencies each day

2. What share of the Aggregate index is Treasuries?

A) 46.8%
B) 22.8%, as for mortgage bonds
C) About 11.5%, the BBB share of the index
D) About 90%, up from half in 2008

3. In the module's CDS example, what does the fund receive if the retailer defaults with its bonds at 35 cents?

A) $10 million, the full face value
B) $3.5 million, the bonds' recovery value
C) $6.5 million, par less recovery on $10 million
D) $1.25 million, five years of premiums

4. From when must cash Treasury trades be centrally cleared?

A) Since 2020
B) December 31, 2026
C) June 30, 2027, the deadline for every trade
D) Only during a crisis declared by the Fed

5. What was the CDS market's notional size at the end of 2025?

A) $11.0 trillion
B) About $60 trillion, as in 2007
C) $844.6 trillion, all derivatives
D) About $1 trillion, after the AIG rules

Module 16 — Bonds in Portfolios and the Economy

What the Market Means for Investors and for Everyone Else

Recommended Reading / Reference

Reference: AQR's research on the changing stock-bond correlation (2023); the IMF's *Fiscal Monitor* (October 2026); the Bank for International Settlements' *Annual Economic Report* (June 2026)

Article: Thomas J. Sargent and Neil Wallace, 'Some Unpleasant Monetarist Arithmetic', Federal Reserve Bank of Minneapolis *Quarterly Review* (Fall 1981)

16a. The 60/40 Record

The classic portfolio, 60% stocks and 40% bonds, rests on bonds doing two things: paying a steady income, and rising when stocks fall, because recessions bring rate cuts. The second property is younger than its reputation. The stock-bond correlation was positive through the 1970s, 1980s, and 1990s and reliably negative only after 2000; the years 1981-2021 were the bond bull market, not a forty-year hedge.

The hedge failed in 2022 because the shock was inflation, which hurts both. That year was one of only five since 1928 in which stocks and ten-year Treasuries both lost money, and on stocks plus ten-year Treasuries it was the worst year since 1937.

Year	S&P 500	Bloomberg Aggregate	60/40	The regime
2008	−37.00%	+5.24%	−20.10%	Bonds hedged the crash
2013	+32.39%	−2.02%	+18.63%	The taper tantrum; a mild bond loss
2019	+31.49%	+8.72%	+22.38%	Both rallied
2020	+18.40%	+7.51%	+14.04%	Bonds hedged March; both rose
2021	+28.71%	−1.54%	+16.61%	Inflation stirs
2022	−18.11%	−13.01%	−16.07%	Both fell: an inflation shock
2023	+26.29%	+5.53%	+17.99%	Recovery
2024	+25.02%	+1.25%	+15.51%	Bonds flat as cuts were priced out
2025	+17.88%	+7.30%	+13.65%	Fed cuts; yields fall
2026, to September 30	+12.75%	−2.91%	+6.49%	An oil shock and Fed increases; real yields up

Total returns; the 60/40 is rebalanced each year. If the Aggregate's 2026 loss holds, it will be only its sixth losing calendar year since 1976.

The lesson the market has absorbed is that bonds hedge growth shocks and not inflation shocks, and that the correlation depends on which kind dominates. In 2026 it has been positive again: from February 27 to March 27 the ten-year yield rose from 3.97% to 4.44% while stocks fell 9.1% from their January record, so bonds failed to cushion the war's first weeks.

Bonds now offer income they did not for a decade: at the yields of October 2026, the bond half of a 60/40 portfolio contributes about 2.0-2.2 points a year by itself. Whether they offer protection depends on the next crisis. If it is a recession, they will; if it is an inflation or fiscal shock, they will not.

16b. How Investors Hold Bonds

• **Ladder**: bonds maturing in each of the next N years, with each maturity reinvested at the long end. It reduces reinvestment and rate risk, provides predictable cash, and is the default for individuals and small institutions.

• **Barbell**: short and long bonds and nothing in between, capturing the long end's convexity while keeping liquidity; it beats a single bond of the same duration when the curve flattens.

• **Liability matching**: bonds whose duration equals that of a future obligation, so that a rate change moves assets and liabilities alike. It is the pension and insurance model, and the reason the thirty-year has natural buyers.

• **Core and satellite**: a core that tracks the Aggregate index, with satellites in high yield, emerging markets, TIPS, and private credit for extra return.

• **Hold to maturity against mark to market**: a bond held to maturity returns its yield whatever its price does in between, while a fund marked daily shows every swing. That is why 2022 devastated bond funds' reported returns and left ladder holders' income intact, and why banks that could not hold to maturity failed in 2023.

Worked example — Real Return on a Bond Ladder

Suppose an investor builds a $1 million Treasury ladder of ten $100,000 bonds maturing in one to ten years, at the yields of October 14, 2026. The average yield is 4.98%, first-year income $49,835, and the average duration 4.59. If inflation averages 2.5% over ten years, the real return is about 1.0498 / 1.025 − 1 = 2.42% a year, about $270,000 of purchasing power gained. At 1% inflation the real return is 3.94%, about $472,000. At about 5% inflation the real return is zero: the ladder preserves the dollars and none of the purchasing power. TIPS at the ten-year real yield of 2.84% would gain about $323,000 of purchasing power whatever inflation does. The two tie at inflation of about 2.1% a year (1.0498 / 1.0284 − 1). The investor's real decision is whether to expect more inflation than that, or less.

16c. What the Market Signals

Signal	Reading, mid-October 2026	What it says
Curve slope (2-year to 10-year)	+37 bp, down from +71 at the end of 2025	Flattening as the Fed raises rates; no recession signal
2-year against the funds rate	4.82% against 3.75-4.00%	Another increase expected
10-year breakeven	2.35%, within a 2026 range of 2.18-2.50%	Inflation expectations anchored despite the oil shock
10-year real yield (TIPS)	2.84%; 2.95% on October 5, the highest since 2008	Restrictive
Investment-grade spread	84 bp	Little fear of default
High-yield spread	325 bp; CCC 1,282 bp, a 2026 high	The weakest credits cracking
Emerging-market sovereign spread	235 bp (June 30); Argentina 655 bp (October 2)	Calm overall
MOVE index of rate volatility	104.58 on September 24, the first close above 100 in three months	Rising from low levels
30-year yield	5.52%; 5.67% on October 7	The highest since the early 2000s
Long-bond auctions	The highest yields since 2000, with strong demand in October	Buyers present, at a price

Treasury, FRED (ICE BofA indices), J.P. Morgan via State Street (EMBI), and ICE (MOVE).

Read together, the signals describe a Fed raising rates, inflation expectations anchored, real yields at their highest since 2008, credit priced for little default except at the bottom, and long yields at their highest in a quarter-century. It is the picture of tight money more than of a fiscal crisis, for now (Module 4).

16d. Fiscal Dominance

The debate at the market's center in 2026 is whether American debt has begun to shape monetary policy rather than the reverse. A central bank that raises rates to fight inflation also raises the government's borrowing cost, and a government under that pressure has every incentive to want rates held down, inflation tolerated, and the debt eroded in real terms. Thomas Sargent and Neil Wallace called this 'some unpleasant monetarist arithmetic' in 1981: when the fiscal authority will not adjust, the monetary authority eventually must.

The arithmetic is now large. Net interest is a fifth of federal revenue (Module 5), and a CBO estimate cited by Congress's Joint Economic Committee puts the cost of rates 50 basis points higher at $1.9 trillion through 2036, and of 150 basis points at $6.0 trillion.

The case that it is here or coming

Those who see fiscal dominance arriving point to the pressure and the plumbing. President Trump demands far lower rates (Module 6); the Treasury has tilted its borrowing to bills and buys back long bonds with them (Module 5). Former Treasury Secretary Janet Yellen said on January 4 that 'the preconditions for fiscal dominance are clearly strengthening', and the economist Eric Leeper argues it is already here in a 'behavioral' form.

Isabel Schnabel of the ECB's Executive Board warned in a speech in May that central banks could eventually be forced to finance government debt. The IMF's Fiscal Monitor (October 14) urged governments to act 'before markets force a more painful adjustment', and the Bank for International Settlements has warned of 'more frequent and sharper drops in sovereign bond values'.

The case that it is not

Those who see no fiscal dominance point to what the Fed did. It raised rates 12-0 on September 16, seven weeks before the midterm elections and against the president's demand, and it is expected to raise them again. Real yields, not inflation expectations, have risen: the opposite of the financial repression that dominance implies. Bastien Drut of CPR Asset Management scored the year 'Monetary Dominance 1 – Fiscal Dominance 0'.

Warsh said on September 16 that 'independence is a two-way street' and that fiscal and trade policy should 'stay in their lane, too'. And the Supreme Court's ruling in Trump v. Cook protects governors from removal without cause (Module 6).

The evidence

Fiscal dominance would show up as low or falling real yields and rising breakevens, as the market priced inflation to come; instead the ten-year real yield reached its highest since 2008 while the breakeven stayed within a narrow range. The pressure is nonetheless rising, and abroad the two destinations are visible: Japan, where the central bank holds nearly half the government's bonds and the prime minister has asked it

to buy more (Modules 6 and 14), and Britain in 2022, where the market imposed the discipline itself (Module 17).

The course's reading

Fiscal dominance is not here: the Fed raised rates into an election against the president's wishes, and the market is pricing tight money, not tolerated inflation. But the preconditions are strengthening, as Yellen said, with interest at a fifth of revenue and rising, a Treasury shortening its debt, and a president pressing in public. The signal that would change this reading is a Fed that stops raising rates while inflation is above target and breakevens climb.

16e. What It Means for Everyone Else

The bond market is where the price of time is set, and that price reaches everyone. The thirty-year mortgage, 7.40% in mid-October and the highest since November 2023, is the ten-year Treasury plus a spread (Module 7). A car loan is an auto-bond yield plus a margin. A city's school bond, a company's factory, a farmer's operating loan, and a country's ability to fund itself in a crisis are all priced off the same curve.

When the ten-year rose from 0.52% in August 2020 to 4.98% in October 2023, housing affordability fell to its worst in decades, growth companies were repriced, regional banks failed, and emerging markets defaulted. The market's next large move, up on fiscal fear or down on recession, will be felt in every one of those places before it is felt in a bond portfolio.

Module 16 Key Points

Bonds in Portfolios and the Economy

• Bonds hedge growth shocks, not inflation shocks; 2022 was one of five years since 1928 when stocks and Treasuries both fell.

• In 2026 the 60/40 returned 6.49% to September 30, with stocks up 12.75% and the Aggregate down 2.91%.

• A $1 million Treasury ladder yields about 4.98%; TIPS at 2.84% real deliver about $323,000 of purchasing power whatever inflation does.

• The October signals read as tight money: real yields at 2008 highs, anchored breakevens, and spreads tight except at the bottom.

• Fiscal dominance is not here, since the Fed raised rates against the president's wishes, but interest is a fifth of revenue and rising.

Module 16 Quiz

Check Your Understanding

1. What kind of shock do bonds fail to hedge?

A) A recession
B) A crash
C) A fall in corporate profits that leads to rate cuts
D) An inflation shock

2. What did the 60/40 portfolio return in 2026 through September 30?

A) −16.07%, as in 2022
B) 12.75%, the stock index's return
C) 6.49%
D) −2.91%, the bond index's return

3. What do TIPS deliver that the nominal ladder does not?

A) A fixed real return, whatever inflation does
B) A higher yield
C) Tax-free income
D) A guaranteed gain over stocks for any ten-year holding period

4. Which evidence does the module cite against fiscal dominance today?

A) Breakeven inflation doubled during 2026 as the Treasury sold more bills
B) The Treasury stopped selling thirty-year bonds in 2026
C) The Fed bought long bonds to hold yields down in the autumn
D) The Fed raised rates 12-0 seven weeks before the midterms, against the president's wishes

5. On the CBO's figures, what would rates 50 basis points higher add to deficits through 2036?

A) $6 billion
B) $1.9 trillion
C) $6.0 trillion, the figure for 150 basis points
D) About $1.14 trillion, a single year's interest

Module 17 — Ten Crises

The Case Studies

Recommended Reading / Reference

Book: Roger Lowenstein, *When Genius Failed* (2000), on Long-Term Capital Management (LTCM); Andrew Ross Sorkin, *Too Big to Fail* (2009); Adam Tooze, *Crashed* (2018)

Reference: The New York Fed's speeches and research on the market-function purchases of 2020; the Bank of England's letter to Parliament on the liability-driven investment (LDI) episode (October 5, 2022); the Federal Reserve's review of Silicon Valley Bank (2023)

Ten episodes in which the bond market broke or was broken, each with a mechanism and a lesson. Read in sequence they are a history of the modern market. Read together they show a system built on leverage, liquidity, and the assumption that government bonds are safe discovering, every few years, that one of those assumptions is conditional.

17a. The Ten

Crisis	Trigger	Mechanism	Damage	Resolution	Lesson
Volcker, 1979-82	Double-digit inflation; in October 1979 the Fed targets money instead of rates	The funds rate near 20%; the ten-year to 15.84% (September 30, 1981); two recessions	Long bonds lose heavily in real terms; much of the savings and loan industry insolvent	Inflation broken; a forty-year bull market in bonds begins in late 1981	A central bank willing to cause a recession can break inflation, at the expense of every holder of long bonds
The 1994 bond massacre	The Fed raises rates from 3% to 6% within a year, from February 1994	Leveraged mortgage-derivative positions unwind; from February 3 to November 7 the ten-year rises 224 basis points and the thirty-year 185	Orange County files for bankruptcy (December 6; Module 11); Mexico's peso crisis follows	The Fed stops in 1995; a soft landing	Surprise increases into leverage cause losses far larger than the rate move implies
LTCM, 1998	Russia's default in August	Relative-value trades at about 26 times leverage at the start of 1998, $4.7 billion of equity on about $125 billion borrowed and $1.25 trillion notional, move against it as investors flee to the newest Treasuries	$4.6 billion lost in under four months	A $3.625 billion recapitalization by 14 institutions (September 23), brokered by the New York Fed; three rate cuts	Convergence trades converge eventually; leverage means you may not be there when they do
2008	Subprime defaults; Bear Stearns in March, Lehman Brothers on September 15	Private-label mortgage bonds and CDOs on leveraged balance sheets; runs on repo; AIG's credit default swaps; the Reserve Primary Fund breaks the buck at $0.97 on September 16	Record credit spreads (Module 8); commercial paper frozen; a global recession	The Troubled Asset Relief Program (TARP), Fed facilities, the first round of QE, conservatorship for Fannie Mae and Freddie Mac, the Dodd-Frank Act	Securitization can concentrate the risk it was meant to disperse; a run on repo is a bank run

Crisis	Trigger	Mechanism	Damage	Resolution	Lesson
The taper tantrum, 2013	Fed Chair Ben Bernanke signals on May 22 that the third round of QE will slow	The ten-year rises from 1.66% in early May to 2.98% by September 5; emerging-market currencies and bonds sell off	The worst emerging-market bond selloff since 2008; mortgage bonds extend	Tapering delayed to December 18, at $10 billion a meeting	The end of quantitative easing is priced before it happens
The dash for cash, March 2020	Pandemic lockdowns	Section 17b	The Treasury market stops functioning for a week	Fed purchases on an unprecedented scale; central clearing follows	The safest market's liquidity depends on the Fed
The gilt crisis, 2022	£45 billion of unfunded tax cuts (September 23)	Section 17b	Pension funds days from insolvency; a prime minister falls	Emergency purchases by the Bank of England	Bond vigilantes are real, and leverage in 'safe' pensions is systemic
Silicon Valley Bank (SVB), March 2023	A run after the bank disclosed losses on bond sales (March 8)	$91.3 billion of bonds held to maturity, with losses above $15 billion at the end of 2022; about $42 billion withdrawn on March 9; about 94% of deposits uninsured	Signature Bank and First Republic follow: three of the four largest bank failures in American history	Every deposit at SVB and Signature guaranteed; the Fed lends at par against underwater bonds through its Bank Term Funding Program	Duration risk on safe bonds can kill a bank; hold-to-maturity accounting hides losses until a run reveals them
The tariff selloff, April 2025	'Liberation Day' tariffs (April 2)	Stocks and Treasuries fall together; the ten-year rises from 4.01% to 4.48% in a week; swap-spread trades unwind, while the basis trade largely holds and foreign selling is modest	The 'sell America' trade; the S&P 500 down 18.9% from its February record	The tariffs are paused on April 9	The bond market can help reverse a policy in a week; haven status depends on credibility
The long-end selloff, 2025-26	Deficits, bill-heavy issuance, the war's oil shock, and a Fed that resumes raising rates	Real yields rise about a point; auction yields reach the highest since 2000; the ten-year peaks at 5.31% and the thirty-year at 5.67% in October	Mortgage rates at 7.40%; long yields at their highest since the early 2000s	Unresolved; the Fed raises rates and the Treasury doubles its long-bond buybacks	Contested: a rates story or a fiscal one (Module 4)

17b. Two Cases in Detail

The dash for cash, March 2020

As the pandemic hit, investors of every kind sold the most liquid thing they owned to raise cash: Treasuries. Hedge funds unwound their basis trades, foreign official accounts sold heavily, and bond funds sold to meet redemptions, while dealers at the limit of their balance sheets could not absorb the flow. For a week the world's safest market did not function. Bid-ask spreads on older Treasuries widened to about thirty times normal, and bond ETFs traded at deep discounts to their holdings (Module 15).

The ten-year yield rose from 0.54% on March 9 to 1.18% on March 18 while stocks crashed, the opposite of what a haven should do. The Fed ended it by buying about $1 trillion of Treasuries by the end of March, and $1.6 trillion of Treasuries plus $700 billion of mortgage bonds by June 10. It also opened facilities for corporate bonds, municipal bonds, and commercial paper.

The gilt crisis, September 2022

On September 23, 2022 a new British government announced £45 billion of unfunded tax cuts. The thirty-year gilt yield rose by 160 basis points in a few days, a move the Bank of England said was more than twice as large as any since 2000; on September 28 alone the intraday range was 127 basis points. The mechanism was pensions.

British defined-benefit schemes had adopted 'liability-driven investment', holding long gilts and index-linked gilts with leverage, through repo and swaps, to match their liabilities. The yield spike triggered margin calls they met by selling gilts into a falling market, a doom loop that threatened to bankrupt funds within days. The Bank of England, which had been due to begin selling gilts the following week, postponed the sales and bought £19.3 billion of long gilts from September 28 to October 14.

Chancellor Kwasi Kwarteng was dismissed on October 14, and Prime Minister Liz Truss resigned on October 20. The episode revived the 'bond vigilantes' as a live force, forced pension funds to hold larger buffers against their leverage, and is the reference every finance ministry now cites for why deficits have limits.

17c. The Pattern

Leverage against a 'safe' asset is the recurring mechanism: LTCM's Treasury spreads, the basis trade in 2020, Britain's pension funds in 2022, and Silicon Valley Bank's bond book. The Fed's backstop has grown each time, from brokering a rescue in 1998 to buying in 2008 to buying almost everything in 2020, and the market now assumes it.

The shocks a central bank cannot fix, inflation in 1979 and a loss of fiscal credibility in Britain in 2022, cost the most. Every crisis produced a reform that addressed its own mechanism, such as the Dodd-Frank Act, pension leverage buffers, central clearing, and deposit guarantees, and not the next one.

The long-end selloff of 2025-26 is unusual on the list: slow, without a single trigger, and with its cause still disputed. If the Fed's increases are the cause, it ends when they do. If the fiscal reading is right, the only backstop, central-bank purchases of long bonds, would confirm the fear that caused it (Modules 6 and 16).

Module 17 Key Points

Ten Crises

• Ten crises, from Volcker to 2026, each with a trigger, a mechanism, a resolution, and a lesson.

• Leverage against a 'safe' asset recurs: LTCM, the 2020 basis trade, Britain's pension funds in 2022, Silicon Valley Bank.

• The Fed's backstop grew each time: brokered in 1998, bought in 2008, bought almost everything in 2020.

• In 2022 the thirty-year gilt rose 160 basis points in days; the Bank of England bought £19.3 billion to stop the spiral.

• The shocks central banks cannot fix, inflation and fiscal credibility, cost the most; reforms address the last crisis, not the next.

Module 17 Quiz

Check Your Understanding

1. How much leverage did LTCM carry at the start of 1998?

A) About 2 times, like a bond fund
B) A little; it used mostly its own money
C) About 100 times, as in the basis trade
D) About 26 times, on $125 billion borrowed

2. When did the Reserve Primary Fund break the buck?

A) March 2020, during the dash for cash
B) October 2022, after the gilt crisis
C) September 16, 2008
D) March 2023, with Silicon Valley Bank's run

3. How did the ten-year Treasury yield move from March 9 to March 18, 2020?

A) It rose, from 0.54% to 1.18%
B) It fell to zero
C) It was unchanged
D) It fell below the Fed's target as investors bought Treasuries

4. What did the Bank of England do in the gilt crisis?

A) Cut rates to zero
B) Bought £19.3 billion of long gilts
C) Sold gilts into the falling market to cool it
D) Lent to the government directly at a zero rate for a year

5. Why is the long-end selloff of 2025-26 unusual on the list?

A) It is slow, has no single trigger, and its cause is still disputed
B) It is the only crisis in which bonds lost money
C) It began with a bank failure in Europe
D) It ended when the Fed bought long bonds in September

Module 18 — Where Things Stand, and What to Watch

The Argument on a Page

Recommended Reading / Reference

Reference: The IMF's *Global Financial Stability Report* and *Fiscal Monitor* (October 2026); the Bank for International Settlements' *Annual Economic Report* (June 2026); the Treasury's quarterly refunding documents and tentative auction schedule

18a. One Curve and a Taxonomy of Spreads

Assembled, the market has a single architecture. At the base is the sovereign risk-free curve, Treasuries in dollars and Bunds, gilts, and JGBs abroad, set by expectations for the central bank, by inflation, and by the term premium. Every other bond is that curve plus a spread for something: prepayment, credit, tax treatment, structure, country, and liquidity.

The spreads move with the cycle, the base curve moves with policy and fiscal fear, and the price of any bond on earth is the sum of the two. That is why one course can cover all of debt: once the curve is understood, every sector is a variation.

Sector	Priced off	Spread, October 2026	Yield	Key risk	Module
Ten-year Treasury	The curve		5.19%	Term premium, supply	4-5
Agency mortgage pool (UMBS 6.5)	Ten-year Treasury	About 1.3 points	About 6.5%	Negative convexity; the guarantee	7
Investment-grade corporates (index)	Treasuries	84 bp	5.94%	Downgrade, spread	8
High-yield corporates (index)	Treasuries	325 bp	8.20%	Default	9
Leveraged loan (B-rated)	SOFR	About 350 bp	About 7.4%, floating	Default; no covenants	9
Direct lending	SOFR	About 450-550 bp	About 8.5-9.5%	Illiquidity, marks, leverage	10
AAA municipal, ten years	Ten-year Treasury	About −1.2 points, for the tax exemption	About 4.0%	The exemption, pensions, climate	11
Ten-year TIPS	The real curve		2.84% real	A rise in real yields	13
Emerging-market sovereigns (index)	Treasuries	235 bp (June 30)		The dollar, default	14
Ten-year JGB; ten-year gilt	Their own curves		3.00%; 5.40%	The central bank; the budget	14

18b. Five Contradictions

• **Tight money, loose budgets.** The Fed is raising rates while the government runs a deficit of 6.2% of GDP near full employment. Monetary and fiscal policy pull in opposite directions, and the bond market prices both: real yields have risen, and the term premium sits near 1%.

• **The Treasury shortens as the market charges for term.** As long yields rise, the Treasury sells bills and buys back long bonds. That holds down the supply of long debt and today's interest cost, but it raises rollover risk and makes the budget more sensitive to the very Fed decisions the Treasury hopes to keep at arm's length.

• **Safe borrowers, risky structures.** The hyperscalers are rated AA- to AAA, yet the build-out's credit risk sits in circular deals, private credit, and securitization. The same boom is financed three ways, with the safest pieces public and the riskiest private.

• **Calm on average, stress in the tail.** The investment-grade spread is near its tights while the CCC spread is at its 2026 high, private-credit defaults are at a record on one measure, and bankruptcies are the most since 2010. An average calm hides a stressed tail.

• **The hedge that does not hedge.** Treasuries pay the most income in nearly two decades, yet they have not cushioned stocks in 2026, because the shocks have been oil and rates (Module 16).

18c. What to Watch

Date	What to watch	Why it matters
October 21, 2026	The twenty-year bond auction	The first long-bond test after October's peaks
October 23	Moody's review of France (Aa3, negative)	A downgrade would test the spread to Bunds
October 25	Brazil's presidential runoff	Fiscal policy in one of the largest emerging-market bond markets
October 27-28	The Fed's meeting	Whether a second increase comes now, in December, or not at all (Module 6)
October 28	Britain's Budget	Whether gilts rally or retest the 6% thirty-year
October 29 and 29-30	The ECB's and the Bank of Japan's meetings	Whether the tightening abroad continues
November 1	The I-bond rate reset	A composite of about 5.3-5.4% if the fixed rate is set as projected
November 3	The midterm elections	The fiscal path, and the pressure on the Fed
November 4	The Treasury's quarterly refunding	Coupon sizes against bills, and whether the larger buybacks continue
November 5	The Bank of England's decision	A first increase since 2023 is in play
November 9-12	The refunding auctions of 3-, 10-, and 30-year securities	Demand for duration after the refunding
November 27	S&P's review of France (A+)	The second rating test
Late November	The Federal Deposit Insurance Corporation's third-quarter banking data	Unrealized bond losses after the third-quarter rise in yields
December 8-9	The Fed's meeting and projections	Whether the increases continue into 2027
December	Private-credit funds' fourth-quarter redemption windows	Whether the queues of 10-17% persist
December 31	Central clearing of cash Treasury trades begins	The plumbing's largest reform since the 1980s
By January 18, 2027	The stablecoin law takes effect at the latest	A rule-bound source of demand for bills

Date	What to watch	Why it matters
April 2027	The Bank of Japan stops reducing purchases; the Bank of England's gilt-sale plan is due	How fast the two keep shrinking their bond holdings (Modules 6 and 14)
Around May 2027	The debt limit binds again, on the National Taxpayers Union's projection	Another standoff; the date by which the Treasury runs out of room is projected for about February 2028
June 30, 2027	Central clearing of Treasury repo begins	The second phase of the reform
Unscheduled	Switzerland's Federal Supreme Court on Credit Suisse's AT1s; a Fannie Mae and Freddie Mac sale; a US license for Venezuela's restructuring	Three open questions with market-wide precedents

Scheduled dates are as published by the institutions concerned; auction dates are from the Treasury's tentative schedule.

18d. The Last Word

The bond market is $160.7 trillion of promises to pay, organized around one curve and a hierarchy of spreads, and it is where the world sets the price of time. That price governs every mortgage, every corporate investment, every government's room to act, and every other asset's valuation. For forty years it fell, and the market was a quiet source of steady returns and reliable diversification.

Since 2022 it has risen, and the market has become the loudest voice in economic policy. It brought down a British government, helped reverse an American tariff in a week, ended Japan's zero era, and in 2026 lifted American long yields to their highest since the early 2000s.

The machine worked because a buyer indifferent to price sat at its center. It has lost that buyer, moved its riskiest lending into private hands, and is discovering what its debt is worth when the market, rather than the central bank, decides. The tools of the preceding modules, from duration and convexity to the curve's decomposition, the spread's arithmetic, the auction's numbers, and the cases, are the instruments for reading that discovery as it happens.

Module 18 Key Points

Where Things Stand, and What to Watch

• Every bond is a sovereign curve plus a spread for prepayment, credit, tax, structure, country, or liquidity.

• The Fed is tightening while the budget runs a 6.2% deficit near full employment; the bond market prices both.

• The Treasury is shortening its debt just as the market charges more for term, trading today's cost for rollover risk.

• The AI build-out's safest debt is public and its riskiest private; average credit calm hides a stressed tail.

• Watch the October 27-28 Fed meeting, the November 4 refunding, clearing on December 31, and the debt limit around May 2027.

Module 18 Quiz

Check Your Understanding

1. What is the base of the bond market's architecture, in the module's argument?

A) The corporate credit spread over Treasuries
B) The stock market's earnings yield
C) The price of gold in each currency
D) The sovereign curve

2. Which contradiction involves the Treasury's buybacks?

A) It sells gold
B) It shortens its debt as the market charges for term
C) It buys back long bonds with money borrowed from the Fed at zero
D) It issues only thirty-year bonds while the Fed buys bills

3. Which event comes first on the module's watch list?

A) The midterms
B) The Fed's December meeting
C) The twenty-year auction of October 21
D) The debt limit binding again around May 2027, on one projection

4. Around when does the National Taxpayers Union project the debt limit will bind again?

A) Around May 2027
B) In 2030
C) On November 3, 2026, election day
D) In December 2026, with the clearing deadline

5. How does the module describe the 2026 credit picture?

A) A full crisis
B) Uniform calm
C) Average calm hiding a stressed tail
D) Uniform stress across every rating and sector of the market

Answer Sheet

Answers to every module's Check Your Understanding quiz.

Module	Answers
Module 1 Quiz	1. B 2. A 3. D 4. C 5. A
Module 2 Quiz	1. C 2. B 3. D 4. C 5. A
Module 3 Quiz	1. B 2. D 3. A 4. C 5. D
Module 4 Quiz	1. B 2. A 3. C 4. D 5. B
Module 5 Quiz	1. B 2. C 3. D 4. A 5. C
Module 6 Quiz	1. D 2. B 3. A 4. A 5. B
Module 7 Quiz	1. C 2. D 3. C 4. D 5. B
Module 8 Quiz	1. A 2. A 3. B 4. D 5. C
Module 9 Quiz	1. A 2. D 3. B 4. C 5. A
Module 10 Quiz	1. D 2. C 3. B 4. C 5. B
Module 11 Quiz	1. A 2. D 3. C 4. A 5. B
Module 12 Quiz	1. D 2. C 3. D 4. B 5. A
Module 13 Quiz	1. B 2. D 3. C 4. A 5. C
Module 14 Quiz	1. B 2. A 3. D 4. C 5. D
Module 15 Quiz	1. B 2. A 3. C 4. B 5. A
Module 16 Quiz	1. D 2. C 3. A 4. D 5. B
Module 17 Quiz	1. D 2. C 3. A 4. B 5. A
Module 18 Quiz	1. D 2. B 3. C 4. A 5. C