

LM07 · FIXED INCOME · CFA LEVEL I

Yield & Yield Spread Measures for Fixed-Rate Bonds

Periodicity and annualized-yield conversions; street-convention yields and yield-to-call; and the four spread measures (G-, I-, Z-, OAS).

Learning Outcomes

LOS a Calculate annualized yields on fixed-rate bonds of different periodicity and convert to a common basis

LOS b Compare, calculate, and interpret yield and yield spread measures for fixed-rate bonds

LOS A · PERIODICITY & EAY CONVERSIONS

Periodicity and Annualized Yields

Periodicity = number of compounding periods in a year (= number of coupon payments per year for coupon bonds). The **stated annual rate (APR)** depends on the assumed periodicity.

$$\left(1 + \frac{APR_m}{m}\right)^m = \left(1 + \frac{APR_n}{n}\right)^n$$

APR_m annualized rate with m compounding periods / yr m, n compounding frequencies per year

WORKED EXAMPLE · PERIODICITY CONVERSIONS

Worked Example — Converting a 4-year 3.75% Bond

EXAMPLE

Periodicity conversion on a 4-year 3.75% semi-annual bond priced at 97.5

GIVEN

4-year, 3.75% semi-annual coupon government bond priced at 97.5.

SOLUTION

Calculator: $N = 8$; $PMT = 1.875$; $FV = 100$; $PV = -97.5$; $CPT\ I/Y \rightarrow I/Y = 2.2195\%$. Annual YTM semi-annual basis $= 2.2195\% \times 2 = 4.439\%$.

Convert to quarterly compounding:

$$(1 + 0.04439/2)^2 = (1 + APR_4/4)^4 \Rightarrow APR_4 = 4.415\%$$

Convert to annual (EAY):

$$(1 + 0.04439/2)^2 - 1 = EAY = 4.488\%$$

ANSWER

4.439% semi-annual-bond basis $\leftrightarrow$ 4.415% quarterly compounding $\leftrightarrow$ 4.488% effective annual rate.

Semi-annual bond equivalent yield = yield per semi-annual period $\times 2$. If the yield per semi-annual period is 2%, the semi-annual bond equivalent yield is 4%.

LOS B · YIELD MEASURES

Common Yield Measures for Fixed-Rate Bonds

Street convention	YTM using a 30/360 day-count convention assuming payments are made on scheduled dates (ignores weekends/holidays).
True yield	YTM calculated using an actual calendar , including weekends and holidays.
Current yield	Annual coupon payments ÷ flat price.
Yield-to-call (YTC)	Rate of return on a callable bond if bought at market price and held until the call date . Calculated like a YTM but using the call price and call date as the terminal cash flow.
Yield-to-worst (YTW)	Minimum of YTM and all YTCs — the most conservative yield.
Yield-to-put	Analogous for puttable bonds.

CHECKPOINT 1

Quiz 1: Periodicity & Yield Measures

Answer all questions to test your understanding. Your score updates on the final step.

Q1. Converting a semi-annual APR of 4.439% to an effective annual yield gives:

Q2. The semi-annual bond equivalent yield is computed as:

Q3. Street-convention yield uses:

Q4. Yield-to-worst is *best* described as:

Q5. Current yield of a bond equals:

LOS B · G / I / Z / OAS SPREADS

Yield Spread Measures

A **yield spread** = difference in yield between a fixed-income security and a benchmark.

G-spread

Yield spread in **basis points** over an **interpolated government bond**. Reflects credit, liquidity, and other risks relative to the government benchmark.

I-spread

Yield spread of the bond over the **standard swap rate** in that currency of the same tenor. Used widely by market participants.

Z-spread (zero-volatility spread)

Based on the **entire benchmark spot curve**. The **constant spread** that, when added to each spot rate, makes the PV of the bond’s cash flows equal its market price.

Option-adjusted spread (OAS)

Z-spread **adjusted for the value of an embedded option**. $OAS = Z\text{-spread} - \text{option value}$ (for callables; the reverse for putables).

$$OAS = Z\text{-spread} - \text{Option value}$$

REVIEW · DECISION TREE FOR SPREADS

When to Use Which Spread

BOND TYPE	PREFERRED SPREAD	WHY
Option-free corporate	G-spread or Z-spread	No embedded option to adjust for
Callable / putable corporate	OAS	Strips out the option value
Cross-market or rate-environment comparisons	I-spread	Uses a consistent swap benchmark
Analysis relying on full term structure	Z-spread	Uses the entire spot curve

CHECKPOINT 2

Quiz 2: Spreads

Answer all questions to test your understanding. Your score updates on the final step.

Q6. The **G-spread** for a corporate bond is *best* described as:

Q7. The Z-spread is *best* described as:

Q8. The OAS of a callable corporate bond is *typically*:

Q9. Which spread measure uses a **single interpolated government yield**?

Q10. An I-spread is measured over:

WORKED EXAMPLE · YTC COMPUTATION

YTC Computation (Callable Bond)

EXAMPLE

Yield-to-call on a 5-year callable bond

GIVEN

Face = 1,000, *coupon* 6%, callable in 3 years at call price \$1,020.

SOLUTION

Solve for I/Y: $N = 3$; $PMT = 60$; $FV = 1,020$; $PV = -980$. CPT I/Y.

$$YTC \approx 7.38\% \text{ (annual)}$$

If the bond's YTM is 6.45%, the **yield-to-worst (YTW)** = $\min(6.45\%, 7.38\%) = 6.45\%$.

TAKEAWAY

YTC uses the call price and call date as the terminal cash flow; $YTW = \min$ of YTM and all YTCs.

CHECKPOINT 3 · SYNTHESIS

Quiz 3: Synthesis

Answer all questions to test your understanding. Your score updates on the final step.

Q11. A 2-year semi-annual coupon bond has a periodic yield of 2.5%. Its EAY is:

Q12. A bond's **current yield** will *most accurately*:

Q13. A callable bond's **yield-to-worst** is *most likely* used because:

Q14. For an **option-free** bond, the OAS is:

Q15. Compared to semi-annual compounding at 4.439%, quarterly compounding that yields the same EAY is:

MODULE COMPLETE

Your Scorecard

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LM07 Key Takeaways — Exam-Ready Cheat Sheet

Periodicity

$(1 + \text{APR}_m/m)^m = (1 + \text{APR}_n/n)^n$. Curriculum benchmark: 4.439% semi $\leftrightarrow$ 4.415% quarterly $\leftrightarrow$ 4.488% EAY.

Yield measures

Street (30/360) vs. True (actual cal); current yield = coupon/price; YTC (to call), YTP (to put), YTW = min of all.

Spreads

G-spread = vs interpolated gov; **I-spread** = vs swap; **Z-spread** = vs entire spot curve (constant add);
OAS = Z-spread – option value.

Rule of thumb: For option-free bonds OAS = Z-spread. For callables OAS < Z-spread.