

LM08 • FIXED INCOME • CFA LEVEL I

Yield & Yield Spread Measures for Floating-Rate Instruments

FRN pricing and discount margin; money-market discount / add-on rates; DR ↔ AOR conversions.

Learning Outcomes

LOS a Calculate and interpret yield and yield spread measures for floating-rate notes

LOS b Calculate and interpret yield measures for money market instruments

LOS A · FRN COUPON & PRICE

Floating-Rate Notes

Coupon resets each period as MRR + quoted margin; price is determined by discounting at MRR + required (discount) margin.

$$PV = \sum_{t=1}^N \frac{(MRR + QM) \cdot FV/m}{\left(1 + \frac{MRR + DM}{m}\right)^t} + \frac{FV}{\left(1 + \frac{MRR + DM}{m}\right)^N}$$

<i>MRR</i>	market reference rate (resets each period)	<i>QM</i>	quoted margin (fixed spread in coupon)	<i>DM</i>	discount margin required by investors
<i>m</i>	periods per year	<i>N</i>	total periods to maturity		

- **MRR** — market reference rate
- **QM (quoted margin)** — specified spread over/under MRR
- **DM (discount margin / required margin)** — spread required by investors today (moves with credit/market conditions)
- **m** — periodicity

At par: QM = DM. **Premium:** QM > DM. **Discount:** QM < DM.

WORKED EXAMPLE · ITALIAN FRN

Worked Example — 3-year Italian FRN

EXAMPLE

Discount margin on a 3-year FRN priced at 99

GIVEN

3-year Italian FRN pays 3-month MRR + 0.75%. Priced at 99. 3-month MRR constant at 1%. 30/360 day-count.

SOLUTION

Interest payment per period = $(1.00\% + 0.75\%) / 4 = 0.4375\%$.

Solve for market discount rate: $PV = -99$, $PMT = 0.4375$, $FV = 100$, $N = 12$, $CPT\ I/Y = 0.5237$. Annual = $0.5237 \times 4 = 2.09\%$.

$$DM = 2.09\% - 1\% = 1.09\% \text{ (109 bps)}$$

ANSWER

Discount margin = **109 bps**. Since QM (75 bps) < DM (109 bps), the FRN trades at a discount (price 99).

LOS B · DISCOUNT RATE VS. ADD-ON RATE

Money Market Instruments

Maturities of one year or less, ranging from overnight repos to 1-year CDs. Quotes use either a **discount rate (DR)** or an **add-on rate (AOR)**.

Discount-rate (DR) instruments

T-bills, commercial paper (CP), and banker's acceptances are issued at a **discount** and redeemed at par. The difference = interest.

$$PV = FV \times \left(1 - \frac{\text{Days}}{\text{Year}} \times DR \right)$$

DR discount rate (annualised)

Days days until maturity

Year day-count year (usually 360)

Add-on (AOR) instruments

Bank term deposits, repos, CDs, and Libor/Euribor-style indices quote AOR. Interest is added to the principal at maturity.

$$PV = \frac{FV}{1 + \frac{\text{Days}}{\text{Year}} \times AOR}$$

AOR add-on (money-market) rate

Days days until maturity

Year day-count year (usually 360 or 365)

WORKED EXAMPLES · BANKER'S ACCEPTANCE & CD

Worked Example 1 — Banker's Acceptance (DR)**EXAMPLE 91-day BA at 5% discount rate****GIVEN**

FV = \$1,000,000. Days = 91. Year = 360. DR = 5%.

SOLUTION

$$PV = 1,000,000 \times \left(1 - \frac{91}{360} \times 0.05 \right) = \mathbf{\$987,361}$$

ANSWER

Price = **\$987,361**.

Worked Example 2 — Canadian Banker's Acceptance (AOR)**EXAMPLE 180-day BA at 4.38% AOR (365-day year)****GIVEN**

Initial principal CAD 10,000,000. 180 days. AOR = 4.38%. 365-day year.

SOLUTION

$$\begin{aligned}\text{AOR} &= \frac{\text{Year}}{\text{Days}} \times \frac{\text{FV} - \text{PV}}{\text{PV}} \\ 0.0438 &= \frac{365}{180} \times \frac{\text{FV} - 10,000,000}{10,000,000} \\ \text{FV} &= \mathbf{\$10,216,000}\end{aligned}$$

ANSWER

Redemption amount = **CAD 10,216,000**.

CHECKPOINT 1

Quiz 1: FRNs & Money Market

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

Q1. A 3-year FRN pays 3-month MRR + 75 bps; the current 3-month MRR is 1%. The next quarterly coupon as a percent of par is:

Q2. If the 3-year Italian FRN is priced at 99 and the DM = 109 bps vs. QM = 75 bps, the price is at a discount because:

Q3. A 91-day banker's acceptance with DR = 5% and FV \$1,000,000 has a price of:

Q4. An add-on rate (AOR) is *most accurately* used for:

Q5. Given a 180-day BA with AOR 4.38% and 365-day year, CAD 10M initial principal, the redemption amount is:

LOS B · CONVERTING DR ↔ AOR

Relationship Between DR and AOR

$$AOR = DR / [1 - (Days/Year) \times DR]$$

EXAMPLE 90-day T-bill quoted at 5.25% DR**GIVEN**

FV = 100; Days = 90; Year = 360; DR = 5.25%.

SOLUTION — FIRST APPROACH

PV = $100 \times (1 - 90/360 \times 0.0525) = \98.687 .

AOR = $(360/90) \times (100 - 98.687)/98.687 = 5.32\%$.

SOLUTION — SECOND APPROACH (DIRECT)

$$AOR = 0.0525 / (1 - (90/360) \times 0.0525) = \mathbf{5.3198\%}$$

ANSWER

AOR $\approx 5.32\%$, higher than the 5.25% DR — DR understates the true (effective) yield.

LOS B · RANKING INSTRUMENTS ON A COMMON BASIS

Comparing Discount Basis with Add-On Yield

Two approaches

1. **Memorize-less approach:** Determine PV of the DR instrument → compute AOR on that PV → compare the two AORs.
2. **Formula approach:** Use $AOR = DR / [1 - (Days/Year) \times DR]$ directly.

Key insight: For the same instrument, $AOR > DR$ — the DR always understates the true yield because the discount is taken against face value, not the actual PV paid.

CHECKPOINT 2

Quiz 2: DR & AOR

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

Q6. A 90-day T-bill with a discount rate of 5.25% has an AOR of *approximately*:

Q7. For the same 90-day money-market instrument, the AOR compared to the DR is *most likely*:

Q8. Given an FRN with $QM = 80$ bps and market-demanded $DM = 80$ bps, the FRN should trade at:

Q9. Bank term deposits and repurchase agreements *most commonly* use which yield quotation?

Q10. If an FRN trades at a premium, the quoted margin (QM) is *most likely*:

REVIEW · DR VS AOR DECISION GRID

Money-Market Quick Reference

INSTRUMENT	BASIS	KEY FORMULA
T-bill	DR	$PV = FV \times (1 - (\text{Days/Year}) \times DR)$
Commercial paper	DR	Same as T-bill
Banker’s acceptance	DR (U.S.) / AOR (Canada)	Use appropriate formula
Certificate of deposit	AOR	$PV = FV / [1 + (\text{Days/Year}) \times AOR]$
Repo	AOR	Same as CD
Libor/Euribor indices	AOR	Quoted directly as AOR

CHECKPOINT 3 · SYNTHESIS

Quiz 3: Synthesis

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

Q11. An FRN's coupon resets are designed to keep the FRN *approximately* priced at par. This is true as long as:

Q12. For a 120-day money-market instrument, doubling the DR from 3% to 6% (with 360-day year) *most likely*:

Q13. The key assumption in the FRN discount-margin calculation we did (Italian FRN) was:

Q14. Which of these instruments is *most likely* quoted on a discount-rate basis?

Q15. For a Z-spread-like analysis on a floating-rate note, the analogue is the:

MODULE COMPLETE

Your Scorecard

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LM08 Key Takeaways — Exam-Ready Cheat Sheet

FRNs

Coupon = MRR + QM; price depends on MRR + DM. Par: QM = DM. Example: 3yr Italian FRN at 99, MRR 1% constant → DM = 109 bps; coupon per period = 0.4375%.

Money market

DR instruments (T-bill, CP, BA): $PV = FV \times (1 - \text{Days/Year} \times DR)$. **AOR instruments** (CD, repo, deposit): $PV = FV / [1 + \text{Days/Year} \times AOR]$.

Conversion: $AOR = DR / (1 - (\text{Days/Year} \times DR))$.

Numeric benchmarks: 91-day BA DR 5% → \$987,361 PV. 90-day T-bill DR 5.25% → AOR 5.32%. 180-day BA AOR 4.38% on CAD 10M → CAD 10,216,000 FV.