Fixed Income

Yield and Yield Spread Measures for Floating-Rate Instruments

Exam Focus

- Yield spreads for floating-rate notes (FRNs)
- Yield measures for money market instruments

Floating-Rate Notes

- **Reminder:** If yields increase, the value of fixed-rate notes decreases. FRNs have fixed coupons, and so this is the market reaction to the note becoming less desirable.
- The value of floating-rate notes remains more constant as the coupon gets reset each period, so if yields increase, the next coupon reset will be higher.
- Coupon rate = MRR + fixed margin

Floating-Rate Notes

- **Quoted margin**
  - Fixed margin paid above MRR
- **Required margin = discount margin**
  - Margin required to price bond at par
- In other words: if a bond is trading at par (likely at issuance), quoted margin = required margin

Floating-Rate Notes: Example

The MRR for the Antelas AG four-year floating-rate note is on a three-month basis, currently –0.55% and the quoted margin is 250 bps. The bond is priced at 97. Calculate the **discount margin** assuming a 30/360 day-count.

1. The coupon will be

2. Solve for I/Y:

   FV = 100; PMT = ; PV = –97; N = 16; **I/Y CPT** =

3. Yield = =

Source: CFA Institute. Used with permission.

Floating-Rate Notes: Example

4. Compute discount margin:

   Discount margin = =

   In other words, the quoted margin of 250 bps would have to increase to 329 bps for the bond to trade at par.

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Source: CFA Institute. Used with permission.

Floating-Rate Notes: Example

For a five-year floating-rate security, if market interest rates change by 0.5%, the change in the price of the security will *most likely* be:

A. zero.

B. like an otherwise identical fixed-rate security.

C. related to the security's coupon reset frequency.

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Source: CFA Institute. Used with permission.

Money Market Instruments

- Debt securities ≤ 1 year
- Yield measures in the money market are annualized but not compounded (unlike bonds)
- Some yield quotes based on 360 days, some 365 days
- Bank CDs, repos, and market reference rates typically quoted as annualized add-on rates
- U.S. Treasury bills and commercial paper typically annualized discount based on face value

Add-On vs. Discount Yields

Discount yields:

$$DR = \left(\frac{\text{assumed days in year}}{\text{days to maturity}}\right) \times \left(\frac{FV - PV}{FV}\right)$$

Add-on yields:

$$AOR = \left(\frac{\text{assumed days in year}}{\text{days to maturity}}\right) \times \left(\frac{FV - PV}{PV}\right)$$

Add-On vs. Discount Yields: Example

Suppose that an investor is comparing the following two money market instruments. Which offers the higher expected rate of return, assuming that credit risks are the same?

- A 90-day commercial paper (CP) issued by Bright Wheel Automotive Corporation (BRWA), quoted at a discount rate of 0.120% for a 360-day year
- A 90-day certificate of deposit issued by CFP Bank, quoted at an add-on rate of 0.120% for a 365-day year

Source: CFA Institute. Used with permission.

Add-On vs. Discount Yields: Solution

Convert Bright Wheel Automotive Corporation (BRWA) to AOR:

Step 1: Compute PV (price):

$$DR = \left(\frac{\text{assumed days in year}}{\text{days to maturity}}\right) \times \left(\frac{FV - PV}{FV}\right)$$

$$= \left(\frac{\quad}{\quad}\right) \times \left(\frac{\quad}{\quad}\right)$$

$$= \left(\frac{\quad}{\quad}\right)$$

Discount =

Price = FV – discount = =

-4

Source: CFA Institute. Used with permission.

Add-On vs. Discount Yields: Solution

Step 2: Convert to AOR:

$$\text{AOR} = \left(\frac{\text{assumed days in year}}{\text{days to maturity}}\right) \times \left(\frac{\text{FV} - \text{PV}}{\text{PV}}\right)$$

Note CFP uses 365-day count

AOR = (———) × (———————) = or

The BRWA commercial paper AOR is 0.2 bps greater than CFP bank CD

Note AOR on a 365 basis may be called bond equivalent yield

Source: CFA Institute. Used with permission.

Comparing MMIs Using BEYs: Example

A money market investor observes quoted rates on four 180-day money market instruments: A, B, C, and D

Instrument	Quotation Basis	Number of Days in Year	Quoted Rate
A	Discount rate	360	4.33%
B	Discount rate	365	4.36%
C	Add-on rate	360	4.35%
D	Add-on rate	365	4.45%

Which instruments have the highest and lowest rates of return?

Source: CFA Institute. Used with permission.

BEYs: Solution

Bond A:

$$DR = \left(\frac{\text{assumed days in year}}{\text{days to maturity}}\right) \times \left(\frac{FV - PV}{FV}\right)$$

$$= \left(\frac{\quad}{\quad}\right) \times \left(\frac{\quad}{\quad}\right)$$

$$= \left(\frac{\quad}{\quad}\right) \therefore \text{discount} =$$

$$\text{Price} = 100 - \quad =$$

$$\text{BEY} = \left(\frac{\quad}{\quad}\right) \times \left(\frac{\quad}{\quad}\right) = \quad \text{or}$$

-4

Source: CFA Institute. Used with permission.

BEYs: Solution

Bond B:

$$DR = \left(\frac{\text{assumed days in year}}{\text{days to maturity}}\right) \times \left(\frac{FV - PV}{FV}\right)$$

$$= \left(\frac{\quad}{\quad}\right) \times \left(\frac{\quad}{\quad}\right)$$

$$= \left(\frac{\quad}{\quad}\right) \therefore \text{discount} =$$

$$\text{Price} = 100 \quad =$$

$$\text{BEY} = \left(\frac{\quad}{\quad}\right) \times \left(\frac{\quad}{\quad}\right) = \quad \text{or}$$

-4

Source: CFA Institute. Used with permission.

BEYs: Solution

Bond C:

$$BEY = AOR \times \left(\frac{365}{360}\right) = \quad = \quad \text{or}$$

Bond D:

BEY = AOR = 4.450%

Instrument	BEY
A	
B	
C	
D	

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Source: CFA Institute. Used with permission.

Comparing MMI to Bonds: Example

Suppose that an analyst prefers to convert money market rates to a semiannual bond basis so that the rates are directly comparable to yields on bonds that make semiannual coupon payments. The quoted rate for a 91-day Indian rupee T-bill is 3.50%, quoted as a bond equivalent yield,

$$EAR = \left(1 + \frac{\quad}{\quad}\right) \quad = \quad \text{or}$$

Equivalent to EAR on semiannual bond, not YTM

$$YTM = \left[\quad\right] \times \quad = \quad \text{or}$$

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Source: CFA Institute. Used with permission.

Solutions

Floating-Rate Notes: Example

The MRR for the Antelas AG four-year floating-rate note is on a three-month basis, currently –0.55% and the quoted margin is 250 bps. The bond is priced at 97. Calculate the **discount margin** assuming a 30/360 day-count.

1. The coupon will be (–0.55% + 2.50%) / 4 = 0.4875

2. Solve for I/Y:

   FV = 100; PMT = 0.4875; PV = –97; N = 16; **I/Y CPT** = 0.6861

3. Yield = 0.6861 × 4 = 2.7444%

Floating-Rate Notes: Example

4. Compute discount margin:

   Discount margin = 2.7444% – (0.55%) = 3.2944% or 329 bps

   In other words, the quoted margin of 250 bps would have to increase to 329 bps for the bond to trade at par.

Floating-Rate Notes: Example

For a five-year floating-rate security, if market interest rates change by 0.5%, the change in the price of the security will *most likely* be:

A. zero.

B. like an otherwise identical fixed-rate security.

C. related to the security's coupon reset frequency.

A is incorrect. When the interest rates changes, the discount rate of the floating-rate security also changes, changing the present value of the security when discounting the cashflows.

B is incorrect. With a fixed-rate security, interest rates changes affect the price more than an identical (same-term) floating-rate security, due to its fixed-coupon payments and a higher duration.

Add-On vs. Discount Yields: Solution

Convert Bright Wheel Automotive Corporation (BRWA) to AOR:

Step 1: Compute PV (price):

$$DR = \left(\frac{\text{assumed days in year}}{\text{days to maturity}}\right) \times \left(\frac{FV - PV}{FV}\right)$$

$$0.0012 = \left(\frac{360}{90}\right) \times \left(\frac{\text{discount}}{100}\right)$$

$$0.0003 = \left(\frac{\text{discount}}{100}\right)$$

Discount = 0.03

Price = FV – discount = 100 – 0.03 = 99.970

-4

Add-On vs. Discount Yields: Solution

Step 2: Convert to AOR:

$$AOR = \left(\frac{\text{assumed days in year}}{\text{days to maturity}}\right) \times \left(\frac{FV - PV}{PV}\right)$$

Note CFP uses 365-day count

$$AOR = \left(\frac{365}{90}\right) \times \left(\frac{100 - 99.970}{99.970}\right) = 0.00122 \text{ or } 0.122\%$$

The BRWA commercial paper AOR is 0.2 bps greater than CFP bank CD

Note AOR on a 365 basis may be called bond equivalent yield

BEYs: Solution

Bond A:

$$DR = \left(\frac{\text{assumed days in year}}{\text{days to maturity}}\right) \times \left(\frac{FV - PV}{FV}\right)$$

$$0.0433 = \left(\frac{360}{180}\right) \times \left(\frac{\text{discount}}{100}\right)$$

$$0.02165 = \left(\frac{\text{discount}}{100}\right) \therefore \text{discount} = 2.165$$

$$\text{Price} = 100 - 2.165 = 97.835$$

$$BEY = \left(\frac{365}{180}\right) \times \left(\frac{100 - 97.835}{97.835}\right) = 0.04487 \text{ or } 4.487\%$$

-4

BEYs: Solution

Bond B:

$$DR = \left(\frac{\text{assumed days in year}}{\text{days to maturity}}\right) \times \left(\frac{FV - PV}{FV}\right)$$

$$0.0436 = \left(\frac{365}{180}\right) \times \left(\frac{\text{discount}}{100}\right)$$

$$0.021501 = \left(\frac{\text{discount}}{100}\right) \therefore \text{discount} = 2.1501$$

$$\text{Price} = 100 - 2.1501 = 97.8499$$

$$BEY = \left(\frac{365}{180}\right) \times \left(\frac{100 - 97.8499}{97.8499}\right) = 0.04456 \text{ or } 4.456\%$$

-4

BEYs: Solution

Bond C:

$$BEY = AOR \times \left(\frac{365}{360}\right) = 0.0435 \times \left(\frac{365}{360}\right) = 0.04410 \text{ or } 4.41\%$$

Bond D:

BEY = AOR = 4.450%

Instrument	BEY
A	4.487%
B	4.456%
C	4.410%
D	4.450%

-2

Source: CFA Institute. Used with permission.

Comparing MMI to Bonds: Example

Suppose that an analyst prefers to convert money market rates to a semiannual bond basis so that the rates are directly comparable to yields on bonds that make semiannual coupon payments. The quoted rate for a 91-day Indian rupee T-bill is 3.50%, quoted as a bond equivalent yield,

$$EAR = \left(1 + \frac{0.035}{\left(365/91\right)}\right)^{365/91} - 1 = 0.03546 \text{ or } 3.546\%$$

Equivalent to EAR on semiannual bond, not YTM

$$YTM = \left[(1.03546)^{1/2} - 1\right] \times 2 = 0.03515 \text{ or } 3.515\%$$

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Source: CFA Institute. Used with permission.