Learning Module 8: Yield and Yield Spread Measures for Floating-Rate Instruments

Fixed Income

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Floating-Rate Notes (FRN) Pricing Model

$$PV = \frac{\frac{(MRR+QM)\times FV}{m}}{\left(1+\frac{MRR+DM}{m}\right)^{1}} + \frac{\frac{(MRR+QM)\times FV}{m}}{\left(1+\frac{MRR+DM}{m}\right)^{2}} + \ldots + \frac{\frac{(MRR+QM)\times FV}{m}+FV}{\left(1+\frac{MRR+DM}{m}\right)^{N}} \quad (1)$$

Where:

- PV = present value, or the price of the floating-rate note
- MRR = the market reference rate, stated as an annual percentage rate (it is sometimes known generically as Index)
- QM = the quoted margin, stated as an annual percentage rate
- FV = the future value paid at maturity, or the par value of the bond
- m = the periodicity of the floating-rate note, the number of payment periodsper year
- DM = the discount margin = required margin stated as an annual percentage rate
- N = the number of evenly spaced periods to maturity
- Notice that in Equation 1, because we are using annual rates for MRR, QM, and DM, we must divide by m periods in the year

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### Floating-Rate Notes (FRN) Pricing Model

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PV \;=\; \frac{\frac{(MRR + QM)\times FV}{m}}{\left(1+\frac{MRR + DM}{m}\right)^{1}}
\;+\;
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\;+\; \ldots \;+\;
\frac{\frac{(MRR + QM)\times FV}{m} + FV}{\left(1+\frac{MRR + DM}{m}\right)^{N}}
\tag{1}
$$

Where:

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- $MRR$ = the market reference rate, stated as an annual percentage rate (it
  is sometimes known generically as Index)
- $QM$ = the quoted margin, stated as an annual percentage rate
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Pricing formula for money market instruments quoted on a discount rate basis.

$$PV = FV \times \left(1 - \frac{Days}{Year} \times DR\right) \tag{2}$$

Where:

- PV = present value, or the price of the money market instrument
- FV = the future value paid at maturity, or the face value of the money market instrument
- $Days$ = the number of days between settlement and maturity
- $Year$ = the number of days in the year
- DR = the discount rate, stated as an annual percentage rate

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- $DR$ = the discount rate, stated as an annual percentage rate
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Transforming Equation 2 algebraically to isolate the DR term

$$DR = \frac{Year}{Days} \times \frac{(FV - PV)}{FV} \tag{3}$$

- The unique characteristics of a money market discount rate can be examined with Equation 3, which transforms Equation 2 algebraically to isolate the DR term
- The first term, Year/Days, is the periodicity of the annual rate
- The second term reveals the odd character of a money market discount rate

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### Transforming Equation 2 algebraically to isolate the DR term

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DR = \frac{Year}{Days} \times \frac{(FV - PV)}{FV} \tag{3}
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- The unique characteristics of a money market discount rate can be examined
  with Equation 3, which transforms Equation 2 algebraically to isolate the
  $DR$ term
- The first term, Year/Days, is the periodicity of the annual rate
- The second term reveals the odd character of a money market discount rate
```

Pricing formula for money market instruments quoted on an add-on rate basis

$$PV = \frac{FV}{\left(1 + \frac{Days}{Year} \times AOR\right)} \tag{4}$$

Where:

- PV = present value, the principal amount, or the price of the money market instrument
- FV = the future value, or the redemption amount paid at maturity including interest

- $Days$ = the number of days between settlement and maturity
- $Year$ = the number of days in the year
- AOR = the add-on rate, stated as an annual percentage rate

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### Pricing formula for money market instruments quoted on an add-on rate basis

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PV = \frac{FV}{\left(1 + \frac{Days}{Year} \times AOR \right)} \tag{4}
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Where:

- $PV$ = present value, the principal amount, or the price of the money
  market instrument
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  interest
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- $AOR$ = the add-on rate, stated as an annual percentage rate
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