ACI FINANCIAL MARKETS ASSOCIATION

EXAMINATION FORMULAE

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INTEREST RATE CONVERSIONS

Converting between bond basis and money market basis (Act/360)

$$rate_{bond\,basis} = rate_{money\,market\,basis} \frac{365}{360}$$

$$rate_{money\,market\,basis} = rate_{bond\,basis} \frac{360}{365}$$

Converting between annually and semi-annually compounding frequencies

$$rate_{annually\text{-}compounded} = \left(1 + \frac{rate_{semi\text{-}annually\,compounded}}{2}\right)^2 - 1$$

$$rate_{semi\text{-}annually\,compounded} = \left(\sqrt{1 + rate_{annually\,compounded}} - 1\right)2$$

The formulae for converting between annually and semi-annually compounded rate apply only to rates quoted on a bond basis, not a money market basis.

MONEY MARKET

Certificates of deposit

proceeds at maturity = face value $(1 + \dfrac{\text{coupon x term}}{\text{annual basis}})$

$$\dfrac{\text{proceeds at maturity}}{1 \quad \dfrac{\text{yield x day count}}{\text{annual basis}}}$$

FIXED INCOME

Clean and dirty price of bond with annual coupons on coupon date

$$price =$$

$$100 \; \frac{coupon}{yield} \; \left[1 - \frac{1}{(1+yield)^{remaining\,coupons}} \right] + \frac{1}{(1+yield)^{remaining\,coupons}}$$

Dirty price of bond with annual coupons

$$dirty\,price =$$

$$\frac{first\,cashflow}{(1+yield)^{\frac{days\,to\,next\,coupon}{annual\,basis}}} + \frac{second\,cashflow}{(1+yield)^{1+\frac{days\,to\,next\,coupon}{annual\,basis}}} + L + \frac{n^{th}\,cashflow}{(1+yield)^{(n-1)+\frac{days\,to\,next\,coupon}{annual\,basis}}}$$

Duration at issue or on a coupon date

Macaulay Duration =

$$\frac{\begin{pmatrix} present\,value\,of\,first\,coupon\,amount\,x\,time\,to\,first\,coupon \end{pmatrix} + \\ (present\,value\,of\,second\,coupon\,amount\,x\,time\,to\,second\,coupon) + ... \\ + (present\,value\,of\,(last\,coupon\,amount + nominal\,amount)\,x\,time\,to\,last\,coupon)}{net\,present\,value\,of\,bond}$$

$$Modified\,Duration = \frac{Macaulay\,Duration}{1 + \dfrac{yield}{compounding\,frequency}}$$

Calculating zero-coupon yield from an annual yield-to-maturity (bootstrapping)

zero - coupon yield for n - year term

$$= \left[\sqrt[n]{\frac{\text{final coupon amount} + \text{nominal amount}}{\text{implied present value of final coupon and nominal amount}}} - 1 \right] 100$$

The implied present value of the final coupon and nominal amount is calculated by subtracting from the net present value of the bond the sum of the present values of all coupons except the final one, where each present value is calculated using the appropriate zero-coupon yield.

FOREIGN EXCHANGE

OPTIONS

Standard deviation