

EXECUTING AND REPORTING FINANCIAL MARKET TRANSACTIONS

Homework Assignments

FINC 620

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1. T-bill Yield: You paid \$98,000 for a \$100,000 T-bill maturing in 120 days. If you hold it until maturity, what is the T-bill yield? What is the T-bill discount?

The annualized yield from investing in a T-bill (Y_T) can be determined as

$$Y_T = \frac{SP - PP}{PP} \times \frac{365}{n}$$

where

SP = selling price

PP = purchase price

n = number of days of the investment (holding period)

$$Y_T = \frac{\$100,000 - \$98,000}{\$98,000} \times \frac{365}{120}$$

$$= 6.2075\% \sim 6.21\%$$

$$Y_d = \frac{P_f - P_0}{P_f} \times \frac{360}{n} \times 100\%$$

y_d = discount yield on annualized basis

P_f = face value (amount paid to the investor at maturity)

P_0 = purchase price of the Tbill

n = number of days to maturity

$$\text{T-bill discount} = \frac{\$100,000 - \$98,000}{\$100,000} \times \frac{360}{120}$$

$$= 6\%$$

2. Valuing a zero-coupon bond: Assume the following information for existing zero coupon bonds:

Par value = \$100,000

Maturity = 3 years

Required rate of return by investors = 12%

How much should investors be willing to pay for these bonds?

Answer:

$$\begin{aligned}
P &= \left(\frac{C}{1+i} + \frac{C}{(1+i)^2} + \dots + \frac{C}{(1+i)^N} \right) + \frac{M}{(1+i)^N} \\
&= \left(\sum_{n=1}^N \frac{C}{(1+i)^n} \right) + \frac{M}{(1+i)^N} \\
&= C \left(\frac{1 - (1+i)^{-N}}{i} \right) + M(1+i)^{-N}
\end{aligned}$$

where:

F = face values

i_F = contractual interest rate

$C = F * i_F$ = coupon payment (periodic interest payment)

N = number of payments

i = market interest rate, or required yield, or observed / appropriate yield to maturity

M = value at maturity, usually equals face value

P = market price of bond.

$$\text{PV of bond} = \$0/(1+0.12)^1 + \$0/(1+0.12)^2 + \$100,000/(1+0.12)^3$$

$$= \$0 + \$0 + \$71,178.0248$$

$$= \$ 71,178.0248$$

The present value of this bond is \$ 71,178.0248. The investors will be willing to pay this amount for buying this zero coupon bonds.

