Daffodil Institute of Information Technology (DIIT)

Third Year, Sixth Semester

BBA (Honors) in Tourism and Hospitality Management (THM)

Fundamentals of Finance

Chapter-4

Bonds and Convertible Securities

Formula for Bonds and Convertible securities

1. Common Stock/ Equity Share Valuation (Po)

a. Dividend, Zero Growth Model

$$Po = \frac{Do}{K}$$

Where,

Po= Price of Common Stock

Do= Dividend of Common Stock

K= Cost of Common Stock

b. Dividend, Constant Growth Model

$$Po = \frac{D1}{K-g}$$

Where,

Po= Price of Common Stock

K= Cost of Common Stock

D1= Dividend at the end of the year/ ending dividend.

Do=Dividend/ last year dividend/ Current year dividend/ beginning dividend.

g = Dividend Growth Rate

D1= Do (1+g)

c. Dividend, Variable Growth Model

$$Po = \frac{D1}{(1+k)^1} + \frac{D2}{(1+k)^2} + \frac{D3+P3}{(1+k)^3}$$

Where,

Po= Price of Common Stock

K= Cost of Common Stock

D1= Dividend at the end of 1st year

D2= Dividend at the end of 2nd year

D3= Dividend at the end of 3rd year

D4= Dividend at the end of 4th year

P3= Price of common stock at the end of 3rd year

g = Dividend Growth Rat

$$P3=\frac{D4}{K-g}$$

2. Convertible Securities/ Bond Valuation (Vo)

a. Value of Zero Coupon Bond (Vo)

$$Vo=\frac{FV/MV}{(1+k)^n}$$

Where,

FV/MV= Face Value (FV) /Maturity Value (MV)
K= Cost of Common Stock
n= Number of years/ Maturity Period
Vo= Value of Bond

b. Value of Coupon Bond (Vo)

$$Vo= C_p\left[\frac{1}{k}-\frac{1}{k(1+k)^n}\right]+\frac{MV}{(1+k)^n}$$

Where,

C_p = Interest payment on bond/ Coupon payment on bond
MV= Maturity Value of bond
K= Cost of Common Stock
n= Number of years
V= Value of Bond

Or.

$$Vo = Cp\left[\frac{1-\frac{1}{(1+k)^n}}{k}\right]+\frac{FV/MV}{(1+k)^n}$$

Where,

Vo= Value of Bond
Cp= Coupon Interest Payment of bond (CI)/Interest Payment (Ip)/Coupon Payment (Cp)/Annual Interest Payment (I)
FV/= Face value (FV)/ Principal Payment (Pp)/ Par Value (Pv)/ Maturity Value (MV)
K= Cost of capital
N= Number of years/ Maturity Period

3. Yield to Maturity (YTM)/ Nominal Rate of Return (NRR)

$$YTM=\frac{CI(FV-SV)\div N}{(FV+SV)\div 2}\times 100$$

Where,

YTM= Yield to Maturity (YTM)/ Nominal Rate of Return (NRR)
CI= Coupon Interest Payment of bond (CI)/Interest Payment (Ip)/Coupon Payment (Cp)/Annual Interest Payment (I)
FV/= Face value (FV)/ Principal Payment (Pp)/ Par Value (Pv)
SV= Sales Value (SV)/Market Price (Mp)/ Price of the Bond (PB)
N= Number of years (N)/ Maturity Period (N)/ Number of years to maturity (N)

[If Sami Annual Bond then Number of years will be multiplied by 2 and Coupon interest payment will be divided by 2]

$$YTM=\frac{CI(FV-SV)\div N}{(FV+SV)\div 2}\times 100\times 2$$

4. **<u>Yield to Call (YTC)</u>**

YTC= $\frac{CI(CP-SV)\div N}{(CP+SV)\div 2} \times 100$

Where,

CI= Coupon Interest Payment of bond (CI)/Interest Payment (Ip)/Coupon Payment (Cp)/Interest (I)

Cp= Call Price of the bond (Cp)

SV= Sales Value (SV)/Market Price (Mp)/ Price of the Bond (PB)

N= Number of years (N)/ Maturity Period (N)/ Number of years to maturity (N)

[If Sami Annual Bond then Number of years will be multiplied by 2 and Coupon interest payment will be divided by 2]

YTC= $\frac{CI(CP-SV)\div N}{(CP+SV)\div 2} \times 100 \times 2$

5. Effective Annual Yield to Maturity (EA_{YTM})

$EA_{YTM}=\left(1+\frac{YTM}{N}\right)^{N}-1$

6. Yield to Maturity After Tax (YTM_{AT})

YTM_{AT}= YTM (1−T)

Where,

T= Tax rate

7. Current Yield (CY)= $\frac{Coupon\ Payment(Cp)}{NSV}$

Where,

NSV= Sales Values - Floatation Cost

NSV= Net Sales Value

SV= Face value + Premium

SV= Face Value - Discount

8. Capital gain yield= YTM- Current Yield

Or. Capital gain yield= $\frac{P_1-P_0}{P_0}$

9. Dividend Yield/ Dividend of Common stock (D) = $\frac{D_1}{P_0}$

10. **Conversion Ratio= Bond Price ÷ Share Price**
11. **Conversion Value= Conversion Ratio × Conversion Price**
12. **Conversion Price= Conversion Value ÷ Conversion Ratio**
13. **Conversion Premium= Market Price – Conversion Price**
14. **Market Price= Conversion Price + Conversion Premium**

N.B:

1. যে Year পর্যন্ত Dividend Grow করবে সেই Year পর্যন্ত Math হবে।

2. Dividend Constant হওয়ার আগের বছর পর্যন্ত Math হবে।

3. Last যে Year পর্যন্ত Dividend Grow করবে সেই Year এর Share Price বের করতে হবে।

4. যে বছর পর্যন্ত Constant dividend হবে সেই বছর পর্যন্ত d বের করতে হবে। যেমন ৫ম বছর থেকে Constant হলে D_5 পর্যন্ত বের করতে হবে।

5. শেষ D কে (k-g) দ্বারা ভাগ করে তার আগের বছর এর Share Price, like P4 বের করতে হবে।