

# AG215 BUSINESS FINANCE COURSEWORK SUMMARY

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# Company Valuation

## 1.1 Capital Asset Pricing Model

$$r = r_f + \beta(r_m - r_f)$$

## 1.2 Earnings Per Share

### 1.2.1 Ungeared Company

$$EPS_{UG} = \frac{EBIT(1 - T_C)}{N_{UG}}$$

$$T_C = \text{Corporate Tax}$$

### 1.2.2 Geared Company

$$EPS_G = \frac{(EBIT - r_B(B_G))(1 - T_C)}{N_G}$$

## 1.3 Earnings Yield

$$EY = \frac{EPS}{P_t}$$

## 1.4 Rate on Equity

### 1.4.1 Ungeared Company

$$r_{S(UG)} = \frac{EBIT(1 - T_C)}{V_{UG}}$$

### 1.4.2 Geared Company

$$r_{S(G)} = \frac{(EBIT - r_B(B_G))(1 - T_C)}{S_G}$$

### 1.4.3 Equity Company

$$r_S = \frac{D_1(1 + g)}{P_0} + g$$

## 1.5 Rate on Debt

$$R_{B(G)} = \frac{(EBIT - r_B(B_G))(1 - T_C)}{V_G}$$

## 1.6 Value of Company

### 1.6.1 Geared Company

$$V_G = S_G + B_G$$

### 1.6.2 Ungeared Company

$$V_{UG} = P_0(N_{UG})$$

$$\therefore V_G = V_{UG} + B_G(T_C)$$

### 1.7 Rate on Weighted Average Cost of Capital

$$r_{WACC} = r_S\left(\frac{S_G}{B_G}\right) + (r_B\left(\frac{B_G}{V_G}\right)(1 - T_C))$$

## Working Capital

### 2.1 Annual Holding Cost

$$AHC = \frac{1}{2} Q C_H$$

$C_H$  = Unit Cost to Hold

$Q$  = Order Quantity

### 2.2 Annual Order Cost

$$AOC = \frac{D}{Q} C_0$$

$D$  = Demand

$C_0$  = Unit Cost to Order

$$\therefore TAC = \left(\frac{1}{2} Q C_H\right) + \left(\frac{D}{Q} C_0\right)$$

### 2.3 Optimal Holding Quantity

$$Q^* = \sqrt{\frac{2DC_0}{C_H}}$$

### 2.4 Optimal Holding Period

$$\text{Optimal Period} = \frac{Q^*}{\frac{D}{365}}$$

### 2.5 Optimal Cash

$$C^* = \sqrt{\frac{2(ACR)(TC)}{r}}$$

$ACR$  = Annual Cash Required

$TC$  = Transaction Costs

### 2.6 Optimal Cash Period

$$\text{Optimal Period} = \frac{C^*}{\frac{ACR}{365}}$$

## 2.7 Optimal Target Cash Balance (All Daily)

$$Z^* = \sqrt{\frac{3(TC)(\sigma^2)}{4r}} + L$$

$$U^* = \text{Optimal Upper Cash Balance} = 3Z^* - 2L$$

$U$  = Upper Cash Limit

$L$  = Lower Cash Limit

$\sigma^*$  = Variance of CFs

$$r = \sqrt[365]{EAR + 1} - 1$$

$$\therefore \text{Average Cash} = \frac{4Z - L}{3}$$

## Capital Budgeting & Leasing

### 3.1 Basic Capital Budget

- Initial Costs
- Maintenance Costs
- Tax Savings on Maintenance Costs
- Scrap Value
- Tax Savings on Scrap Value

#### 3.1.1 Tax Saving

$$\text{Tax Saving} = \text{Tax Depreciation} * T_C$$

#### 3.1.2 Straight Line Depreciation

$$\text{Straight Line Tax Depreciation} = \frac{\text{Initial Cost} - \text{Scrap Value}}{t}$$

#### 3.1.3 Equivalent Annual Cost

$$EAC = \frac{NPV}{PVAF_{r,n}}$$

#### 3.1.4 Rate of Depreciation

$$r = r_B(1 - T_C)$$

### 3.2 Leases

#### 3.2.1 Net Advantage to Leasing

$$NAL = PV(\text{Cost to Lease}) - PV(\text{Cost to Buy})$$

## Raising Equity

### 4.1 Taking Up Rights

#### Step 1

$$P_s = P_0(1 - d)$$

$d$  = Discount (Not Rate)

$P_s$  = New Offer Share Price

$P_0$  = Current Share Price

$P_x$  = Share Price Day After Offer

#### Step 2

$$N^* = \frac{F}{P_s}$$

$F$  = Funds to Be Raised

$N^*$  = Number of New Shares Issued

$N$  = Number of Current Shares

#### Step 3

$$\frac{N^*}{N} = \text{Ratio Offered}$$

To Lowest Denominator

“Offered  $N^*$  (New) for Every  $N$  (Old)”

#### Step 4

$$P_{x(Pre-Issue)} = \frac{(P_0)(N) + F}{(N + N^*)}$$

$$P_x = \frac{(P_0)(N) + (P_s)(N^*)}{(N + N^*)}$$

### Step 5

$$\text{Rights Value} = P_x - P_s$$

If  $P_x > P_s$ : Capital Gain

If  $P_x < P_s$ : Capital Loss

## 4.2 Selling Rights

### Step 1

- Find Original Shares Owned:

$$P_0 N = x$$

- Find Price to Sell New:

$$P_x - P_s = \text{Rights Value}$$

- Find Proportion Entitled To:

$$\frac{N^*}{N}$$

- Find Value of New:

$$(P_x - P_s)N$$

- Determine Cost:

$$\text{Cost} = (P_0 N) - ((P_x - P_s)N^*)$$

$$\text{Should} = (P_0 N) + (P_s N^*)$$

### Step 2

- Find Day-After Value of Only Current Shares:

$$P_x N$$

- Hence, Answers Should Be (=) Such That: “*Value after selling new rights (=) value to buy current amount of shares owned, the day after*”

## 4.3 Sell & Take-Up (Tail Swallowing)

$$Y = \frac{(P_s N^*)}{P_x}$$

$Y$  = Optimal Amount of Rights to Sell

Sell Newly Entitled Rights Proportion  $Y$  to  $P_s$

To Get Money for  $(N - Y)$  New Shares At  $P_x$



**Step 1 (Cost)**

- Own

$$N @ P_0$$

- Sell

$$Y @ (P_x - P_s)$$

- Purchase

$$(N^* - Y) @ P_s$$

$$\text{Cost} = P_0 N + ((P_x - P_s) Y) - (P_s(N^* - Y))$$

$$P_0 N = \text{Original}$$

$$(P_x - P_s) Y = \text{Sold Rights}$$

$$P_s(N^* - Y) = \text{Taken Rights}$$

$$(P_x - P_s Y) \text{ Should} = P_s(N^* - Y)$$

**Step 2 (Value)**

$$\text{Own } (N + N^* - Y) @ P_x$$

$$\therefore \text{Value} = P_x(N + N^* - Y)$$