AG215 Business Finance
Coursework Summary

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1 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

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

2 Working Capital

2.1 Annual Holding Cost

$$\text{AHC} = \frac{1}{2}\text{QC}_\text{H}$$

C_H = Unit Cost to Hold

Q = Order Quantity

2.2 Annual Order Cost

$$\text{AOC} = \frac{\text{D}}{\text{Q}}\text{C}_0$$

D = Demand

C_0 = Unit Cost to Order

$$\therefore \text{TAC} = (\frac{1}{2}\text{QC}_\text{H}) + (\frac{\text{D}}{\text{Q}}\text{C}_0)$$

2.3 Optimal Holding Quantity

$$\text{Q}^* = \sqrt{\frac{2\text{DC}_0}{\text{C}_\text{H}}}$$

2.4 Optimal Holding Period

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

2.5 Optimal Cash

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

ACR = Annual Cash Required

TC = Transaction Costs

2.6 Optimal Cash Period

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

2.7 Optimal Target Cash Balance (All Daily)

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

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

U = Upper Cash Limit

L = Lower Cash Limit

L = Lower Cash Limit

σ^* = Variance of CFs

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

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

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

$$\text{Tax Saving} = \text{Tax Depreciation} * \text{T}_\text{C}$$

3.1.2 Straight Line Depreciation

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

3.1.3 Equivalent Annual Cost

$$\text{EAC} = \frac{\text{NPV}}{\text{PVAF}_{\text{r,n}}}$$

3.1.4 Rate of Depreciation

$$\text{r} = \text{r}_\text{B}(1 - \text{T}_\text{C})$$

3.2 Leases

3.2.1 Net Advantage to Leasing

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

4 Raising Equity

4.1 Taking Up Rights

4.1.1 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

4.1.2 Step 2

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

F = Funds to Be Raised
N^* = Number of New Shares Issued
N = Number of Current Shares

4.1.3 Step 3

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

To Lowest Denominator
"Offered N^* (New) for Every N (Old)"

4.1.4 Step 4

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

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

4.1.5 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

4.2.1 Step 1

- Find Original Shares Owned:

$$\mathrm{P_0N = x}$$

- Find Price to Sell New:

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

- Find Proportion Entitled To:

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

- Find Value of New:

$$\mathrm{(P_x - P_s)N}$$

- Determine Cost:

$$\mathrm{Cost = (P_0N) - ((P_x - P_s)N^*)}$$

$$\mathrm{Should = (P_0N) + (P_sN^*)}$$

4.2.2 Step 2

- Find Day-After Value of Only Current Shares:

$$\mathrm{P_xN}$$

- 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)

$$\mathrm{Y = \frac{(P_sN^*)}{P_x}}$$

Y = Optimal Amount of Rights to Sell
Sell Newly Entitled Rights Proportion Y to $\mathrm{P_s}$
To Get Money for $\mathrm{(N - Y)}$ New Shares At $\mathrm{P_x}$

4.3.1 Step 1 (Cost)

- Own

$$N \text{ @ } P_0$$

- Sell

$$Y \text{ @ } (P_x - P_s)$$

- Purchase

$$(N^* - Y) \text{ @ } P_s$$

$$\text{Cost} = P_0N + ((P_x - P_s)Y) - (P_s(N^* - Y))$$

P_0N = Original
$(P_x - P_s)Y$ = Sold Rights
$P_s(N^* - Y)$ = Taken Rights
$(P_x - P_sY)$ Should = $P_s(N^* - Y)$

4.3.2 Step 2 (Value)

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

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