# Managerial Finance
# FRL 3000
# Formula Sheet
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$$\text{Average Tax Rate} = \frac{\text{Tax Liability}}{\text{Taxable Income}}$$

Cash Flow from Assets = Cash Flow to Creditors + Cash Flow to Stockholders

| Operating Cash Flow | Interest Paid | Dividend Paid |
|---|---|---|
| - ΔNet Working Capital | - Net New Borrowing | - Net New Equity |
| - Net Capital Spending | Cash Flow to Creditors | Cash Flow to Stockholders |
| Cash Flow from Assets | | |

| EBIT | Ending Net Fixed Assets |
|---|---|
| + Depreciation | - Beginning Net Fixed Assets |
| - Taxes | + Depreciation . |
| Operating Cash Flow | Net Capital Spending |

Ending Net Working Capital (CA – CL)
- Beginning Net Working Capital (CA-CL)
Change in Net Working Capital

| Ending L.T. Debt | Ending Equity |
|---|---|
| - Beginning L.T. Debt | - Beginning Equity |
| Net New Borrowing | - Addition to Retained Earnings |
| | Net New Equity |

$$\text{Internal Growth Rate} = \frac{\text{ROA} * b}{1 - (\text{ROA} * b)}$$

$$\text{Sustainable Growth Rate} = \frac{\text{ROE} * b}{1 - (\text{ROE} * b)}$$

Earnings Retention Ratio = b = 1 − Dividend Payout Ratio

$$FV = PV(1+r)^t = PV * FVIF_{r,t}$$

$$PV = \frac{FV}{(1+r)^t} = FV * PVIF_{r,t}$$

$$FV = PV(1+\frac{r}{m})^{m*t} = PV * FVIF_{\frac{r}{m},mt}$$

$$PV = \frac{FV}{(1+\frac{r}{m})^{m*t}} = FV * PVIF_{\frac{r}{m},mt}$$

$$PV = FV * e^{-r*t}$$

$$EAR = \left(1 + \frac{APR}{m}\right)^m - 1$$

$$FV = PV * e^{r*t}$$

$$PVA = C * \left[\frac{1}{r} - \frac{1}{r*(1+r)^t}\right] = C * PVIFA_{r,t}$$

$$FVA = C * \left[\frac{(1+r)^t - 1}{r}\right] = C * FVIFA_{r,t}$$

$$FVA = C_{due} * \left[ \frac{(1+r)^t - 1}{r} \right] * (1+r) = C_{due} * FVIFA_{r,t} * (1+r)$$

$$PVA = C_{due} * \left[ \frac{1}{r} - \frac{1}{r * (1+r)^t} \right] * (1+r) = C_{due} * PVIFA_{r,t} * (1+r)$$

**Reminder:** In the case of frequent compounding or discounting, divide the nominal rate (APR) by "m" and multiply period by "m". "m" is number of times interest is compounded/discounted in one period. Also, annuity interval must match the frequency (m) of compounding or discounting.

$$P_0 = \frac{D}{r}$$

$$P_0 = \frac{D_1}{r - g}$$

$$r = \frac{D_1}{P_0} + g$$

$$D_n = D_0 * (1 + g)^n$$

$$(1+R) = (1+r)*(1+h)$$

$$Bond\ Value = C * \left[ \frac{1}{r} - \frac{1}{r * (1+r)^t} \right] + \frac{FV}{(1+r)^t}$$

$$P_0 = \frac{D_1}{(1+r)^1} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^3} + ........$$

$$P_0 = \frac{D_1}{(1+r)^1} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^t} + ..... + \frac{D_n}{(1+r)^n} + \left[ \frac{D_{n+1}}{r - g_c} * \frac{1}{(1+r)^n} \right]$$

$$Coupon\ Rate = \frac{Coupon}{FV}$$

$$Current\ Yield = \frac{Coupon}{V_B}$$

$$V_B = C * \left[ \frac{1}{YTM} - \frac{1}{YTM * (1+YTM)^t} \right] + \frac{FV}{(1+YTM)^t}$$

$$NPV = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} + (CF_0)$$

$$\sum_{t=1}^{n} \frac{CF_t}{(1+IRR)^t} + (CF_0) = 0$$

$$PI = \frac{\sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}}{|CF_0|}$$

$$PBP = t + \frac{|Cum\ CF_t|}{CF_{t+1}}$$

$$\sum_{t=o}^{n} \frac{COF_t}{(1+r_F)^t} = \frac{\sum_{t=1}^{n} CIF_t * (1+r_I)^{n-t}}{(1+MIRR)^n} \qquad PV_{Perpetuity} = \frac{C}{r}$$

$$ARR = \frac{\dfrac{\sum_{t=1}^{n} Net\ Income_t}{n}}{\dfrac{Beginning\ Value\ Investment + Ending\ Value\ Ivestment}{2}}$$

**Operating Cash Flow** = (Sales–Variable Cost–Fixed Cost–Depreciation)(1-T) + Depreciation

**Operating Cash Flow** = EBIT + Depreciation – Taxes

**Operating Cash Flow** = (Sales – OC – Depreciation)*(1-T) + Depreciation

**Operating Cash Flow** = Net Income + Depreciation

**Operating Cash Flow** = (Sales – OC)*(1 – T) + T*Depreciation

**Book Value of Asset** = Original Cost – Accumulated Depreciation

$$Straight-Line\ Depreciation = \frac{Original\ Cost - Salvage\ Value}{n}$$

$$Return\ on\ Capital = \frac{Net\ Income + Interest + Preferred\ Dividnd}{Debt + Common\ Equity + Preferred\ Stock}$$

$$Internal\ Growth\ Rate = \frac{ROA*b}{1-(ROA*b)}$$

$$Sustainable\ Growth\ Rate = \frac{ROE*b}{1-(ROE*b)}$$

Earnings Retention Ratio = b = 1 – Dividend Payout Ratio

$$\textbf{\textit{Dividend Yield}} = \frac{D_{t+1}}{P_t}$$

$$R = \frac{D_t + P_t - P_{t-1}}{P_{t-1}}$$

$$(1+R) = (1+r) \times (1+h)$$

$$R = r + h$$

$$R(T) = \frac{T-1}{N-1} \times \textit{Geometric Average} + \frac{N-T}{N-1} \times \textit{Arithmetic Average}$$

$$E(R) = \sum_{s=1}^{n} \text{Pr.}_s * R_s$$

$$\sigma^2 = \sum_{s=1}^{n} \text{Pr.}_s * [R_s - E(R)]^2$$

$$\sigma = \sqrt{\sigma^2} = \sqrt{\sum_{s=1}^{n} \text{Pr}_s * [R_s - E(R)]^2}$$

$$E(R_p) = W_A * E(R_A) + W_B * E(R_B)$$

$$R = E(R) + U$$

$$\beta_p = \sum_{j=1}^{n} W_j * \beta_j$$

$$W_A + W_B + ..... + W_N = 1$$

$$E(R_A) = R_f + [E(R_M) - R_f] * \beta_A$$

$$Slope = \frac{E(R_j) - R_f}{\beta_j}$$

$$P_t = C \left[ \frac{1}{R_D} - \frac{1}{R_D(1+R_D)^t} \right] + \frac{FV}{(1+R_D)^t}$$

$$R_E = \frac{D_1}{P_0} + g = \frac{D_0 * (1+g)}{P_0} + g$$

$$R_E = R_f + \beta_E * (R_M - R_f)$$

$$R_P = \frac{D}{P_0}$$

$$WACC = \left(\frac{E}{V}\right) * R_E + \left(\frac{P}{V}\right) * R_P + \left(\frac{D}{V}\right) * R_D * (1 - t_c)$$

$$V = E + P + D$$

$$WACC = W_E * R_E + W_P * R_P + W_D * R_D * (1 - t_c)$$

$$W_E + W_P + W_D = 1$$

$$YTM_{\text{approximate}} = R_D = \frac{Coupon + \dfrac{FV - P_0}{n}}{\dfrac{FV + 2P_0}{3}}$$

$$f_A = \frac{E}{V} \times f_e + \frac{D}{V} \times f_D$$

$$FC_1 : FC_2 = \frac{FC_1}{\$} \times \frac{\$}{FC_2}$$

$$S = FC : \$$$

$$P_F = S \times P_{US}$$

$$\frac{[E(S_1) - S_0]}{S_0} = h_{FC} - h_{US}$$

$$E(S_1) = S_0 \times [1 + (h_{FC} - h_{US})]$$

$$\frac{F_1 - S_0}{S_0} = R_{FC} - R_{US}$$

$$F_1 = S_0 \times [1 + (R_{FC} - R_{US})]$$

$$F_t = S_0 \times [1 + (R_{FC} - R_{US})]^t$$

$$E(S_t) = S_0 \times [1 + (R_{FC} - R_{US})]^t$$

$$R_{US} - h_{US} = R_{FC} - h_{FC}$$

**Modified Accelerated Cost Recovery System**

| | Property Class | | |
|---|---|---|---|
| Year | 3-Year | 5-Year | 7-Year |
| 1 | 33.33% | 20.00% | 14.29% |
| 2 | 44.44% | 32.00% | 24.49% |
| 3 | 14.82% | 19.20% | 17.49% |
| 4 | 7.41% | 11.52% | 12.49% |
| 5 | | 11.52% | 8.93% |
| 6 | | 5.76% | 8.93% |
| 7 | | | 8.93% |
| 8 | | | 4.45% |