AG312 Advanced Corporate Finance & Financial Markets Coursework Summary

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1 Real Options

1.1 Initial NPV

$$\mathrm{NPV_I} = -\mathrm{CF_0} + \sum \frac{\mathrm{p_s CF_{s_t}} + \mathrm{p_f CF_{f_t}}}{(1+\mathrm{r})^{\mathrm{t}}}$$

Where:

$\mathrm{p_s}$ =Probability of a Successful Project

$\mathrm{p_f}$ =Probability of a Failed Project

1.2 Individual NPVs

$$\mathrm{NPV_s} = -\mathrm{CF_0} + \sum \frac{\mathrm{CF_{s_t}}}{(1+\mathrm{r})^{\mathrm{t}}}$$

$$\mathrm{NPV_f} = -\mathrm{CF_0} + \sum \frac{\mathrm{CF_{f_t}}}{(1+\mathrm{r})^{\mathrm{t}}} + ... + \frac{\mathrm{CF_{f_t}} + \mathrm{V_{svg}}}{(1+\mathrm{r})^{\mathrm{N}}}$$

Where:

$\mathrm{V_s vg}$ =Salvage Value

1.3 NPV of Abandonment Project

$$\mathrm{NPV_{AO}} = \mathrm{p_s NPV_s} + \mathrm{p_f NPV_f}$$

1.4 Value of Abandonment Option

$$\mathrm{V_{AO}} = \mathrm{NPV_{AO}} - \mathrm{NPV_I}$$

2 Call Options (Black & Scholes)

2.1 Normal Probability Distribution Function I

$$d_1 = \frac{\ln \frac{S_t}{K} + t\left(r + \frac{\sigma^2}{2}\right)}{\sigma\sqrt{t}}$$

2.2 Normal Probability Distribution Function II

$$d_2 = d_1 - \sigma\sqrt{t}$$

2.3 Call Option Price

$$C = S_t N(d_1) - Ke^{-rt}N(d_2)$$

Where:

C = Call Option Price

S = Current Asset Price (Equity)

K = Strike Price (Debt)

r = Risk-Free Interest Rate

t = Time-to-Maturity

N = Relative Normal Distribution

e = A Constant

2.4 Value of Outstanding Debt

$$V_D = S - C$$

2.5 Interest Rate on Outstanding Debt

$$r_D = \left(\frac{K}{V_D}\right)^{\frac{1}{t}} - 1$$

3 International Capital Budgeting

3.1 Domestic Interest Rate (Fisher Hypothesis)

$$(1 + \mathrm{r})(1 + \pi) = (1 + \mathrm{i})$$

$$\mathrm{r} = \frac{1 + \mathrm{i}}{(1 + \pi)} - 1$$

Where:

r = Real Domestic Interest Rate

i = Nominal Domestic Interest Rate

π = Domestic Inflation Rate

3.2 Foreign Interest Rate (Fisher Hypothesis)

$$\frac{1 + \mathrm{i}}{(1 + \pi)} = \frac{(1 + \mathrm{i}^*)}{1 + \pi^*}$$

$$\mathrm{i}^* = \frac{(1 + \mathrm{i})(1 + \pi^*)}{(1 + \pi)} - 1$$

Where:

r^* = Real Foreign Interest Rate

i^* = Nominal Foreign Interest Rate

π^* = Foreign Inflation Rate

Real RAtes Are Equal ($\mathrm{r} = \mathrm{r}^*$)

3.3 NPV in Foreign Terms

$$\mathrm{NPV}^* = -\mathrm{CF}_0^* + \sum \frac{\mathrm{CF}_\mathrm{t}^*}{(1 + \mathrm{i}^*)^\mathrm{t}}$$

3.4 NPV Conversion to Domestic Currency

$$\mathrm{NPV} = \mathrm{E}^*(\mathrm{NPV}^*)$$

Where:

E = Relative Exchange Rate

4 Uncovered Interest Parity

$$(1 + \mathrm{i}) = (1 + \mathrm{i}^*)\frac{\mathrm{E}}{\mathrm{E}^{\mathrm{e}}}$$

$$\mathrm{E}^{\mathrm{e}} = \frac{\mathrm{E}}{\frac{(1+\mathrm{i})}{(1+\mathrm{i}^*)}} \qquad\qquad \mathrm{E}^{\mathrm{e}^*} = \frac{\mathrm{E}^{-1}}{\frac{(1+\mathrm{i}^*)}{(1+\mathrm{i})}}$$

Where:

E^{e} = Expected Relative Exchnage Rate

$\mathrm{E}^{-1} = \mathrm{E}^*$ = Forein Exchange Rate

5 Domestic Capital Budget

$$\text{NPV} = -\text{CF}_0 + \sum \frac{\text{CF}_\text{t}}{(1+\text{K})^\text{t}} + \frac{\text{TV}_\text{N}}{(1=\text{K})^\text{N}}$$

Where:

K = Weighted Average Cost of Capital

TV_N = Terminal Value After Tax of Net Working Capital

If:

NPV > 0: Accept Project

NPV < 0: Reject Project

5.1 Adjusted Present Value Model

$$\text{APV} = -\text{CF}_0 + \sum \left(\frac{\text{CF}_\text{t}(1-\tau)}{(1+\text{K})^\text{t}} + \frac{\tau \text{D}_\text{t}}{(1+\text{i})^\text{t}} + \frac{\tau \text{I}_\text{t}}{(1+\text{i})^\text{t}} \right) + \frac{\text{TV}_\text{N}}{(1+\text{K})^\text{N}}$$

Where:

i = Interest Rate on Finance Method

τ = Tax Rate

τI_t = Tax on Interest

$\text{i}(\tau \text{I}_\text{t})$ = Tax Shield on Interest