

AG312 ADVANCED CORPORATE FINANCE &  
FINANCIAL MARKETS  
COURSEWORK SUMMARY

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# 1 Real Options

## 1.1 Initial NPV

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

**Where:**

$p_s$  = Probability of a Successful Project

$p_f$  = Probability of a Failed Project

## 1.2 Individual NPVs

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

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

**Where:**

$V_{svg}$  = Salvage Value

## 1.3 NPV of Abandonment Project

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

## 1.4 Value of Abandonment Option

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

## 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

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

**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)

$$(1 + r)(1 + \pi) = (1 + i)$$

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

**Where:**

$r$  = Real Domestic Interest Rate

$i$  = Nominal Domestic Interest Rate

$\pi$  = Domestic Inflation Rate

### 3.2 Foreign Interest Rate (Fisher Hypothesis)

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

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

**Where:**

$r^*$  = Real Foreign Interest Rate

$i^*$  = Nominal Foreign Interest Rate

$\pi^*$  = Foreign Inflation Rate

Real Rates Are Equal ( $r = r^*$ )

### 3.3 NPV in Foreign Terms

$$NPV^* = -CF_0^* + \sum \frac{CF_t^*}{(1 + i^*)^t}$$

### 3.4 NPV Conversion to Domestic Currency

$$NPV = E^*(NPV^*)$$

**Where:**

$E$  = Relative Exchange Rate

## 4 Uncovered Interest Parity

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

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

**Where:**

$E^e$  = Expected Relative Exchnage Rate

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

## 5 Domestic Capital Budget

$$NPV = -CF_0 + \sum \frac{CF_t}{(1 + K)^t} + \frac{TV_N}{(1 + K)^N}$$

**Where:**

K = Weighted Average Cost of Capital

TV<sub>N</sub> = Terminal Value After Tax of Net Working Capital

**If:**

NPV > 0: Accept Project

NPV < 0: Reject Project

### 5.1 Adjusted Present Value Model

$$APV = -CF_0 + \sum \left( \frac{CF_t(1 - \tau)}{(1 + K)^t} + \frac{\tau D_t}{(1 + i)^t} + \frac{\tau I_t}{(1 + i)^t} \right) + \frac{TV_N}{(1 + K)^N}$$

**Where:**

i = Interest Rate on Finance Method

τ = Tax Rate

τI<sub>t</sub> = Tax on Interest

i(τI<sub>t</sub>) = Tax Shield on Interest