Call & Put Option Profits and Payoffs

- $c_0, c_t = price\ of\ the\ call\ option\ at\ time\ 0\ and\ T$
- $p_0, p_t = price\ of\ the\ call\ option\ at\ time\ 0\ and\ T$
- $X = exercise\ price\ or\ strike\ price$
- $S_0, S_t = price\ of\ the\ call\ option\ at\ time\ 0\ and\ T$
- $pl = profit\ ort\ loss\ from\ the\ trasaction$

Long Call

- $Value\ at\ expiration\ \{c_T = \max(0, S_T - X)\}$
  - $C_T = 0\ if\ S_T \leq X$
  - $C_T = S_T - X\ if\ S_T > X$
- $Profit\ at\ expiration$
  - $pl = -c_0\ if\ S_T \leq X$
  - $pl = S_T - X - c_0\ if\ S_T > X$
- $Breakeven\ \{value\ of\ S_T\ denoted\ as\ S_{T^*}\ where\ pl = 0\}$
  - $S_{T^*} = \mathrm{X} + c_0$
- $Maximum\ profit = \infty$
- $Maximum\ loss = c_0$

Short Call

- $Value\ at\ expiration\ \{p_T = \max(0, X - S_T)\}$
  - $C_T = 0\ if\ S_T \leq X$
  - $C_T = X - S_T + c_0\ if\ S_T > X$
- $Profit\ at\ expiration$
  - $pl = c_0\ if\ S_T \leq X$
  - $pl = X - S_T + c_0\ if\ S_T > X$
- $Breakeven\ \{value\ of\ S_T\ denoted\ as\ S_{T^*}\ where\ pl = 0\}$
  - $S_{T^*} = \mathrm{X} + c_0$
- $Maximum\ profit = c_0$
- $Maximum\ loss = \infty$

Long Put

- $Value\ at\ expiration\ \{c_T = \max(0, S_T - X)\}$
  - $P_T = X\ -\ S_T\ if\ S_T\ < X$
  - $P_T = 0\ if\ S_T\ \geq X$
- $Profit\ at\ expiration$
  - $pl\ = X\ - S_T - \ p_0\ if\ S_T\ < X$
  - $pl\ = - p_0\ if\ S_T\ \geq X$
- $Breakeven\ \{value\ of\ S_T\ denoted\ as\ S_{T^*}\ where\ pl = 0\}$
  - $S_{T^*} = \mathrm{X}\ -\ p_0$
- $Maximum\ profit = \ X - \ p_0$
- $Maximum\ loss = \ p_0$

Short Put

- $Value\ at\ expiration\ \{p_T = \max(0, X - \ S_T)\}$
  - $P_T = S_T\ -\ X\ if\ S_T\ < X$
  - $P_T = 0\ if\ S_T\ \geq X$
- $Profit\ at\ expiration$
  - $pl\ = X\ - S_T + \ p_0\ if\ S_T\ < X$
  - $pl\ = p_0\ if\ S_T\ \geq X$
- $Breakeven\ \{value\ of\ S_T\ denoted\ as\ S_{T^*}\ where\ pl = 0\}$
  - $S_{T^*} = \mathrm{X} - \ p_0$
- $Maximum\ profit = \ p_0$
- $Maximum\ profit = \ X - \ p_0$