Derivatives Formulas

Put - Call Parity

$$C - P = V^T(F_{0,T} - K) = S_0 - V^T K$$

Price Prepaid Forward

$$F^P_{0,T} = S_0 \quad \text{or} \quad F^P_{0,T} = S_0 e^{-\delta T} \text{ with Div.}$$

Price Forward

$$F_{0,T} = S_0 e^{rT} \quad \text{or} \quad F_{0,T} = S_0 e^{(r-\delta)T} \text{ with Div.}$$

Rate Relationships:

$r_0(0,n)$ = Spot rate (yield) of n-year zero-coupon bond

$$P(0,n) = [1 + r_0(0,n)]^{-n}$$

Price of 0-coupon bond expiry n redemption 1

$$[1 + r_0(n-1,n)] = \frac{[1 + r_0(0,n)]^n}{[1 + r_0(0,n-1)]^{n-1}} = \frac{P(0,n-1)}{P(0,n)}$$

$r_0(n-1,n)$ is one-yr implied forward rate

$$\text{Swap Price} = \sum_j \left[\frac{P(0,t_j)}{\sum_{j'} P(0,t_{j'})} \right] F_{0,t_j}$$

$$\text{Swap Rate} = \sum_t \left[\frac{P(0,t)}{\sum_{t'} P(0,t')} \right] r_0(t-1,t)$$