

Illustration of payoffs & profit and @ losses of elementary European derivatives

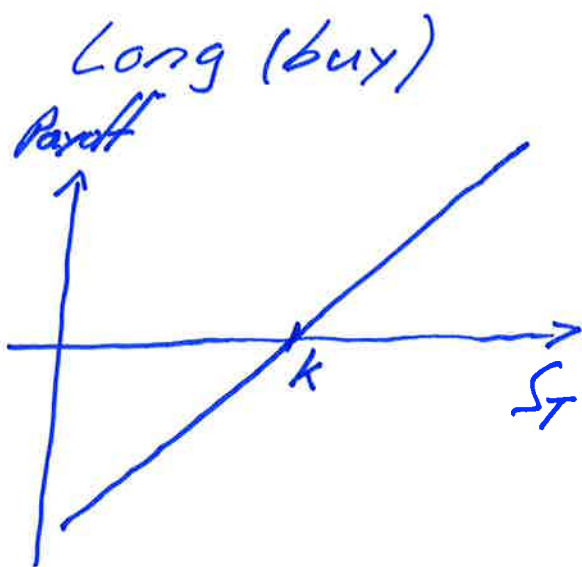
- European vs American Options

- European: Can be exercised at maturity

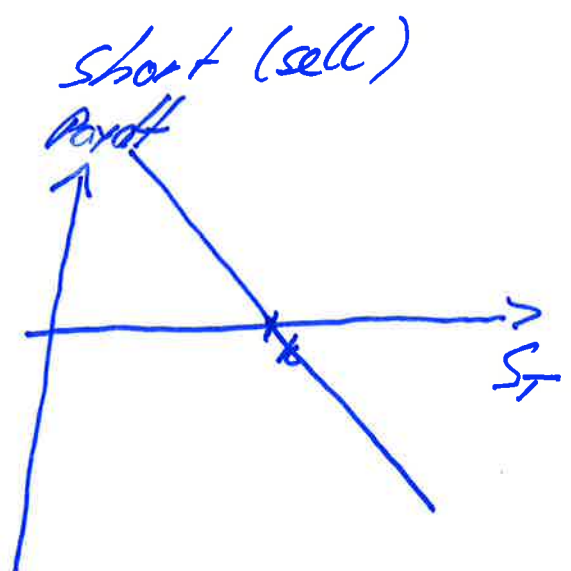
- American: Can be exercised until maturity

- Forward contracts:

The right and obligation to buy the asset (S_T) at maturity T for the price k .



Payoff: $S_T - k$



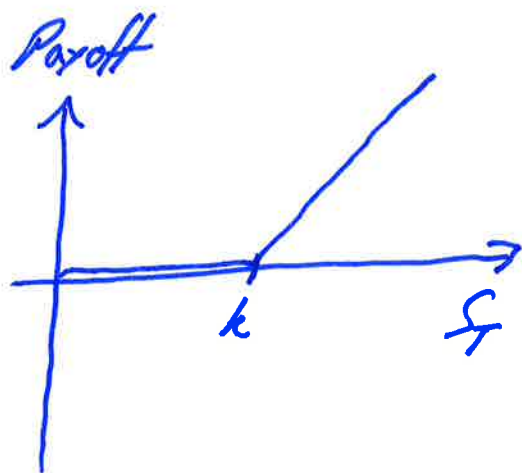
Payoff: $k - S_T$

②

European call options

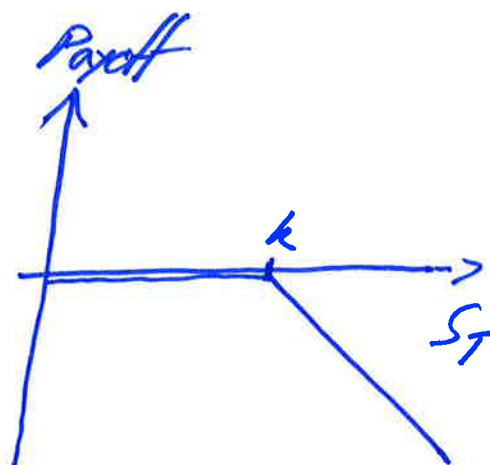
The right but not the obligation to buy the asset (S_T) at maturity T for the price k .

Long (buy)



$$\text{Payoff: } (S_T - k)_+ \\ \text{"} \\ \max(S_T - k, 0)$$

Short (sell)

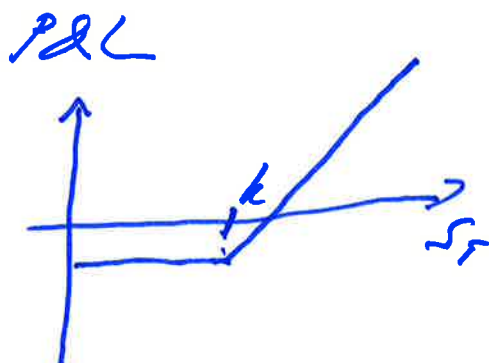


$$\text{Payoff: } -(S_T - k)_+ \\ \text{"} \\ -\max(S_T - k, 0)$$

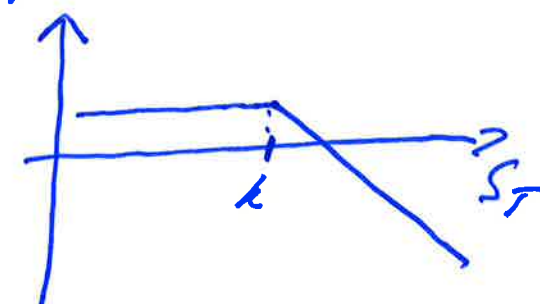
For options, a premium is paid at $t=0$ (the beginning of the contract).

Premium and payoff result in the profit and losses (P&L):

Long (buy)



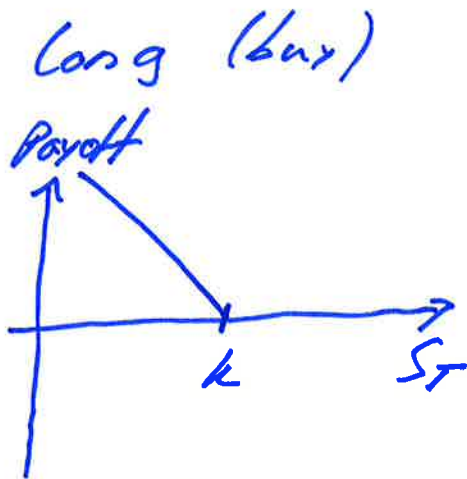
Short (sell)



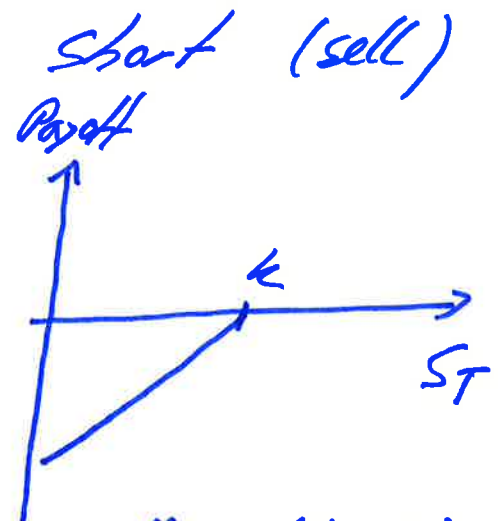
(3)

European put options

The right but not the obligation to sell the asset (S_T) at maturity T for the price k .



Payoff: $(k - S_T)_+$
 " $\max(k - S_T, 0)$



Payoff: $-(k - S_T)_+$
 " $-\max(k - S_T, 0)$

Also here premium and payoff result in the profit and losses (P&L):

