

Derivatives
Problem Set 1
Fundação Getulio Vargas

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- 1) Suppose that a European put option to sell a share for \$60 costs \$8 and is held until maturity. Under what circumstances will the seller of the option (the party with the short position) make a profit? Under what circumstances will the option be exercised? Draw a diagram illustrating how the profit from a short position in the option depends on the stock price at maturity of the option.
- 2) A trader buys a call option with a strike price of \$45 and a put option with a strike price of \$40. Both options have the same maturity. The call costs \$3 and the put costs \$4. Draw a diagram showing the variation of the trader's profit with the asset price.
- 3) What is a lower bound for the price of a 2-month European put option on a nondividend-paying stock when the stock price is \$58, the strike price is \$65, and the riskfree interest rate is 5% per annum?
- 4) The price of a European call that expires in 6 months and has a strike price of \$30 is \$2. The underlying stock price is \$29, and a dividend of \$0.50 is expected in 2 months and again in 5 months. Interest rates (all maturities) are 10%. What is the price of a European put option that expires in 6 months and has a strike price of \$30?
- 5) The price of an American call on a non-dividend-paying stock is \$4. The stock price is \$31, the strike price is \$30, and the expiration date is in 3 months. The risk-free interest rate is 8%. Derive upper and lower bounds for the price of an American put on the same stock with the same strike price and expiration date.
- 6) Discuss the next expression "European calls written in terms of the same underlying, with the same strike and maturity, are more expensive than their respective put"