# Derivative Instruments
# Paris Dauphine University - Master IEF (272)

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Exercises Chapter 9

**Exercise 1** *What is a lower boundfor the price of a four-month call option on a non-dividend-paying stock when the stock price is \$28, the strike price is \$25, and the risk-free interest rate is 8% per annum ?*

**Exercise 2** *The price of a non-dividend paying stock is \$19 and the price of a three-month European call option on the stock with a strike price of \$20 is \$1. The risk-free rate is 4% per annum.*

*What is the price of a three-month European put option with a strike price of \$20 ?*

**Exercise 3** *What is a lower bound for the price of a two-month European put option on a non-dividend- paying stock when the stock price is \$58, the strike price is \$65, and the risk-free interest rate is 5%per annum ?*

**Exercise 4** *A one-month European put option on a non-dividend-paying stock is currently selling for \$2.50.*

*The stock price is \$47, the strike price is \$50, and the risk-free interest rate is 6% per annum.*

*What opportunities are there for an arbitrageur ?*

**Exercise 5 (Done)** *The price of a European call that expires in six 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 two months and again in five months.*

*The term structure is flat, with all risk-free interest rates being 10%.*

*What is the price of a European put option that expires in six months and has a strike price of \$30 ?*

**Exercise 6 (Done)** *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 three 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.*

**Exercise 7** *Prove the Proposition of slide 24. (Hint : For the first part of the relationship consider (a) a portfolio consisting of a European call plus an amount of cash equal to K and (b) a portfolio consisting of an American put option plus one share.)*