8.09 Option Replication Using Put–Call Parity

Question 1
A trader has a short position in an asset, owns a call option on the same asset, and has a long position in a T-bill. Based on put-call parity, the combined positions are *best* described as a synthetic:
A. long put.
B. long call.
C. long asset.

Question 2
Which of the following transactions *best* replicates a long European call option?
A. Buying a put and a share of stock and selling a zero-coupon bond
B. Buying a zero-coupon bond and selling a put and a share of stock
C. Buying a share of stock and selling a put and a zero-coupon bond

Question 3
A portfolio consists of a protective put position. For put-call parity to hold, a portfolio of equal value *most appropriately* consists of a call with the same strike and expiration as the put and:
A. a zero-coupon bond.
B. a long position in the underlying asset.
C. a short position in the underlying asset.

Question 4
.A trader analyzes a European put and call, with the same strike price and expiry, on a stock that pays no dividend. The trader notes that put-call parity does not hold: The price of a protective put is greater than the price of a fiduciary call. To profit from this condition, the trader would *most appropriately*:
A. buy the stock, go long the put, and write the call.
B. sell short the stock, go long the put, and write the call.
C. sell short the stock, write the put, and go long the call.

Question 5
For European options, the difference between put-call parity and put-call-forward parity is *most likely* that the forward contract:
A. replaces the risk-free bond.
B. replaces the strike price of the call option.
C. is combined with a risk-free bond to replace the asset.

Question 6
An investor obtains the following information about a European call and a European put on the same underlying asset, and the forward price of the asset:

Current asset price	€100
1-year forward price	€105
European call premium	€10
European put premium	€6
Risk-free rate	5%

The options and the forward contract expire on the same date, and the options have a strike price of €100. Using put-call-forward parity to analyze the information, the investor *most appropriately* concludes that an arbitrage opportunity:
A. does not exist.
B. is exploited by selling the protective put and buying the fiduciary call.
C. is exploited by buying the protective put and selling the fiduciary call.

Question 7
The following data apply to put and call options on the same asset, with the same expiry one year from today and strike price:

Price of call option	€2.27
Price of put option	€5.12
Strike price	€71.00
Risk-free rate	2.9%

According to put-call-forward parity, the forward price (in €) of the underlying asset is *closest* to:
A. 66.15
B. 68.07
C. 73.93

Question 8
A trader has a long call and a short put on the same risky asset and a long position in a T-bill. Based on put-call parity, the combined positions are *best* described as a synthetic:
A. long put.
B. short call.
C. long asset.

Question 9
A stock is priced today at £48 and the one-year, risk-free rate is 5%. European call and put options on this stock both expire in one year and have a strike price of £50. The arbitrage-free price of the call option is *most likely*:

A. lower than the put price.
B. the same as the put price.
C. higher than the put price.

Question 10
An investor finds that a forward price is greater than the price implied by put-call parity. To earn a risk-free profit, the investor should *most likely* sell the forward contract, buy risk-free bonds, and:
A. buy a call and sell a put.
B. sell a call and buy a put.
C. buy a call and buy a put.

Question 11
When applying put-call parity to determine if an arbitrage opportunity exists, one assumption is that:
A. participants can sell short.
B. it can be used with American and European options.
C. put-call parity requires volatility in the underlying stock.

Question 12
According to put-call-forward parity, which of the following combinations of positions *most appropriately* replicates a short position in a forward contract?
A. Short a call option, long a put option, and long a risk-free bond
B. Long a call option, short a put option, and long a risk-free bond
C. Short a call option, long a put option, and short a risk-free bond

Question 13
A trader observes the following data on European put and call options on the same stock with the same expiry (one year from today):

Price of the stock	204.50
Price of call option	9.36
Price of put option	4.86
Call option strike price	206.00
Put option strike price	206.00
Risk-free rate	3%

Assuming the call option is correctly priced in the market, the trader would m*ost appropriately* conclude that put-call parity is:

A. not violated.
B. violated since the put is overvalued.
C. violated since the put is undervalued.

Question 14

A trader observes the following data for European put and call options on the same stock with the same strike price and expiry (one year from today), and a forward contract on the same stock with the same expiry:

Price of call option	7.50
Price of put option	2.80
Call option strike price	57.00
Put option strike price	57.00
Forward price	62.00
Risk-free rate	3.00%

If the put option is correctly priced in the market, the trader's *most appropriate* conclusion is that put-call-forward parity is:

A. not violated.
B. violated since the call is overvalued.
C. violated since the call is undervalued.

Question 15

An analyst obtains the following information about a call option on 100 shares of a stock:

Price of call option	$2
Forward price	$45
Call option strike price	$50
Put option strike price	$50
Risk-free rate	3%

If the option expires in one year and the analyst estimates that the stock's intrinsic value is $41, then according to put-call-forward parity the put's premium is *closest* to:

A. $5.54
B. $6.85
C. $9.54

Question 16

European puts and calls on the same non-dividend-paying stock have the same exercise price and expiration and are trading at fair value relative to one another. If risk-free rates are positive and the options are at the money, according to put-call parity the value of the call is *most likely*:

A. less than the value of the put.
B. equal to the value of the put.
C. greater than the value of the put.

Question 17

Which of the following combinations of positions is *best* described as the synthetic equivalent of a long bond position?

A. Long asset, short call, long put
B. Long asset, long call, short put
C. Short asset, long call, short put