8.04 Arbitrage, Replication, and the Cost of Carry in Pricing Derivatives

Question 1
An investor owns a dividend-paying stock and sells a one-year forward contract on the stock to create a risk-free portfolio of the two instruments. The forward price of the contract is *most likely* the future value of:
A. the stock's spot price.
B. the stock's spot price plus the future value of the stock's dividends.
C. the stock's spot price minus the future value of the stock's dividends.

Question 2
The following applies to a one-year forward contract:

Forward price	¥119.19
Spot price	¥115.82
Risk-free rate	3.0%

If the present value of the costs of holding the underlying asset for 1 year is ¥1.62, then the present value of the benefits of holding the asset (in ¥) is *closest* to:
A. −1.52
B. 1.52
C. 1.72

Question 3
In May of this year, a farmer sells wheat forward for delivery in August. If the spot price of wheat increases, the value of the contract to the farmer *most likely*:
A. decreases.
B. remains the same.
C. increases.

Question 4
Which of the following is a limit to potential arbitrage opportunities?
A. Constraints on short selling
B. Assets trading in different markets
C. Accuracy of derivative pricing models

Question 5
Compared with a forward contract on the same underlying asset, when interest rates are positively correlated to futures prices, the futures price is *most likely*:
A. lower than the forward price.
B. the same as the forward price.
C. higher than the forward price .

Question 6
When creating a synthetic position, owning a share of stock of a publicly traded company is *best* replicated by:
A. buying a risk-free bond and selling a futures contract on the stock.
B. buying a risk-free bond and buying a futures contract on the stock.
C. selling a risk-free bond and selling a futures contract on the stock.

Question 7
An asset has a spot price of CNY 48 and its one-year cost of carry is CNY −1.20. If the risk-free rate is 3%, the forward price of the asset is *closest* to:
A. CNY 48.20
B. CNY 49.20
C. CNY 50.68

Question 8
A stock has a spot price of £120 and pays dividends over the next year that have a present value of £5.71. Assuming there are no other costs or benefits of holding the asset and a risk-free rate of 5%, the 1-year forward price (in £) of the stock is *closest* to:
A. 114
B. 120
C. 132

Question 9
The costs of holding an asset exceed the benefits. At inception, the price of a forward contract on the asset is *most likely*:
A. less than its spot price.
B. equal to its spot price.
C. greater than its spot price.

Question 10
All else being equal, for a one-year forward contract initiated six months ago, an increase in the storage costs of the underlying asset implies that the contract's value to the long party *most likely*:
A. decreases.
B. remains the same.
C. increases.

Question 11
On the day a forward contract is initiated, the spot price of the underlying asset is greater than the forward price. This implies that the future value of the asset's benefits is *most likely*:
A. less than the future value of the costs of holding the asset.
B. the same as the future value of the costs of holding the asset.
C. greater than the future value of the costs of holding the asset.

Question 12
Arbitrage-free pricing of forward contracts is *most likely* when the difference between the forward and spot prices reflects the underlying asset's:
A. cost of carry.
B. price volatility.
C. expected return.

Question 13
Which of the following is the *least likely* reason for spot prices to be higher than a futures price?
A. Storage costs
B. Convenience yield
C. Increased asset supply

Question 14
All else being equal, an increase in an asset's convenience yield implies that relative to the spot price, the forward price *most likely*:
A. decreases.
B. remains the same.
C. increases.

Question 15
Derivative pricing *most likel*y assumes investors are:
A. risk neutral.
B. risk averse.
C. risk seeking.

Question 16
Which of the following is *least likely* to affect the value of a derivative instrument relative to the price of the underlying asset?
A. Arbitrage pricing
B. Replication of the derivative position
C. Expected rate of return on the underlying asset

Question 17
Derivative pricing uses the assumption of risk neutrality since derivatives:
A. can be replicated.
B. are expected to return the risk-free rate.
C. are priced at a discount to the underlying asset to offset the derivatives' greater risk.

Question 18
An analyst gathers the following information on two 18-month forward contracts, each for a different underlying asset:

	Asset X	Asset Y
Present value of benefits of owning asset	9.17	1.94
Present value of costs of owning asset	11.57	4.34
Spot price	157.939	157.939
Forward price	167.120	?

If the risk-free rate is 2.8%, the forward price of Asset Y is *most likely*:
A. less than the forward price of Asset X.
B. equal to the forward price of Asset X.
C. greater than the forward price of Asset X.

Question 19
Which of the following combinations *best* replicates a long risk-free asset position?
A. Long asset and short risk-free bond
B. Short asset and long a forward contract
C. Long asset and short a forward contract

Question 20
An asset has a one-year forward price of £98, and its one-year cost of carry has a present value of £2.25. If the risk-free rate is 2%, the current arbitrage-free spot price of the asset is *closest* to:
A. £98.28
B. £98.33
C. £100.25

Question 21
Any price difference between otherwise equivalent forward and futures contracts *most likely* results from differences in:
A. counterparty credit risk.
B. timing of gain/loss realization.
C. standardized versus nonstandardized contracts.

Question 22
A commodity has some positive carrying costs. If the commodity's forward price is less than its spot price, which of the following *best* explains this scenario?
A. Storage costs
B. Convenience yield
C. Counterparty credit risk

Question 23
.A commodity's forward price is greater than the future value of its spot price compounded at the risk-free rate. This *most likely* results from the commodity having a convenience yield:

A. and no storage costs.
B. that is less than the storage costs.
C. that is greater than the storage costs.

Question 24
Which of the following *best* describes the relationship of the underlying asset to the pricing of a derivative? The derivative price:
A. represents the value of a replication strategy.
B. considers an embedded risk premium on the underlying asset.
C. implies the same expected rate of return as the underlying asset.

Question 25
A 20-year government bond is currently trading at 100% of par, and a 1-year forward contract on the bond is initiated with a value of zero at a price of 102. There are no other costs or benefits to holding the bond. At the forward contract's initiation, it is *most likely* that the:
A. risk-free rate is equal to 2%.
B. coupon rate is greater than the risk-free rate.
C. risk-free rate is greater than the coupon rate.

Question 26
A one-year forward contract was initiated two months ago on a non–dividend-paying stock. If the contract's value has decreased since initiation, then most likely the asset's:
A. spot price increased.
B. spot price decreased.
C. forward price increased.

Question 27
For a given forward contract on a nondividend paying stock, the forward price *most likely*:
A. increases gradually until contract expiration.
B. is set at contract initiation and does not change.
C. may increase or decrease, depending on the spot price.

Question 28
A long party enters a forward contract to buy bulk materials from a short party three months from now for ¥30 million. One month after the contract's inception (t =1), the same materials cost ¥31.5 million in the open market. If the annual risk-free rate is 3%, then the value of the forward contract (in ¥ millions) at t = 1 is *closest* to:
A. −1.35
B. 1.65
C. 3.22

Question 29
Arbitrage-free pricing of derivatives *most likely* results in using a discount rate equal to:

A. zero due to the inability to earn arbitrage profits.
B. the risk-free rate since riskless positions should earn a risk-free rate of return.
C. the underlying's required rate of return since the derivative's expected returns must be the same.

Question 30
All else equal, an increase in storage costs on a physical commodity will *most likely*:
A. increase forward prices and increase the value of existing forward contracts.
B. increase forward prices and decrease the value of existing forward contracts.
C. decrease forward prices and decrease the value of existing forward contracts.

Question 31
A forward contract is created on a nondividend-paying stock. At contract initiation, the contract's value is *most likely*:
A. less than its forward price.
B. equal to its forward price.
C. greater than its forward price.