Derivative Investments: Forwards and Futures

Test ID: 7441790

Question #1 of 85

Question ID: 464024

Consider a 9-month forward contract on a 10-year 7% Treasury note just issued at par. The effective annual risk-free rate is 5% over the near term and the first coupon is to be paid in 182 days. The price of the forward is *closest to*:

✗ **A) 1,037.27.**

✓ **B)** 1,001.84.

✗ **C)** 965.84.

Explanation

The forward price is calculated as the bond price minus the present value of the coupon, times one plus the risk-free rate for the term of the forward.

$(1{,}000 - 35/1.05^{182/365})\ 1.05^{9/12} = \$1{,}001.84$

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Question ID: 464070

How is market backwardation related to an asset's convenience yield? If the convenience yield is:

✗ **A) positive, causing the futures price to be below the spot price and the market is in backwardation.**

✗ **B)** negative, causing the futures price to be below the spot price and the market is in backwardation.

✓ **C)** larger than the borrowing rate, causing the futures price to be below the spot price and the market is in backwardation.

Explanation

When the convenience yield is more than the borrowing rate, the no-arbitrage cost-of-carry model will not apply. It means that the value of the convenience of holding the asset it is worth more than the cost of funds to purchase it. This usually applies to non-financial futures contracts.

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Question ID: 464012

A portfolio manager holds 100,000 shares of IPRD Company (which is trading today for $9 per share) for a client. The client informs the manager that he would like to liquidate the position on the last day of the quarter, which is 2 months from today. To hedge against a possible decline in price during the next two months, the manager enters into a forward contract to sell the IPRD shares in 2 months. The risk-free rate is 2.5%, and no dividends are expected to be received during this time. However, IPRD has a historical dividend yield of 3.5%. The forward price on this contract is *closest* to:

✗ **A) $905,175.**

✓ **B)** $903,712.

✗ **C)** $901,494.

Explanation

The historical dividend yield is irrelevant for calculating the no-arbitrage forward price because no dividends are expected to be paid during the life of the forward contract. In the absence of an arbitrage opportunity, the value of $S_0 - \left[\frac{FP}{(1 + R_f)^T}\right]$ should be 0.

Therefore, $FP = S_0(1 + R_f)^T$

$903{,}712 = 900{,}000(1.025)^{2/12}$

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Question ID: 464009

At contract initiation, the value of a forward contract:

✗ **A) is set to 100 by convention.**

✗ **B)** depends on the market price of the underlying asset.

✓ **C)** is typically zero regardless of the price of the underlying asset.

Explanation

Due to the no-arbitrage principle, the price of a forward contract is calculated to make the value of the contract zero at contract initiation. Neither the long nor the short typically makes any payment to enter into the forward agreement. A special case is an off-market forward where, for whatever reason, the contract price is not set equal to the no-arbitrage price, and the long or short position makes a payment to the opposite counterparty to offset the difference.

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Question ID: 464056

The value of a futures contract is:

✓ **A) zero when the account is marked to market for an account that has sufficient margin.**

✗ **B)** calculated in the same manner as the value of a forward contract.

✗ **C)** equal to the variation margin paid on any given day.

Explanation

The value of a futures contract is zero when the account is marked-to-market and there is no margin call. The price of the contract is adjusted to the new 'no-arbitrage'value, which is theoretically the same as the settle price at the end of trading, as long as price change limits have not been reached. Note that this is different from a forward contract. With a forward contract, the forward price is fixed for the life of the contract so the contract may accumulate either a positive or negative value as the forward price for new contracts changes over the life of the contract.

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Question ID: 464017

Jim Trent, CFA has been asked to price a three month forward contract on 10,000 shares of Global Industries stock. The stock is currently trading at $58 and will pay a dividend of $2 today. If the effective annual risk-free rate is 6%, what price should the forward contract have? Assume the stock price will change value after the dividend is paid.

✗ **A) $56.85.**

✗ **B)** $58.85.

✓ **C)** $56.82.

Explanation

One method is to subtract the future value of the dividend from the future value of the asset calculated at the risk free rate (i.e. the no-arbitrage forward price with no dividend).

$FP = 58(1.06)^{1/4} - 2(1.06)^{1/4} = \$56.82$

This is equivalent to subtracting the present value of the dividend from the current price of the asset and then calculating the no-arbitrage forward price based on that value.

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Question ID: 464047

Credit risk to the long (position) in a forward contract will increase over the life of the contract due to all of the following EXCEPT the:

✗ **A) short party has deteriorating finances.**

✓ **B)** settlement date is getting closer.

✗ **C)** contract value to the short is negative and decreasing.

Explanation

Deteriorating finances of the counterparty increase the probability of default. The amount owed to the long increases as the value of the underlying asset increases, which is the same as an increase in the value of the contract. An increase in the amount 'owed' and an increase in the probability of default can both be viewed as increasing credit risk. By itself, the passage of time does not necessarily increase credit risk.

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Question ID: 464029

The price of a 3 × 5 forward rate agreement (FRA) is the:

✗ **A) 2-month implied forward rate 5 months from today.**

✗ **B)** 3-month implied forward rate 5 months from today.

✓ **C)** 2-month implied forward rate 3 months from today.

Explanation

The notation for FRAs is unique. There are two numbers associated with an FRA: the number of months until the contract expires and the number of months until the underlying loan is settled. The difference between these two is the maturity of the underlying loan. For example, a 3 × 5 FRA is a contract that expires in three months (90 days), and the underlying loan is

settled in five months (150 days). The price of the 3 × 5 FRA is calculated by annualizing the implied forward rate. The implied forward rate is calculated from the 3-month rate and the 5-month rate.

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Question ID: 464025

The U.S. risk-free rate is 2.96%, the Japanese yen risk-free rate is 1.00%, and the spot exchange rate between the United States and Japan is $0.00757 per yen. Both rates are continuously compounded. The price of a 180-day forward contract on the yen and the value of the forward position 90 days into the contract when the spot rate is $0.00797 are *closest* to:

	Forward Price	Value After 90 Days
✗ **A)**	**$0.00764**	**$0.00212**
✓ **B)**	$0.00764	$0.00037
✗ **C)**	$0.00750	$0.00212

Explanation

The no-arbitrage price of the 180-day forward contract is:

$F_T = \$0.00757 \times e^{(0.0296 - 0.0100) \times (180 / 365)} = \$0.00764$

The value of the contract in 90 days with 180 - 90 = 90 days remaining is:

$$V_{90} = \left(\frac{\$0.00797}{e^{0.0100 \times (90/365)}} \right) - \left(\frac{\$0.00764}{e^{0.0296 \times (90/365)}} \right) = \$0.00037$$

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Question ID: 464069

A situation where the futures price is above the spot price of the underlying asset is called:

- ✗ **A) positive carry.**
- ✓ **B)** contango.
- ✗ **C)** normal backwardation.

Explanation

A situation where the futures price is above the spot price of the asset is called contango.

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Question ID: 464046

Over the life of a forward contract, the amount of credit risk is *least likely* to:

- ✗ **A) change signs.**
- ✗ **B)** increase.
- ✓ **C)** stay the same.

Explanation

The amount of credit risk is least likely to stay the same. The amount of credit risk is based on the contract value, which is zero at contract initiation. For the value to stay the same (at zero), the expected future price of the asset must not change over the life of the contract, an unlikely circumstance. As the value of the contract to the long goes from positive to negative, the amount of credit risk changes in sign.

Question #12 of 85

Question ID: 464027

30 days ago, J. Klein took a short position in a $10 million (3X6) forward rate agreement (FRA) based on the London Interbank Offered Rate (LIBOR) and priced at 5%. The current LIBOR curve is:

- 30-day = 4.8%
- 60-day = 5.0%
- 90-day = 5.1%
- 120-day = 5.2%
- 150-day = 5.4%

The current value of the FRA, to the short, is *closest to*:

✗ **A) −$15,280.**

✗ **B)** −$15,495.

✓ **C)** −$15,154.

Explanation

FRAs are entered in to hedge against interest rate risk. A person would buy a FRA anticipating an increase in interest rates. If interest rates increase more than the rate agreed upon in the FRA (5% in this case) then the long position is owed a payment from the short position.

Step 1: Find the forward 90-day LIBOR 60-days from now.

[(1 + 0.054(150 / 360)) / (1 + 0.05(60 / 360)) − 1](360 / 90) = 0.056198. Since projected interest rates at the end of the FRA have increased to approximately 5.6%, which is above the contracted rate of 5%, the short position currently owes the long position.

Step 2: Find the interest differential between a loan at the projected forward rate and a loan at the forward contract rate.

(0.056198 − 0.05) × (90 / 360) = 0.0015495 × 10,000,000 = $15,495

Step 3: Find the present value of this amount 'payable' 90 days after contract expiration (or 60 + 90 = 150 days from now) and note once again that the short (who must 'deliver' the loan at the forward contract rate) loses because the forward 90-day LIBOR of 5.6198% is greater than the contract rate of 5%.

[15,495 / (1 + 0.054(150 / 360))] = $15,154.03

This is the *negative* value to the short.

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Question ID: 464076

What is the situation called when a futures price continuously increases over its life because most hedging strategies are short hedges?

✗ **A) Contango.**

✓ **B)** Normal backwardation.

✗ **C)** A normal market.

Explanation

Normal backwardation means that *expected futures spot prices* are greater than futures prices. It suggests that when hedgers are net short futures contracts, they must sell them at a discount to the expected future spot prices to get investors to buy them. The futures price rises as the contract matures to converge with spot prices.

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Question ID: 464063

All of the following are examples of the *monetary* benefits or costs of holding an asset underlying a futures contract EXCEPT:

✓ **A) having a ready supply of the asset for business purposes.**

✗ **B)** dividend payments from a portfolio of stocks.

✗ **C)** storage and insurance costs for storing gold.

Explanation

Having a ready supply of an asset for business purposes is a non-monetary benefit of holding the asset. This convenience yield can result in backwardation.

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Question ID: 464060

Compared to futures prices on a six-month contract, forward prices on an identical contract are:

✗ **A) always higher.**

✗ **B)** equal.

✓ **C)** higher, lower, or equal.

Explanation

Futures prices may be higher or lower than forward prices on a contract with identical terms, depending on the correlation between interest rate changes and the price changes of the underlying asset. When interest rates and asset values are positively correlated, the futures price tends to be higher, and when interest rates and asset values are negatively correlated, the futures price tends to be lower.

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Question ID: 464030

Consider a forward contract on 1 million Mexican Pesos at $0.08254/MXN. 60 days prior to expiration the U.S. risk-free rate is 5%, the Mexican risk-free rate is 6%, and the spot rate is $0.08211/MXN. The value of the contract to the long is *closest to*:

✗ **A) -$297.**

✗ **B)** $553.

✓ **C)** -$553.

Explanation

The formula is:

$V_t = S_t / (1 + R_{for})^{(T-t)} - F_T / (1 + R_{dom})^{(T-t)}$.

The value is $0.08211 / 1.06^{60/365} - 0.08254/1.05^{60/365} = 0.08132763 - 0.08188065 = -0.00055302$.

The answer is in USD/ Peso, because when multiplying by Pesos, the answer is in USD.

0.00055302 × 1 million Pesos = -$553.02.

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Question ID: 464055

The value of a futures contract between the times when the account is marked-to-market is:

✗ **A) never less than the value of a forward contract entered into on the same date.**

✓ **B)** equal to the difference between the price of a newly issued contract and the settle price at the most recent mark-to-market period.

✗ **C)** the same as the contract price.

Explanation

Between the mark-to-market account adjustments, the contract value is calculated just like that of a forward contract; it is the difference between the price at the last mark-to-market and the current futures price, (i.e. the futures price on a newly issued contract). The mark-to-market of a futures contract is the payment or receipt of funds necessary to adjust for the gains or losses on the position. This adjusts the contract price to the 'no-arbitrage' price currently prevailing in the market.

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Question ID: 464008

The theoretical price of a forward contract:

✓ **A) is the no-arbitrage price.**

✗ **B)** equals the long's expectation of the future price of the underlying asset.

✗ **C)** is always greater than the current price of the underlying asset.

Explanation

The theoretical price of a forward contract is the future price of the underlying asset imposed by the no-arbitrage conditions. It can be less than the current price of the asset if the cost-of-carry is negative. Accrued interest is paid by the long at delivery under a bond forward, but is not included in the price quote, which is usually in terms of yield to maturity at the settlement date.

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Question ID: 464061

To initiate an arbitrage trade if the futures contract is underpriced, the trader should:

✗ **A) borrow at the risk-free rate, short the asset, and sell the futures.**

✓ **B)** short the asset, invest at the risk-free rate, and buy the futures.

✗ **C)** borrow at the risk-free rate, buy the asset, and sell the futures.

Explanation

If the futures price is too low relative to the no-arbitrage price, buy futures, short the asset, and invest the proceeds at the risk-free rate until contract expiration. Take delivery of the asset at the futures price, pay for it with the loan proceeds and keep the profit. For Treasury bill (T-bills), shorting the asset is equivalent to borrowing at the T-bill rate.

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Question ID: 464007

Which of the following *best* describes the price of a forward contract? The forward price is:

✗ **A) always equal to the market price at contract termination.**

✗ **B)** always expressed in dollars.

✓ **C)** the price that makes the values of the long and short positions zero at contract initiation.

Explanation

The forward price is the contract price of the underlying asset under the terms of the forward contract, and is the price that makes the values of the long and short positions zero at contract initiation. It is not the amount it costs to purchase the forward contract. The forward price is expressed in terms of the underlying asset, and may be a dollar value, exchange rate, or interest rate. The value of a forward contract comes from the difference between the forward contract price and the market price for the underlying asset. These values are likely to be different at contract termination, which will result in a profit for either the long or the short position.

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Question ID: 464058

The no-arbitrage price of a futures contract with a spot rate of 990, a time to maturity of 2 years, and a risk-free-rate of 5% is *closest to*:

✗ **A) 792.**

✗ **B)** 1040.

✓ **C)** 1091.

Explanation

The no-arbitrage price of a futures contract is based on the spot rate, the time to maturity, and the risk-free-rate.

$$FP = S_0 \times (1 + R_f)^T$$
$$= 990(1.05)^2$$
$$= 1091$$

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Question ID: 464077

The theoretical question of whether futures prices are unbiased predictors of future spot rates focuses on:

✗ **A) whether futures markets are efficient.**

✗ **B)** the correlation between interest rate changes and asset price changes.

✓ **C)** whether futures buyers are taking on asset owners' price risk.

Explanation

The theoretical analysis of whether futures prices are unbiased predictors of spot rates at futures expiration dates depends on whether futures buyers are being compensated for taking on the asset price risk that futures sellers are avoiding. Under the assumption that futures transactions are driven by those with natural short price risk transacting with those who have natural long positions, expected future spot prices are equal to futures prices.

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Question ID: 464016

The price of a forward contract:

✗ **A) depends on forward interest rates.**

✗ **B)** changes over the term of the contract.

✓ **C)** is determined at contract initiation.

Explanation

The price of a forward contract is established at the initiation of the contract and is expressed in different terms, depending on the underlying assets. It is the price that makes the contract value zero, and depends on current interest rates through the cost-of-carry calculation.

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Question ID: 464051

The difference between the spot and the futures price must converge to zero at futures expiration because:

✓ **A) the futures contract becomes equivalent to the underlying asset at expiration.**

✗ **B)** the futures contract has to be worth the same as all other delivery months.

✗ **C)** an arbitrage trade can be implemented using only other futures contracts.

Explanation

If the futures and spot prices are not equal, arbitrage activity will occur.

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Question ID: 464018

An index is currently 965 and the continuously compounded dividend yield on the index is 2.3%. What is the no-arbitrage price

on a one-year index forward contract if the continuously compounded risk-free rate is 5%.

✗ **A) 991.1.**

✓ **B)** 991.4.

✗ **C)** 987.2.

Explanation

The futures price $FP = S_0 e^{-\delta T} (e^{RT})$

$= S_0 e^{(R-\delta)T}$

$= 965e^{(.05-.023)}$

$= 991.4$

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Question ID: 464049

At the expiration of a futures contract, the difference between the spot and the futures price is:

✗ **A) at its point of highest volatility.**

✓ **B)** equal to zero.

✗ **C)** always positive.

Explanation

The difference must be zero at expiration because both the spot price and the futures price are, at that point in time, the price of the underlying asset for immediate delivery.

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Question ID: 464079

Which of the following statements regarding Eurodollar futures is *most* accurate?

✗ **A) Eurodollars futures are based on 60-day LIBOR, which is an add-on yield.**

✗ **B)** Every basis point (0.01%) move in annualized 60-day LIBOR represents a $25 gain or loss on the contract.

✓ **C)** Eurodollar futures are priced as a discount yield and LIBOR is subtracted from 100 to get the quote.

Explanation

Eurodollar futures are priced as a discount yield and are quoted as 100 minus 90-day LIBOR.

Question #28 of 85

Question ID: 464048

The credit risk in a forward contract is:

✗ **A) only an issue for the long.**

✓ **B)** directly related to the contract value.

✗ **C)** positively related to the term of the contract.

Explanation

The credit risk to the party with the position with the positive value (long or short) is greater, the greater the value of the forward contract at a point in time. A contract with a longer term may have a lower contract value.

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Question ID: 464062

Compared to the price on an otherwise identical forward contract, the price of a futures contract is:

✗ **A) always the same at contract initiation.**

✓ **B)** higher when asset price changes are positively correlated with interest rate changes.

✗ **C)** lower when asset price changes are positively correlated with interest rate changes.

Explanation

A positive correlation between asset price changes and interest rate changes makes the mark-to-market feature attractive to a futures buyer. This leads to a higher futures price compared to the forward price on an otherwise identical contract.

Question #30 of 85

Question ID: 464065

The return from the non-monetary benefits of holding the asset underlying a futures contract is (are) called:

✗ **A) the non-monetary return.**

✗ **B)** negative-storage costs.

✓ **C)** the convenience yield.

Explanation

The return from the non-monetary benefits of holding the asset underlying a futures contract is called the *convenience yield*.

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Question ID: 464052

Regarding futures contracts, the spot price refers to the:

✗ **A) price of the underlying asset in a particular location, or 'spot', in the future.**

✗ **B)** present value of the expected future price.

✓ **C)** current market price of the asset underlying the futures contract.

Explanation

The spot price refers to the current market price of the asset underlying the contract. It is the price for immediate delivery of the asset.

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Question ID: 464066

Backwardation refers to a situation where:

✗ **A) the futures price is above the spot price.**

✓ **B)** the futures price is below the spot price.

✗ **C)** long hedgers outnumber short hedgers.

Explanation

Backwardation refers to a situation where the futures price is below the spot price. For backwardation to occur, there must be a significant benefit to holding the asset, either monetary or non-monetary.

Questions #33-36 of 85

Craig Champion, CFA, manages portfolios of U.S. securities for European investors. His clients have each hold different kinds of securities, and each has differing views with respect to hedging exchange rate risk. Francois Levisque is a Belgian investor who holds a large diversified portfolio of U.S. equities. Levisque has a reputation for some success in timing the U.S. equity market. For example, he has often locked in gains on his portfolio with derivatives shortly before a market correction. Sometimes he also hedges his portfolio's currency risk. Levisque has just instructed Champion to take a large short position in S&P 500 index, either with futures or with a forward contract. Champion notices that the futures price is less than the current spot price and consults with his colleague Danielle Silvers, CFA. Champion says he thinks that the futures price is less than the spot price because the dividend yield of the S&P 500 is greater than the Treasury Bill rate. Silvers says that it could just be backwardation. Silvers also notes that the use of a forward contract might be a good idea because the contract will not attract the attention of other market participants who might react to Levisque's move. Champion tells Silvers that the reason Levisque wants to hedge his equity position is that he thinks all U.S. interest rates will increase soon. This, he believes, is bearish for equities, and he also thinks the negative relationship between equity prices and interest rates makes a short forward contract more attractive than a short futures contract.

Ragnar Hvammen is a Norwegian investor with a large investment in oil-related assets that he often hedges with futures contracts. Champion notices that the price of an oil futures contract is usually higher than the spot price. Hvammen uses short-term borrowings in dollars, from both European and U.S. banks, to meet the liquidity needs of his oil investments, and he has Champion hedge these loan positions with Eurodollar futures. Silvers suggests that Champion should consider using T-bill futures to hedge the loans from U.S. banks, and use Eurodollar futures only for the Eurodollar loans. Champion says he will look into that, as well as forward rate agreements, as alternative hedging tools for Hvammen.

Champion is also evaluating pricing of T-bond futures. Specifically, he is looking for pricing on a 1.2-year contract. The CTD is a 6.5% 30-year bond issued 10 years ago currently yielding 5%. The conversion factor for the bond is 1.08. Assume that the risk-free rate over the contract period is 3%.

Question #33 of 85

Question ID: 464092

Champion and Silvers each gave a reason for why the futures price of the S&P 500 index might be less than the spot price. With respect to their statements, it is *most accurate* to conclude that:

✗ **A) Champion's statement is invalid while Silver's statment is valid.**

✗ **B)** neither statement is valid.

✓ **C)** both statements are valid.

Explanation

The equation for the price of a futures contract on an equity index is $FP = S_0 \times e^{(R - \sigma) \times T}$, where σ is the dividend yield and R is the risk-free rate. If $R < \sigma$, then $FP < S_0$ and Champion is correct. Silvers could be correct in that backwardation is defined as $FP < S_0$, with the relationship being caused by the risk aversion of hedgers of long asset positions. Their risk aversion makes them willing to take short contracts at lower prices than otherwise might be the case.

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Question ID: 464093

If Champion thinks that the S&P 500 index is negatively correlated with interest rates, then choosing the short forward contract over the short futures contract is:

✗ **A) appropriate because the forward contract would benefit more from a higher reinvestment rate.**

✓ **B)** counterproductive because a short futures contract would benefit more from a higher reinvestment rate.

✗ **C)** counterproductive because a short futures contract would benefit more from a higher borrowing rate.

Explanation

When hedging a position, futures contracts are better if the hedge produces a positive cash flow, via marking-to-market, when interest rates rise and is hurt when interest rates fall. In this case, when interest rates rise and cause equity values to fall, a short futures position will receive a positive cash flow that can be reinvested at the higher rate. If interest rates fall, and the short futures position must be marked to market with a negative cash flow, the opportunity cost of the negative cash flow is lower. Forward contracts that do not require marking-to-market do not "benefit" from changes in interest rates.

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Question ID: 464094

Oil futures prices might be higher than the spot price because:

✓ **A) there are more costs than benefits to holding the asset.**

✗ **B)** of reverse contango.

✗ **C)** there are more benefits than costs to holding the asset.

Explanation

In calculating the futures price, we would subtract the benefits of holding the asset, e.g., the present value of dividends and coupons, and add the costs of holding the asset. Oil does not pay a dividend, and there would be costs for holding oil. Contango describes the situation where the futures price exceeds the spot price, and there is not such thing as reverse contango.

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Question ID: 464095

With respect to using Eurodollar futures, instead of T-bill futures, to hedge short-term loans from U.S. banks, Champion is:

✗ **A) justified because the Eurodollar futures market is very liquid, and LIBOR is less correlated with short-term loan rates than is the T-bill rate.**

✓ **B)** justified because the Eurodollar futures market is very liquid, and LIBOR is more correlated with short-term loan rates than is the T-bill rate.

✗ **C)** not justified because the Eurodollar futures market is not very liquid, and LIBOR is more correlated with short-term loan rates that T-bills.

Explanation

Eurodollar futures are futures on dollar LIBOR, and LIBOR is the prevailing rate on very large bank loans called Eurocurrency loans. The rates on T-bills can be driven by influences (e.g., a flight to quality) that are different than those that drive dollar LIBOR rates. As a result, Eurodollar futures are more highly correlated with (dollar) bank loan rates should provide a better hedge for the client's bank loan exposure. Moreover, the Eurodollar futures market is large and very liquid.

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Question ID: 464081

Unlike U.S. T-bills and their futures contracts, no riskless arbitrage relation exists between LIBOR and the Eurodollar futures contract:

✓ **A) but Eurodollar futures contracts are still a useful, widely used hedging vehicle for exposure to LIBOR.**

✗ **B)** therefore investors must utilize synthetic instruments to hedge their exposure to LIBOR.

✗ **C)** resulting in most investors hedging their LIBOR exposure with 90-day T-bill contracts.

Explanation

Although an imperfect hedge, Eurodollar futures are still widely used to hedge exposure to LIBOR.

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Question ID: 464045

The best measure of the amount of credit risk exposure for a forward contract, at a point in time, is the:

✗ **A) notional amount of the contract.**

✗ **B)** liabilities of the counterparty.

✓ **C)** value of the contract.

Explanation

The amount of credit risk is best measured by the contract value at a point in time. This is the present value of the settlement payment, based on current market prices, interest rates, or exchange rates. The party to whom the payment would be made has the credit risk, the risk that the payment will not be made or that the asset will not be delivered/purchased at contract expiration.

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Question ID: 464015

At expiration, the value of a forward contract is:

✗ **A) equal to the market price of the underlying asset.**

✓ **B)** the difference between the contract price and the market value of the underlying asset.

✗ **C)** always greater than or equal to zero.

Explanation

In a forward contract, the long is obligated to buy, and the short is obligated to sell, the underlying asset at the contract price. The difference between the contract price and the market price of the asset is what gives the contract value. The contract has a positive value at expiration to the long/short only if the contract price is below/above the market price.

Question #40 of 85

Question ID: 464011

The forward price in a 90-day forward contract on a non-dividend-paying stock currently (at contract initiation) selling for $55 when the 90-day risk-free rate is 5% is *closest* to:

✗ **A) $54.32.**

✗ **B)** $52.38.

✓ **C)** $55.67.

Explanation

$FP = S_0 \times (1 + R_f)^T = \$55 \times (1.05)^{90/365} = \$55.67$

Question #41 of 85

Question ID: 464028

What is the value of a 6.00% 1x4 (30 days x 120 days) forward rate agreement (FRA) with a principal amount of $2,000,000, 10 days after initiation if $L_{10(110)}$ is 6.15% and $L_{10(20)}$ is 6.05%?

✗ **A) $700.00.**

✗ **B)** $767.40.

✓ **C)** $745.76.

Explanation

The current 90-day forward rate at the settlement date, 20 days from now is:
([1+ (0.0615 x 110/360)]/[1+ (0.0605 x 20/360)] - 1) x 360/90 = 0.061517

The interest difference on a $2 million, 90-day loan made 20 days from now at the above rate compared to the FRA rate of 6.0% is:
[(0.061517 x 90/360) - (0.060 x 90/360)] x 2,000,000 = $758.50

Discount this amount at the current 110-day rate:
758.50/[1+ (0.0615 x 110/360)] = $745.76

Question #42 of 85

Question ID: 464022

A company has chosen to use a 6 x 9 FRA expiring in 6 months to mitigate the risk of paying a floating coupon on the bond

issue. The current term structure for LIBOR is as follows:

Term	*Interest Rate*
180 days	5.65%
270 days	5.95%

What is the price of this forward rate agreement (FRA)?

✗ **A) 3.19%**

✓ **B)** 6.37%

✗ **C)** $6.37

Explanation

The price of an FRA is the fixed rate. To determine the FRA's fixed rate, the following formula should be used:

$$\text{FRA price} = \left(\frac{1+r_{Y_P}}{1+r_{X_P}} - 1\right)\left(\frac{360}{Y-X}\right)$$

$$= \left[\frac{1+.0595\left(\frac{270}{360}\right)}{1+.0565\left(\frac{180}{360}\right)} - 1\right]\left(\frac{360}{90}\right) = \underline{0.0637}$$

The FRA"s fixed rate would be quoted as 6.37%.

The price of an FRA is given as a rate percentage, never as a dollar amount.

Question #43 of 85

Question ID: 464053

At the expiration of a futures contract, the futures price is:

✗ **A) the same as the price at the initiation of the contract.**

✓ **B)** equal to the market price for immediate delivery of the asset.

✗ **C)** above or below the market price, depending on supply and demand.

Explanation

At expiration, the futures price is equal to the price of the asset for immediate delivery because the contract calls for delivery of the asset on that date. Note that at expiration, the spot price and the futures price are equal.

Question #44 of 85

Question ID: 464073

Suppose the soybean market is in backwardation with a cash price of $6.50/bushel and a futures price of $6.00/bushel. Also assume that a trader owns 5,000 bushels of soybeans and does not need the soybeans until after futures expiration. Which of the following is the *best* strategy for the trader?

✗ **A) Sell the soybeans in the spot market, buy an appropriate futures, and profit $1,250.**

✓ **B)** Sell the soybeans in the spot market, buy an appropriate futures, and profit $2,500.

✗ **C)** Do nothing since the convenience yield is so high.

Explanation

Since the trader does not need the soybeans now he should monetize the convenience yield by selling in the spot market and simultaneously buy soybean futures for his later needs. The total profit is computed as follows:

Total profit = (Cash Price − Futures Price) × Amount = ($6.50 − $6.00) × 5,000 = $2,500.

Questions #45-50 of 85

Chantal DuPont is the CFO of Vetements Verdun, a manufacturer of specialty clothing and uniforms, located in northern France. The firm is currently undergoing an expansion which will require DuPont to draw down 25 million on Vetements Verdun's credit line as a 90-day bridge loan before the mortgage closes. The money will not be needed for 60 days, at which point the interest rate will be determined. The interest rate on the loan will be based off 90-day LIBOR.

DuPont is becoming concerned because of signs that interest rates may begin to rise. The firm cannot afford to have its borrowing costs increase significantly over current rates. In response to DuPont's concerns, the company's CEO, Viviane Lamarre, has asked DuPont to hedge the firm's borrowing costs, even if that entails some near-term outlays.

DuPont and Lamarre discuss entering into a forward rate agreement (FRA) to hedge Vetements Verdun's interest rate exposure on the credit line. Current LIBOR rates are:

	Libor rate
30-day	2.6%
60-day	2.8%
90-day	3.0%
120-day	3.2%
150-day	3.3%
180-day	3.4%

They decide to go forward with the hedge and DuPont enters into the appropriate FRA for the full amount of 25 million.
In the first 30 days of the FRA, the fixed income markets rally sharply. The new set of LIBOR rates, on the thirtieth day of the FRA, is:

	Libor rate
30-day	2.2%
60-day	2.4%
90-day	3.6%
120-day	3.8%

150-day	3.8%
180-day	3.8%

At the settlement date, the interest savings on the loan term is 23,750. DuPont tells Lamarre, "I am looking forward to cashing our settlement check for 23,750." Lamarre adds, "Yes, and on top of that we get to borrow for 90 days at a below-market rate." Both DuPont and Lamarre are pleased with their decision to hedge.

Question #45 of 85

Question ID: 464039

Which statement *most* accurately describes a 2 x 3 forward rate agreement?

✓ **A) Contract expires in two months on an underlying loan settled in three months.**

✗ **B)** Underlying loan of two month maturity under a contract that expires in three months.

✗ **C)** Two-month underlying interest rate on a contract settled in three months.

Explanation

A 2 x 3 forward rate agreement is a contract that expires in two months and the underlying loan is settled in three months. The underlying rate is a 30-day (1-month) rate on a 30-day (1-month) loan in 60 days (2 months). (Study Session 16, LOS 48.a)

Question #46 of 85

Question ID: 464040

Which forward rate agreement would *most* effectively hedge Vetements Verdun's exposure to LIBOR?

✗ **A) 2 x 3.**

✓ **B)** 2 x 5.

✗ **C)** 3 x 2.

Explanation

Vetements Verdun needs to be hedged against 90-day LIBOR rates that will prevail 60 days from now. Such a hedge would require a two-month contract on three-month rates, to be settled in five months: a 2 x 5. (Study Session 16, LOS 48.c)

Question #47 of 85

Question ID: 464041

Which value is *closest* to the price of the most effective hedge for Vetements Verdun?

✗ **A) 3.3%.**

✓ **B)** 3.6%.

✗ **C)** 3.0%.

Explanation

The actual, unannualized rate on the 60-day loan is:

$R60 = 0.028 \times 60/360 = 0.00467$

The actual, unannualized rate on the 150-day loan is:

$R150 = 0.033 \times 150/360 = 0.01375$

So the rate on a 90-day loan to be made 60 days from now is:

FR (60,90) = ((1 + R150)/(1 + R60)) − 1
FR (60,90) = (1.01375/1.00467) − 1
FR (60,90) = 1.00904 − 1
FR (60,90) = 0.904%

We annualize this rate using the formula:

0.904% × (360/90) = 3.62%

(Study Session 16, LOS 48.c)

Question #48 of 85

Question ID: 464042

What must the 90-day LIBOR rate have been at the expiration of the contract?

✓ **A) 4.0%.**

✗ **B)** 3.6%.

✗ **C)** 3.4%.

Explanation

Since Vetements Verdun is long the FRA, the market rate of interest at settlement must be higher than the price of the contract and the 23,750 has a positive value. The interest savings at the end of the loan term will be:

Interest savings = ((market rate × (90/360)) − (0.0362 × (90/360))) × 25,000,000
23,750 = ((market rate × 90/360) − 0.00905) × 25,000,000
0.000950 = market rate × 90/360 − 0.00905
0.0100 = market rate × 0.25
0.0400 = market rate

The market rate must have been 4.0%.

(Study Session 16, LOS 48.c)

Question #49 of 85

Question ID: 464043

Regarding the statements made by Lamarre and DuPont about the ultimate value of their hedge:

✗ **A) Lamarre's statement is correct; DuPont's statement is incorrect.**

✓ **B)** Lamarre's statement is incorrect; DuPont's statement is incorrect.

✗ **C)** Lamarre's statement is incorrect; DuPont's statement is correct.

Explanation

The interest savings at the end of the loan term must be discounted back to the present value on the FRA settlement date:

Settlement payment = Present value of interest savings
Settlement payment = 23,750 / (1 + (0.040 × 90/360))
Settlement payment = 23,750 / (1 + 0.010)
Settlement payment = 23,750 / 1.010
Settlement payment = 23,515

The settlement check would be for 23,515. DuPont's statement is incorrect. Lamarre's statement is also incorrect because the settlement check represents the value of the below-market loan. The actual loan will be at the prevailing rate, and the

settlement on the FRA will offset the interest cost on the loan.

(Study Session 16, LOS 48.c)

Question #50 of 85

Question ID: 464044

Thirty days into the FRA, what is the value of the contract from Vetements Verdun's perspective?

✓ **A) Due 43,943.**

✗ **B)** Due 45,000.

✗ **C)** Owes 43,943.

Explanation

Since we have moved 30 days into the FRA, the new rate for the end of the contract is the 30-day rate (60 days originally minus 30 days passed) and the new rate for the settlement of the loan is the 120-day rate (150 days originally minus 30 days passed).

With that information, the pricing is straightforward:

The actual, unannualized rate on the 30-day loan is:

R30 = 0.022 × 30/360 = 0.00183

The actual, unannualized rate on the 120-day loan is:

R120 = 0.038 × 120/360 = 0.01267

The rate on a 90-day loan to be made 30 days from now is:

FR (30,90) = ((1 + R120) / (1 + R30)) − 1
FR (30,90) = ((1 + 0.01267) / (1 + 0.00183)) − 1
FR (30,90) = (1.01267 / 1.00183) − 1
FR (30,90) = 1.010820 − 1
FR (30,90) = 1.0820%

We annualize this rate using the formula:

1.082% × (360/90) = 4.33%

The interest saving is:

Interest saving = ((0.0433 × 90/360) − (0.0362 × 90/360)) × 25,000,000
Interest saving = (0.01083 − 0.00905) × 25,000,000
Interest saving = 0.00178 × 25,000,000
Interest saving = 44,500

The interest "saving" is a positive 44,500. Discounting that back at the current 120-day rate we have:

FRA value = 44,500 / (1 + (0.038 × 120/360))
FRA value = 44,500 / (1 + (0.012667))
FRA value = 44,500 / 1.012667
FRA value = 43,943

The value of the FRA to Vetements Verdun 30 days into the contract is 43,943. In other words, they are due 43,943.

(Study Session 16, LOS 48.c)

Question #51 of 85

Question ID: 464054

The primary difference in credit risk between forwards and futures contracts is *most likely* because:

✓ **A) futures are marked to market daily.**

✗ **B)** futures markets have higher-quality participants.

✗ **C)** forwards markets have higher-quality participants.

Explanation

Futures are marked to market daily-this reduces credit risk to a single day's losses.

Question #52 of 85

Question ID: 464020

Calculate the no-arbitrage forward price for a 90-day forward on a stock that is currently priced at $50.00 and is expected to pay a dividend of $0.50 in 30 days and a $0.60 in 75 days. The annual risk free rate is 5% and the yield curve is flat.

✗ **A) $48.51.**

✗ **B)** $50.31.

✓ **C)** $49.49.

Explanation

The present value of expected dividends is: $0.50 / $(1.05^{30 / 365})$ + $0.60 / $(1.05^{75 / 365})$ = $1.092

Future price = ($50.00 − 1.092) × $1.05^{90 / 365}$ = $49.49

Question #53 of 85

Question ID: 464071

Which of the following statements is *least accurate*?

✓ **A) Backwardation means the futures price is below the asset's price and occurs if r_f is greater than the dividend yield.**

✗ **B)** Normal backwardation means that the futures price is less than the expected asset price at contract expiration. It could occur because the futures price only reflects the risk-free rate in an arbitrage transaction.

✗ **C)** Normal contango means the futures price is greater than the expected asset price is at contract expiration. This might occur if there is high demand to buy contracts.

Explanation

Recognize that the question is looking for a false statement. Backwardation means that $f_0 < S_0$. However, r_f increases the value of f_0 and dividend yield decreases the value of f_0. Backwardation would occur if r_f is less than the dividend yield.

Normal backwardation occurs when the futures price is less than the expected asset price at contract expiration and correctly explains why f_0 is generally less than the expected future spot price. Note the contrast with backwardation which means $f_0 <$

S_0.

Normal contango occurs when the futures price is greater than the expected asset price at contract expiration. The statement that high demand to buy the contract could increase the contract price is also correct. Note the contrast with contango, which means the futures price is above the asset's spot price. (LOS 49.f)

Question #54 of 85

Question ID: 464014

During the life of a forward contract, the value of the contract is *best* described as:

✗ **A) the difference between the future value of the spot price and the expected future price of the underlying asset.**

✓ **B)** the difference between the spot price and the present value of the forward price of the underlying asset.

✗ **C)** the present value of the expected future price of the underlying asset.

Explanation

The value of a forward contract on an asset with no cash flows during its term is equal to spot − (forward price) / $(1 + R_f)^t$), the difference between the spot price and the present value of the forward price of the underlying asset.

Questions #55-60 of 85

Monica Lewis, CFA, has been hired to review data on a series of forward contracts for a major client. The client has asked for an analysis of a contract with each of the following characteristics:

1. A forward contract on a U.S. Treasury bond
2. A forward rate agreement (FRA)
3. A forward contract on a currency

Information related to a forward contract on a U.S. Treasury bond: The Treasury bond carries a 6% coupon and has a current spot price of $1,071.77 (including accrued interest). A coupon has just been paid and the next coupon is expected in 183 days. The annual risk-free rate is 5%. The forward contract will mature in 195 days.

Information related to a forward rate agreement: The relevant contract is a 3 × 9 FRA. The current annualized 90-day money market rate is 3.5% and the 270-day rate is 4.5%. Based on the best available forecast, the 180-day rate at the expiration of the contract is expected to be 4.2%.

Information related to a forward contract on a currency: The risk-free rate in the U.S. is 5% and 4% in Switzerland. The current spot exchange rate is $0.8611 per Swiss France (SFr). The forward contract will mature in 200 days.

Question #55 of 85

Question ID: 464032

Based on the information given, what initial price should Lewis recommend for a forward contract on the Treasury bond?

✗ **A) $1,073.54.**

✗ **B)** $1,035.12.

✓ **C)** $1,070.02.

Explanation

The forward price (FP) of a fixed income security is the future value of the spot price net of the present value of expected coupon payments during the life of the contract. In a formula:

$FP = (S_0 - PVC) \times (1 + R_f)^T$

A 6% coupon translates into semiannual payments of $30. With a risk-free rate of 5% and 183 days until the next coupon we can find the present value of the coupon payments from:

$PVC = \$30 / (1.05)^{183/365} = \$29.28$.

With 195 days to maturity the forward price is:

$FP = (\$1{,}071.77 - \$29.28) \times (1.05)^{195 / 365} = \$1{,}070.02$.

(Study Session 16, LOS 51.c)

Question #56 of 85

Question ID: 464033

Suppose that the price of the forward contract for the Treasury bond was negotiated off-market and the initial value of the contract was positive as a result. Which party makes a payment and when is the payment made?

✗ **A) The short pays the long at the maturity of the contract.**

✓ **B)** The long pays the short at the initiation of the contract.

✗ **C)** The long pays the short at the maturity of the contract.

Explanation

If the value of a forward contract is positive at initiation then the long pays the short the value of the contract at the time it is entered into. If the value of the contract is negative initially then the short pays the long the absolute value of the contract at the time the contract is entered into. (Study Session 16, LOS 51.a)

Question #57 of 85

Question ID: 464034

Suppose that instead of a forward contract on the Treasury bond, a similar futures contract was being considered. Which one of the following alternatives correctly gives the preference that an investor would have between a forward and a futures contract on the Treasury bond?

✗ **A) It is impossible to say for certain because it depends on the correlation between the underlying asset and interest rates.**

✓ **B)** The forward contract will be preferred to the futures contract.

✗ **C)** The futures contract will be preferred to the forward contract.

Explanation

The forward contract will be preferred to a similar futures contract precisely because there is a negative correlation between bond prices and interest rates. Fixed income values fall when interest rates rise. Borrowing costs are higher when funds are needed to meet margin requirements. Similarly reinvestment rates are lower when funds are generated by the mark to market of the futures contract. Consequently the mark to market feature of the futures contract will not be preferred by a typical investor. (Study Session 16, LOS 51.a)

Question #58 of 85

Question ID: 464035

Based on the information given, what initial price should Lewis recommend for the 3 × 9 FRA?

✓ **A) 4.96%.**

✗ **B)** 4.66%.

✗ **C)** 5.66%.

Explanation

The price of an FRA is expressed as a forward interest rate. A 3 × 9 FRA is a 180-day loan, 90 days from now. The current annualized 90-day money market rate is 3.5% and the 270-day rate is 4.5%. The actual (unannualized) rates on the 90-day loan (R90) and the 270-day loan (R270) are:

R90 = 0.035 × (90 / 360) = 0.00875

R270 = 0.045 × (270 / 360) = 0.03375

The actual forward rate on a loan with a term of 180 days to be made 90 days from now (written as FR (90, 180)) is:

$$FR(90,180) = \frac{1 + R270}{1 + R90} - 1 = \frac{1.03375}{1.00875} - 1 = 0.02478$$

Annualized = 0.02478 × (360 / 180) = 0.04957 or 4.96%.

(Study Session 16, LOS 51.c)

Question #59 of 85

Question ID: 464036

Based on the information given and assuming a notional principal of $10 million, what value should Lewis place on the 3 × 9 FRA at time of settlement?

✗ **A) $38,000 paid from short to long.**

✓ **B)** $37,218 paid from long to short.

✗ **C)** $19,000 paid from long to short.

Explanation

The value of the FRA at maturity is paid in cash. If interest rates increase then the party with the long position will receive a payment from the party with a short position. If interest rates decline the reverse will be true. The annualized 180-day loan rate is 4.96%. Given that annualized interest rates for a 180-day loan 90 days later are expected to drop to 4.2%, a cash payment will be made from the party with the long position to the party with the short position. The payment is given by:

$$\left[\left(0.042 \times \frac{180}{360}\right) - \left(0.0496 \times \frac{180}{360}\right)\right] \times \$10{,}000{,}000 = -\$38{,}000$$

The present value of the FRA at settlement is:

38,000 / {1 + [0.042 × (180 / 360)]} = 38,000 / 1.021 = $37,218

(Study Session 16, LOS 51.c)

Question #60 of 85

Question ID: 464037

Based on the information given, what initial price should Lewis recommend for a forward contract on Swiss Francs based on a discrete time calculation?

✗ **A) $1.1552.**

✓ **B)** $0.8656.

✗ **C)** $1.0053.

Explanation

The value of a forward currency contract is given by:

$$F_T = S_0 \frac{(1 + R_{domestic})^T}{(1 + Rforeign)^T}$$

Where F and S are quoted in domestic currency per unit of foreign currency. Substituting:

$$F_T = \$0.8611 \times \frac{(1 + 0.05)^{\frac{200}{365}}}{(1 + 0.04)^{\frac{200}{365}}} = \$0.8656$$

(Study Session 16, LOS 51.c)

Questions #61-66 of 85

Wanda Brock works as an investment strategist for Globos, an international investment bank. Brock has been tasked with designing a strategy for investing in derivatives in Mazakhastan, an Eastern European country with impressive economic growth.

One of the first tasks Brock tackles involves hedging. Globos wants to hedge some of its investments in Mazakhastan against interest-rate and currency volatility. After a bit of research, Brock has gathered the following data:

- The U.S. risk-free rate is 5.5%, and most investors can borrow at 2% above that rate.
- The Federal Reserve Board is expected to raise the fed funds rate by 0.25% in one week.
- The current spot rate for the Mazakhastanian currency, the gluck, is 9.4073G/$.
- Annualized 90-day LIBOR is 7.6%.
- Globos' economists expect annualized 90-day LIBOR to rise to 7.9% over the next 60 days.
- The Mazakhastan risk-free rate is 3.75%, and most investors can borrow at 1.5% above that rate.

Using the above data, Brock develops some hedging strategies, and then delivers them to Globos' futures desk.

Brock then turns her attention to Mazakhastanian commodities. Globos has acquired the rights to large deposits of copper, silver, and molybdenum in Mazakhastan and suspects the futures markets may be mispriced. Brock has assembled the following data to aid her in making recommendations to Globos' futures desk:

> Copper
> Spot price: G3.15/pound.
> 1-year futures price: G3.54/pound.
> Silver
> Spot price: G12.75/pound.
> 1-year futures price: G12.82/pound.
> Molybdenum
> Spot price: G34.45/pound.
> 1-year futures price: G35.23/pound.

After making some calculations, Brock assesses the arbitrage opportunities in Mazakhastan and passes the information on to the futures desk. Shortly afterward, she is informed that Globos' Mazakhastan subsidiary uses its silver holdings as collateral for business loans, which allows the unit to obtain a favorable interest rate.

Jonah Mason, one of Globos' traders, asks Brock for a few details about the Mazakhastan financial markets. Brock sends Mason a short e-mail containing the following observations:

- Mazakhastan's investors don't like relying on old valuation data because asset values have changed rapidly in the past, so they generally use a mark-to-market valuation system.
- Standard & Poor's just raised Mazakhastan's sovereign debt to investment grade.
- Interest rates tend to move in the same direction as asset values.
- New technological innovations and commercial expansion has substantially boosted the income of the average Mazakhastanian.

Before Mason receives the e-mail, he turns his attention to a memo about a futures contract a subordinate is considering. Unfortunately, the memo arrives without the summary page to the notes. Mason must deduce the nature of the hedge based on its characteristics: The risk-free rate used in calculating the futures price, and that price adjusted to account for individual future cashflows.

Question #61 of 85

Question ID: 464085

The price of a 75-day gluck future should be *closest* to:

✓ **A) 9.3750G/$.**

✗ **B)** 9.4429G/$.

✗ **C)** 0.1081$/G.

Explanation

To calculate the price of a currency future, use the following equation:
Spot exchange rate × (1 + domestic risk-free rate)^{t} / (1 + foreign risk-free rate)^{t}.
In this case, since the exchange rate is expressed in glucks per dollar, the Mazakhastan interest rate is considered domestic. Since we are pricing a 75-day future, the time variable "t" is 75/365.
9.4073G/$ × $(1.0375)^{(75/365)}$ / $(1.055)^{(75/365)}$ = 9.3750G/$.

(Study Session 16, LOS 52.h)

Question #62 of 85

Question ID: 464086

Based on the information he received from Brock, Mason can *best* conclude that:

✓ **A) futures prices are higher than forward prices in Mazakhastan.**

✗ **B)** inflation in Mazakhastan is likely to rise.

✗ **C)** prices of corporate bonds in Mazakhastan are likely to rise.

Explanation

Since Mazakhastanian investors prefer mark-to-market accounting and interest rates are positively correlated to asset values, Mason can conclude that futures prices are higher than forward prices. The upgrade of sovereign debt could spill over into the private sector, driving up bond prices. And an increase in consumer income could spark spending that drives up inflation. But neither the debt information nor the income information is sufficient to draw conclusions. (Study Session 14, LOS 46.c)

Question #63 of 85

Question ID: 464087

Based on the two characteristics of the futures contract in Mason's memo, which of the following does the contract refer to?

	Treasury bond futures?	Stock index futures?
✓ **A)**	**Yes**	**No**
✗ **B)**	Yes	Yes
✗ **C)**	No	Yes

Explanation

Both Treasury bond futures and stock index futures require the use of the risk-free rate to determine price. But while the pricing of bond futures requires the discounting of individual coupons, the pricing of stock-index futures does not, instead using a continuously compounded dividend yield. (Study Session 14, LOS 46.f)

Question #64 of 85

Question ID: 464088

Based on Brock's information, how should traders *best* take advantage of arbitrage opportunities in Mazakhastan? For this question only, assume 3% transaction cost for futures contracts.

- ✗ **A) Buy spot copper, do not trade silver, and sell spot molybdenum.**
- ✗ **B)** Buy spot copper, sell spot silver, and sell spot molybdenum.
- ✓ **C)** Buy spot copper, sell spot silver, and do not trade molybdenum.

Explanation

First we must determine whether the futures contracts are mispriced, by multiplying the commodity price by (1 + the risk-free rate), or 1.0375. The basic equation uses the risk-free rate, but we have the actual borrowing rate, and for real-world purposes the actual borrowing rate provides a more accurate price estimate. For practical purposes, we should probably use the borrowing rate, but both rates provide the same answer to the question above. For illustration purposes, we use the risk-free rate in the discussion below.

It turns out that all three contracts are mispriced. Copper futures are overpriced, and silver and molybdenum futures are underpriced. However, transaction costs muddy the water. Assuming a 3% commission on futures trades, the price differential on molybdenum is not sufficient to justify an arbitrage trade. Thus, the traders should buy copper, for which the futures contract is overpriced, and sell silver, for which the futures contract is underpriced, and make no trades in molybdenum despite the fact that the futures contract is underpriced.

	Copper (per pound)	*Silver (per ounce)*	*Molybdenum (per pound)*
Spot price	G3.15	G12.75	G34.45
Futures price	G3.54	G12.82	G35.23
No-arbitrage futures price	G3.27	G13.23	G35.74
Potential arbitrage profits	G0.27	G0.41	G0.51
Transaction costs	G0.11	G0.38	G1.06

Arbitrage opportunity	Yes	Yes	No

(Study Session 16, LOS 52.h)

Question #65 of 85

Question ID: 464089

Assume that Globos has taken a position in the Eurodollar futures contract, it is now 60 days later and the contract is expiring. Globos interest rate forecast for 90-day LIBOR was correct. The value of the futures contract at expiration is *closest* to:

✓ **A) $980,250.**

✗ **B)** $981,000.

✗ **C)** $921,000.

Explanation

The Eurodollar futures contract is based on 90-day LIBOR.
The forecast for 90-day LIBOR was 7.9%. Thus, the contract price at expiration is:

$1,000,000 × (1 − (0.079 × 90/360)) = $980,250. (Study Session 14, LOS 46.g)

Question #66 of 85

Question ID: 464090

Which of the following would be *most likely* to cause a contango situation with silver futures in Mazakhastan?

✗ **A) An increase in the availability of asset-backed loans.**

✗ **B)** A huge silver discovery.

✓ **C)** A shortage of warehouse space that drives up rental rates.

Explanation

In a contango situation, futures prices are higher than the spot price. This normally occurs when there are no benefits to holding an asset, or when the costs of storing an asset are high enough to offset the benefits of holding the asset. An increase in the availability of asset-backed loans would increase the convenience yield of silver, which would not cause a contango situation. A silver discovery could have some effect on the price of silver, but should not affect a contango situation one way or another. On the other hand, an increase in storage costs would offset some of the convenience yield. We don't know whether such an increase in costs would be enough to make the net cost of holding silver positive, but any increase in costs could contribute to a contango situation. (Study Session 14, LOS 46.e)

Question #67 of 85

Question ID: 464013

The price of a forward contract:

✗ **A) must be equal to the market price at contract termination.**

✗ **B)** is equal to the value of the contract in equilibrium.

✓ **C)** is the settlement price for the underlying asset.

Explanation

The price of a forward contract is the price of the underlying asset that the long will pay to the short at settlement (for a deliverable contract). The value of a forward contract comes from the difference between the forward contract price and the

market price for the underlying asset. This difference between price and value is a key concept to understand. A forward contract has only one price, which applies to both the long and to the short.

Question #68 of 85

Question ID: 464078

Under the view that futures markets are primarily a mechanism for short hedgers and long hedgers to offset their respective asset price risks:

- ✗ **A) expected future asset prices are less than the futures prices.**
- ✓ **B)** futures prices will be unbiased predictors of future spot rates.
- ✗ **C)** forward prices will be greater than futures prices.

Explanation

Under the view that futures markets are primarily a mechanism for short hedgers and long hedgers to offset their respective risks, futures prices will be unbiased predictors of future spot rates.

Question #69 of 85

Question ID: 464074

Which of the following *best* defines normal contango? Normal contango is when the futures price lies:

- ✗ **A) below the expected future spot price and the futures price falls over the life of the contract.**
- ✗ **B)** above the expected future spot price and the futures price rises over the life of the contract.
- ✓ **C)** above the expected future spot price and the futures price falls over the life of the contract.

Explanation

A pattern of falling futures prices is known as normal contango. This situation occurs if hedgers are net long.

Question #70 of 85

Question ID: 464082

An index is currently 876, the risk-free rate (R_f) is 7%, and the dividend yield on the index portfolio is 1.8%. Assuming that these are continuously compounded yields, the price of an 18-month index future is *closest* to:

- ✓ **A) 947.1.**
- ✗ **B)** 943.0.
- ✗ **C)** 945.2.

Explanation

FP = 876 $e^{(0.07-0.018)1.5}$ = 947.1.

Question #71 of 85

Question ID: 464067

Which of the following best defines backwardation? The market is said to be in backwardation if:

✗ **A) the futures price exceeds the cash price or the distant futures price exceeds the nearby futures price.**

✓ **B)** the cash price exceeds the futures price.

✗ **C)** the futures price exceeds the cash price.

Explanation

Backwardation occurs when there is a convenience, or security, associated with holding the spot asset, usually when it is uncertain whether the asset will even be available in the future. Backwardation is rare with financial futures.

Question #72 of 85

Question ID: 464021

A stock is currently priced at $110 and will pay a $2 dividend in 85 days and is expected to pay a $2.20 dividend in 176 days. The no arbitrage price of a six-month (182-day) forward contract when the effective annual interest rate is 8% is *closest* to:

✗ **A) $110.20.**

✗ **B)** $110.00.

✓ **C)** $110.06.

Explanation

In the formulation below, the present value of the dividends is subtracted from the spot price, and then the future value of this amount at the expiration date is calculated.

$(110 - 2/1.08^{85/365} - 2.20/1.08^{176/365})\ 1.08^{182/365} = \$110.06$

Alternatively, the future value of the dividends could be subtracted from the future value of the stock price based on the risk-free rate over the contract term.

Question #73 of 85

Question ID: 464068

A situation where the futures price is below the spot price of the asset is called:

✗ **A) contango.**

✓ **B)** backwardation.

✗ **C)** negative carry.

Explanation

A situation where the futures price is below the spot price of the underlying asset is called backwardation.

Question #74 of 85

Question ID: 464050

What is the difference between spot and futures prices? Spot prices are always:

✗ **A) lower than futures prices.**

✓ **B)** equal to the futures price at futures expiration.

✗ **C)** delivered to meet the futures obligation at expiration.

Explanation

The difference between the spot and the futures price must be zero at expiration to avoid arbitrage.

Question #75 of 85

Question ID: 464057

The value of a futures contract:

✓ **A) is zero after the mark-to-market period.**

✗ **B)** is equal to the margin balance in the futures account after the mark-to-market period.

✗ **C)** is based on the difference between the futures price at contract initiation and the current futures price.

Explanation

The value of a futures contract may be positive or negative during a trading day, however when the account is marked-to-market the futures price is effectively reset to the most recent settle price so that the contract has zero value unless the equilibrium price is outside daily price change limits.

Question #76 of 85

Question ID: 464072

Under the view that futures transfer risk from asset holders to futures buyers, the:

✗ **A) convenience yield is positive.**

✗ **B)** expected asset price in the future will be less than the futures price.

✓ **C)** futures price will be less than the expected future spot price.

Explanation

Under the view that futures transfer risk from asset holders to futures buyers, the futures price will be less than the expected future spot price. The longs (speculators) must be compensated for bearing asset price risk by receiving a lower future purchase price for the asset.

Question #77 of 85

Question ID: 464064

Consider two assets with identical storage costs. For the asset with the greater convenience yield, the percentage difference between the no-arbitrage price and the spot price will be:

✗ **A) greater at contract initiation but the same at expiration.**

✓ **B)** lower any time prior to expiration.

✗ **C)** greater throughout the term of the contract.

Explanation

The net costs of holding an asset are *Net Costs* = *Storage Costs* - *Convenience Yield*. When the convenience yield is higher, net costs of carrying (storing) the asset are lower, and the futures price will be lower. The difference between the spot price and the futures price is zero at expiration for any asset.

Question #78 of 85

Question ID: 464010

The contract price of a forward contract is:

✓ **A) the price that makes the contract a zero-value investment at initiation.**

✗ **B)** always the present value of the expected future spot price.

✗ **C)** determined at the settlement date.

Explanation

The contract price can be an interest rate, discount, yield to maturity, or exchange rate. The forward price is the future value of the spot price adjusted for any periodic payments expected from the asset. An example of when the forward price may be less than the spot price is in the case of an equity index contract where the dividend yield is greater than the risk-free rate.

Question #79 of 85

Question ID: 464026

Calculate the price of a 200-day forward contract on an 8% U.S. Treasury bond with a spot price of $1,310. The bond has just paid a coupon and will make another coupon payment in 150 days. The annual risk-free rate is 5%.

✓ **A) $1,305.22.**

✗ **B)** $1,333.50.

✗ **C)** $1,270.79.

Explanation

Coupon = (1,000 × 0.08) / 2 = $40.00

Present value of coupon payment = $40.00 / $1.05^{150/365}$ = $39.21

Forward price on the fixed income security = ($1,310 - $39.21) × $(1.05)^{200/365}$ = $1,305.22

Question #80 of 85

Question ID: 464080

The primary reason that Eurodollar futures contracts do not allow a pure arbitrage opportunity relative to LIBOR is that:

✗ **A) the Eurodollar future is denominated in U.S. dollars and LIBOR is based upon Eurodollar time deposits.**

✗ **B)** Eurodollar futures do not have a delivery option that increases price efficiency.

✓ **C)** the value of the deposit does not change $25 for every basis point change in expected 90-day LIBOR.

Explanation

Eurodollar futures are priced at a discount yield. LIBOR is an add-on yield, which is the rate that is earned on the face amount of a deposit. The result is that the deposit value is not perfectly hedged by the Eurodollar contract.

Question #81 of 85

Question ID: 464059

When interest rate changes are negatively correlated with the price changes of the asset underlying a futures/forward contract:

✗ **A)** **futures prices may be higher or lower depending on the risk-free rate and price volatility.**

✗ **B)** futures prices are higher.

✓ **C)** forward prices are higher.

Explanation

A negative correlation between asset price changes and interest rate changes makes the mark-to-market feature unattractive to a futures buyer. This leads to a lower futures price, compared to the forward price on an otherwise identical contract.

Question #82 of 85

Question ID: 464023

Calculate the price (expressed as an annualized rate) of a 1x4 forward rate agreement (FRA) if the current 30-day rate is 5% and the 120-day rate is 7%.

✗ **A)** **6.86%.**

✗ **B)** 7.47%.

✓ **C)** 7.63%.

Explanation

A 1x4 FRA is a 90-day loan, 30 days from today.
The actual rate on the 30-day loan is: R30 = 0.05 x 30/360 = 0.004167
The actual rate on the 120-day loan is: R120 = 0.07 x 120/360 = 0.02333
FR (30,90) = [(1+ R120)/(1+ R30)] - 1 = (1.023333/1.004167) - 1 = 0.0190871
The annualized 90-day rate = 0.0190871 x 360/90 = .07634 = 7.63%

Question #83 of 85

Question ID: 464083

The price of a 9-month future on a newly issued Treasury bond is calculated as the bond price:

✗ **A)** **increased at the 9-month risk-free rate, minus one coupon payment.**

✗ **B)** minus one coupon payment, increased at the 9-month risk-free rate.

✓ **C)** increased at the 9-month risk-free rate, minus one coupon payment increased at the 3-month rate for money 6 months from now.

Explanation

The no-arbitrage 9-month futures price for a newly issued coupon bond is calculated as:

Bond Price $(1 + R_f)^{9/12}$ − Coupon $(1 + R_f)^{3/12}$

An alternative (equivalent) method is:

[Bond Price − (Coupon / $(1 + R_f)^{6/12}$)]$(1 + R_f)^{9/12}$

Question #84 of 85

Question ID: 464019

The value of the S&P 500 Index is 1,260. The continuously compounded risk-free rate is 5.4% and the continuous dividend yield is 3.5%. Calculate the no-arbitrage price of a 160-day forward contract on the index.

✗ **A) $562.91.**

✗ **B)** $1,310.13.

✓ **C)** $1,270.54.

Explanation

$FP = 1{,}260 \times e^{(0.054 - 0.035) \times (160 / 365)} = 1{,}270.54$

Question #85 of 85

Question ID: 464075

Which of the following statements regarding normal backwardation is CORRECT? Futures prices tend to:

✗ **A) rise over the life of the contract because hedgers are net long and have to receive compensation for bearing risk.**

✗ **B)** fall over the life of the contract because hedgers are net short and have to receive compensation for bearing risk.

✓ **C)** rise over the life of the contract because speculators are net long and have to receive compensation for bearing risk.

Explanation

Normal backwardation means that *expected future spot prices* are greater than futures prices. It suggests that when hedgers are net short futures contracts, they must sell them at a discount to the expected future spot prices to get speculators to assume the risk of holding a net long position. The futures price rises over the life of the contract, which compensates speculators for the exposure of their long positions.