2024 FRM Part I

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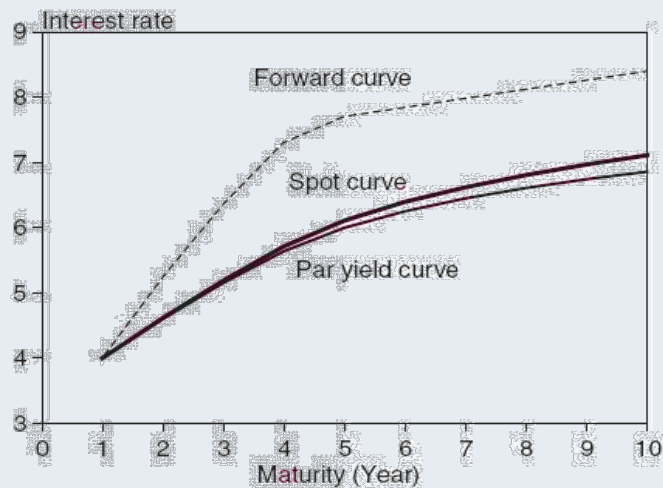# 金融市场与产品

2024 年 03 月

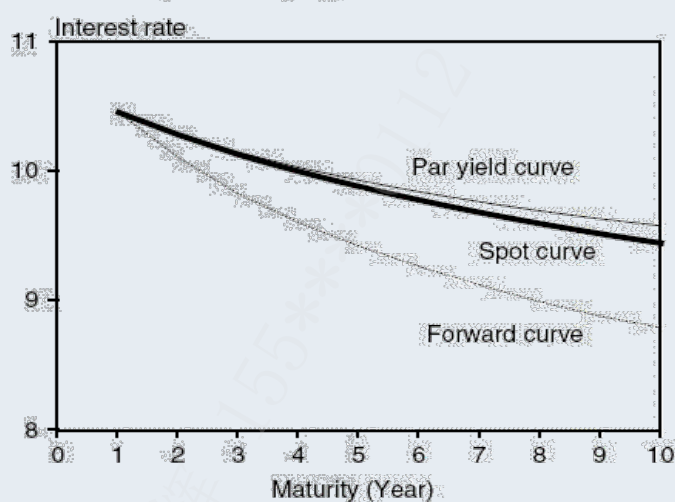## 3.   Financial Markets and Products

3.1.   Spot Rate and Forward Rate

3.1.1.   重要知识点

3.1.1.1.   Spot Rate and Forward Rate

Upward-Sloping Term Structure

Downward-Sloping Term Structure

➢ Forward rates are interest rates implied by the spot curve for a specified future period. The forward rate between T1 and T2 can be calculated as:

$$(1+Z_1)^{T_1} \left(1+F_{1,2}\right)^{(T_2 - T_1)} = \left(1 + Z_2\right)^{T_2}$$

$$e^{Z_1 T_1} \times e^{F_{1,2}(T_2 - T_1)} = e^{Z_2 T_2} \Longrightarrow F_{1,2} = \frac{Z_2 T_2 - Z_1 T_1}{T_2 - T_1}$$

3.1.2.   基础题

Q-1.   The zero rate of three years is 4.6%, the zero rate of four years is 5.0%. Please calculate the 1-year forward rate three years from today (continuously compounding).

A.   6.2%

B.   6.0%

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C.   5.5%

D.   4.8%

Q-2.   Suppose that the yield curve is upward sloping. Which of the following statements is TRUE?

A.   The forward rate yield curve is above the zero-coupon yield curve, which is above the coupon-bearing bond yield curve.

B.   The forward rate yield curve is above the coupon-bearing bond yield curve, which is above the zero-coupon yield curve.

C.   The coupon-bearing bond yield curve is above the zero-coupon yield curve, which is above the forward rate yield curve.

D.   The coupon-bearing bond yield curve is above the forward rate yield curve, which is above the zero-coupon yield curve.

Q-3.   The price of a three-year zero coupon government bond is 85.16. The price of a similar four-year bond is 79.81. What is the one-year implied forward rate form year 3 to year 4?

A.   5.4%

B.   5.5%

C.   5.8%

D.   6.7%

Q-4.   The interest rate for a 1-year period is 5% and the rate for a 2-year period is 6%. Assuming continuous compounding, what is the forward rate for the period from the end of the first year to the second year?

A.   6.9991%

B.   7.0000%

C.   7.0009%

D.   8.0000%

Q-5.   Given the following bonds and forward rates:

Maturity	YTM	Coupon	Price
1 year	4.5%	0%	95.694
2 years	7%	0%	87.344
3 years	9%	0%	77.218

●   1-year forward rate one year from today = 9.56%

●   1-year forward rate two years from today = 10.77%

- 2-year forward rate one year from today = 11.32%

Which of the following statements about the forward rates, based on the bond prices, is true?

A. The 1-year forward rate one year from today is too low.

B. The 2-year forward rate one year from today is too high.

C. The 1-year forward rate two years from today is too low.

D. The forward rates and bond prices provide no opportunities for arbitrage.

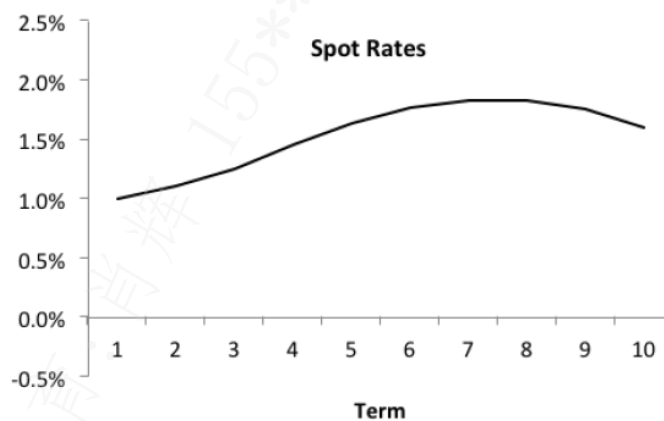**Q-6.** Below is a table of term structure of swap rates:

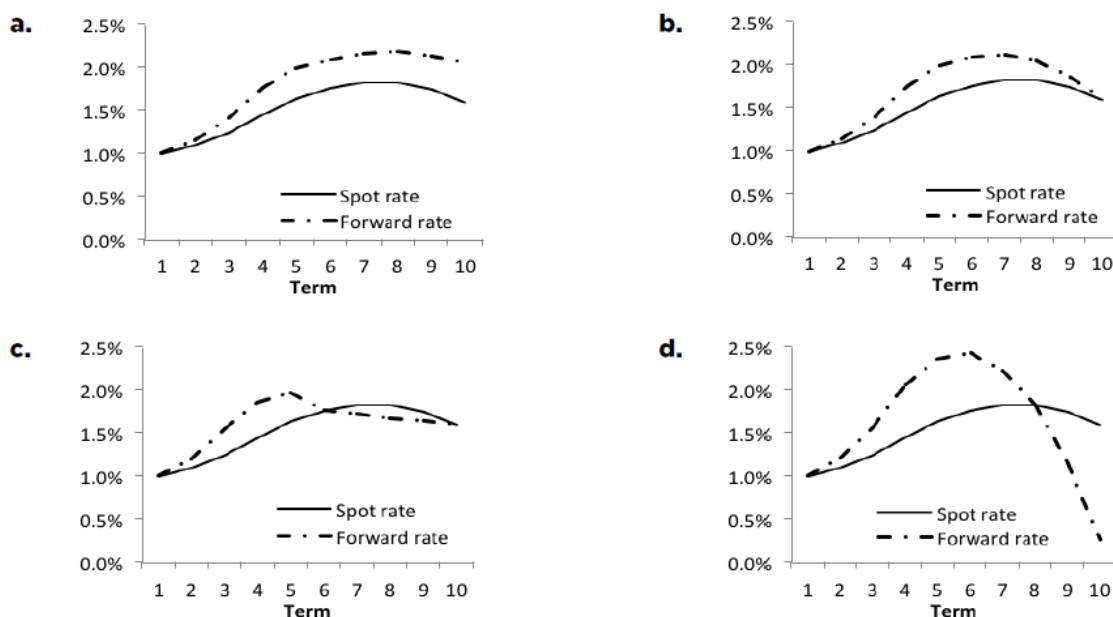| Maturity in Years	Swap Rate
1	2.50%
2	3.00%
3	3.50%
4	4.00%
5	4.50%

The 2-year forward swap rate starting in three years is closest to:

A. 3.50%

B. 4,50%

C. 5.51%

D. 6.02%

Q-7. Below is a chart showing the term structure of risk-free spot rates:

Which of the following charts presents the correct derived forward rate curve?

3.2. Corporate Bonds

3.2.1. 重要知识点

3.2.1.1. Corporate Trustee

> The corporate trustee is a third party to the contract. The trustee acts in a fiduciary (legal) capacity on behalf of the investors. Acting on behalf of the bondholders, the trustee must ensure that the bond issuer is in compliance with the covenants of the indenture at all times.

3.2.2. 基础题

Q-8. As it relates to the bond indenture, the corporate trustee acts in a fiduciary capacity for:

I.   bond investors

II.   bond issuers

III. bond underwriters

IV.   regulators

A.   I only

B.   II only

C.   I and IV

D.   II and III

Q-9. TRSC, a trust company specializing in corporate investments, is brought in as a corporate trustee for a recent bond issue made by Banko, a small investment bank. Which of the following statements about TRSC and its role as a third party to the indenture is correct?

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A. TRSC must monitor Banko's financial situation to foresee any covenant breaches.

B. When deemed necessary, TRSC should take action beyond the terms of the indenture in order to protect bondholders.

C. TRSC must take action according to the terms of the indenture whenever it is requested by bondholders.

D. TRSC is paid by Banko to represent the interests of the bondholders.

Q-10.   Relative to coupon-bearing bonds of same maturity, zero-coupon bonds are NOT subject to which type of risk?

A. Interest rate risk

B. Credit risk

C. Reinvestment risk

D. Liquidity risk

Q-11.   Which of the following statements regarding the trustee named in a corporate bond indenture is correct?

A. The trustee has the authority to declare a default if the issuer misses a payment.

B. The trustee may take action beyond the indenture to protect bondholders.

C. The trustee must act at the request of a sufficient number of bondholders.

D. The trustee is paid by the bondholders or their representatives.

Q-12.   Which of the following statements about high-yield bonds is true?

A. High-yield bonds are always issued by well-established companies with strong financial statements.

B. Investment-grade bonds can never become high-yield bonds.

C. High-yield bonds are typically rated below BBB grade.

D. Step-up bonds pay no interest for a specified time period.

3.3.   Bond Pricing

3.3.1. 重要知识点

3.3.1.1. Bond Pricing

$$P = \frac{C_1}{1+y} + \frac{C_2}{(1+y)^2} + \cdots + \frac{C_T}{(1+y)^T} = \sum_{t=1}^{T} \frac{C_t}{(1+y)^t}$$

3.3.1.2. Perpetual Bond

$$P = \frac{CF}{1+y} + \frac{CF}{(1+y)^2} + \cdots = \sum_{t=1}^{+\infty} \frac{CF}{(1+y)^t} = \frac{CF}{y}$$

3.3.1.3. Clean Price & Dirty Price

Dirty price = clean price + accrued price

3.3.2. 基础题

Q-13. The price of a 182-day U.S. Treasury bill is quoted as 5.20. What is the Cash Price for a purchase of $1 million in face value?

   A. $970,701

   B. $973,711

   C. $976,721

   D. $979,731

Q-14. Given a one-year and a three-year zero coupon bonds price of 95.18 and 83.75 respectively, what should be the price of a two year zero coupon bond using linear interpolation on zero rates (semiannual compounding)?

   A. 95.18

   B. 89.47

   C. 89.72

   D. 83.75

Q-15. A two-year zero-coupon bond issued by corporate XYZ is currently rated A. One year from now XYZ is expected to remain at A with 85% probability, upgraded to AA with 5% probability, and downgraded to BBB with 10% probability. The risk free rate is flat at 4%. The credit spreads are flat at 40, 80, and 150 basis points for AA, A, and BBB rated issuers, respectively. All rates are compounded annually. Estimate the expected value of the zero-coupon bond one year from now (for USD 100 face amount).

   A. USD 92.59

   B. USD 95.33

   C. USD 95.37

   D. USD 95.42

Q-16. A $1,000 par corporate bond carries a coupon rate of 6%, pays coupons semiannually, and has ten coupon payments remaining to maturity. Market rates are currently 5%. There are 90 days between settlement and the next coupon payment. The dirty and clean prices of the bond, respectively, are closest to:

   A. $1,043.76, $1,013.76

   B. $1,043.76, $1,028.76

   C. $1,056.73, $1,041.73

D. $1,069.70, $1,054.70

Q-17.   An investor buys $10,000 face amount of the U.S. Treasury 6 1/2 (coupon rate = 6.50%) of August 15, 2017, for settlement on July 1st, 2014. The last coupon paid on February 15, 2014 and the next coupon pays on August 15, 2014. The bond's yield to maturity happens to be 4.00%. What is nearest to the bond's quoted price at settlement?

A. $9,338.48

B. $9,904.15

C. $10,095.07

D. $10,726.83

3.4.   Exchange VS. Over the Counter Market

3.4.1.   重要知识点

Over-the-Counter	Exchange-Traded
Customized	Standardized
Trade with counterparty (Default Risk)	Backed by a clearing house
Not trade in a central location	Trade in a physical exchange
Unregulated	Regulated
Trading volume: large	Trading volume: small

3.4.2.   基础题

Q-18.   Which of the following statements is an advantage of an exchange trading system? On an exchange system:

A.   Terms are not specified.

B.   Trades are made in such a way as to reduce credit risk.

C.   Participants have flexibility to negotiate.

D.   In the event of a misunderstanding, calls are recorded between parties.

3.5.   CCPs

3.5.1.   重要知识点

3.5.1.1.   Central Counterparties (CCPs):

➢   When trades are centrally cleared, a CCP becomes the seller to a buyer and the buyer to a seller.

3.5.1.2.   Advantages of CCPs:

➢   Transparency, offsetting, loss mutualization, legal and operational efficiency, liquidity, and default management.

3.5.1.3. Disadvantages of CCPs:

➢ Moral hazard, adverse selection, separation of cleared and non-cleared products, and margin procyclicality.

3.5.1.4. Risks faced by CCPs:

➢ Default risk, model risk, liquidity risk, operational risk, and legal risk.

➢ Default of a clearing member and its flow through effects is the most significant risk for a CCP

3.5.2. 基础题

Q-19. Which of the following statements least likely describe a problem with bilaterally cleared over-the-counter (OTC) derivatives trades?

A. The defaults of individual counterparties could lead to systemic problems.

B. Bilateral OTC derivatives are often non-standard with exotic features.

C. Closing out trades may be difficult.

D. Loss mutualization may not spread all the losses among participants.

Q-20. Which of the following functions is least likely performed by an exchange?

A. Derivatives contract design and specifying contract terms.

B. Price negotiation through a bilateral process.

C. Limiting access to approved firms and individuals.

D. Reporting transaction prices to trading participants and data vendors.

Q-21. Alex Dell, a derivatives trader, has some reservations about the central clearing of OTC derivatives with a central counterparty (CCP). Specifically, he is worried that clearing members' willingness to monitor credit risk may decline since the CCP assumes most of the risks, and that CCPs may increase margin requirements during a period of market stress. Which of the following concepts best describe Dell's reservations?

	Decline in Willingness	Higher Margin Requirements
A.	Moral hazard	Procyclicality
B.	Adverse selection	Offsetting
C.	Moral hazard	Offsetting
D.	Adverse selection	Procyclicality

Q-22. XYZ, a clearinghouse member, has recently contributed funds with its clearinghouse. The funds are designed to give the clearinghouse the ability to meet the financial obligations of any defaulting members. The funds may not be withdrawn by XYZ as long as it remains a member of the clearinghouse. Which of the following amounts best describe XYZ's

contribution?

A. Variation margin

B. Original margin

C. Membership dues

D. Guaranty deposit

Q-23. Jack Johnson is going to receive a physical commodity from a settling long futures trade. Which of the following statements best describe the role of Johnson and the clearinghouse in this process?

A. The clearinghouse will coordinate Johnson's settlement with any eligible settling shorts.

B. Johnson will have to contact the clearinghouse to coordinate with any eligible settling short.

C. Johnson will have to close his position with the original counterparty.

D. The clearinghouse will coordinate Johnson's settlement with the original counterparty only.

3.6. Forward Rate Agreement (FRA)

3.6.1. 重要知识点

> ➢ A long FRA position benefits from an increase in rates. A short FRA positions similar to a long position in a bond.

3.6.2. 基础题

Q-24. A long position in a FRA 2 × 5 is equivalent to the following positions in the spot market:

A. Borrowing in two months to finance a five-month investment.

B. Borrowing in five months to finance a two-month investment.

C. Borrowing half a loan amount at two months and the remainder at five months.

D. Borrowing in two months to finance a three-month investment.

Q-25. A company wants to borrow $10 million for 90 days starting in one year. To hedge the interest rate risk of the future borrowing, the company enters into a forward rate agreement (FRA) where the company will pay a fixed rate, R(k), of 5.0%. The FRA cash settles in one year; i.e., in advance (T=1.0) not in arrears (T=1.25). All rates are expressed with quarterly compounding. If the actual 90-day LIBOR observed one year forward turns out to be 6.0%, what is the cash flow payment/receipt by the company under the FRA?

A. Company pays $24,631

B. Company pays $25,000

C. Company receives $24,631

D.   Company receives $25,000

3.7.   Margin

3.7.1.   重要知识点

3.7.1.1.   Initial Margin

➤   Must be deposited when contract is initiated

3.7.1.2.   Marking to Market

➤   At the end of each trading day, margin account is adjusted to reflect gains or losses.

3.7.1.3.   Maintenance Margin

➤   Investor can withdraw funds in the margin account in excess of the initial margin. A maintenance margin guarantees that the balance in the margin account never gets negative (the maintenance margin is lower than the initial margin).

3.7.1.4.   Margin Call

➤   When the balance in the margin account falls below the maintenance margin, broker executes a margin call. The next day, the investor needs to "top up" the margin account back to the initial margin level.

3.7.1.5.   Variation margin

➤   Extra funds deposited by the investor after receiving a margin call.

➤   Variation margin = initial margin – margin account balance

3.7.2.   基础题

Q-26.   To utilize the cash position of assets under management, a portfolio manager enters into a long futures position on the S&P 500 index with a multiplier of 250. The cash position is $15 million with the current futures value of 1000, which requires the manager to long 60 contracts. If the current initial margin is $12500 per contract, and the current maintenance margin is $10000 per contract, what variation margin does the portfolio manager have to advance if the futures contract value falls to 995 at the end of the first day of the position being placed?

A. $30,000

B. $0

C. $300,000

D. $75,000

Q-27.   In late June, John purchased two December gold futures contracts. Each contract size is 5,000 ounces of silver and the futures price on the date of purchase was USD 18.62 per ounce. The required initial margin is USD 6,000 and a maintenance margin of USD 4,500.

You are given the following price history for the December silver futures:

Day	Futures Price	Daily Gain
June 29	18.62	0
June 30	18.69	700
July 1	18.03	-6600
July 2	17.72	-3100
July 6	18.00	2800
July 7	17.70	-3000
July 8	17.60	-1000

On which days did John receive a margin call?

A. July 1 only

B. July 1 and July 2 only

C. July 1, July 2 and July 7 only

D. July 1, July 2 and July 8 only

Q-28. Assume you enter into 5 long futures contracts to buy July gold for $1,400 per ounce. A gold futures contract size is 100 troy ounces. The initial margin is $14,000 per contract and the maintenance margin is 75% of the initial margin. What change in the futures price of gold will lead to a margin call?

A. $35 drop

B. $70 drop

C. $175 drop

D. $350 drop

3.8. Order Terms

3.8.1. 重要知识点

3.8.1.1. Market Order
  ➤ The market order is a simple (the simplest) request to execute the trade immediately at the best available price.

3.8.1.2. Limit Order
  ➤ A limit order specifies a particular price. The order can be executed only at this price or at one more favorable to the investor.

3.8.1.3. Stop Loss
  ➤ The order is executed at the best available price once a bid or offer is made at that particular price or a less-favorable price.

3.8.1.4. Stop-Limit
  ➤ The order becomes a limit order as soon as a bid or offer is made at a price equal to or less favorable than the stop price.

3.8.1.5. Market-if-Touched

➢ A market-if-touched (MIT) order is executed at the best available price after a trade occurs at a specified price or at a price more favorable than the specified price.

3.8.1.6. Discretionary

➢ A market order except that execution may be delayed at the broker's discretion in an attempt to get a better price.

3.8.2. 基础题

Q-29. Assume you have a long position in a stock with a current market price of $35. You have two goals. First, to retain ownership as long as the stock continues to go up. Second, to exit the position completely if the stock drops below $30. Which order best meets your dual objectives?

A. Sell market order

B. Sell limit order at $37

C. Stop-loss sell order at $30

D. Stop-and-limit sell order at $30

Q-30. An investor with a long position in a futures contract wants to issue instructions to close out the position. A market-if-touched order would be used if the investor wants to:

A. Execute at the best available price once a trade occurs at the specified or better price.

B. Execute at the best available price once a bid/offer occurs at the specified or worse price.

C. Allow a broker to delay execution of the order to get a better price.

D. Execute the order immediately or not at all.

3.9. T-bond futures, CTD bond

3.9.1. 重要知识点

➢ In a T-bond futures contract, any government bond with more than 15 years to maturity on the first of the delivery month (and not callable within 15 years) is deliverable on the contract.

➢ The procedure to determine which bond is the cheapest-to-deliver (CTD) is as follows:

Cash received by the short = (QFP × CF) + AI

Cost to purchase bond = QBP + AI

Where:

QFP = quoted futures price

CF = conversion factor

QBP = quoted bond price

➤ The CTD is the bond that minimizes the following: QBP – (QFP × CF). This formula calculates the cost of delivering the bond.

3.9.2. 基础题

Q-31. The yield curve is upward sloping. You have a short T-bond futures position. The following bonds are eligible for delivery:

Bond	A	B	C
Spot price	102-14/32	106-19/32	98-12/32
Coupon	4%	5%	3%
Conversion factor	0.98	1.03	0.952

The futures price is 103-17/32 and the maturity date of the contract is September 1. The bonds pay their coupon semiannually on June 30 and December 31. The cheapest to deliver bond is:

A. Bond A

B. Bond B

C. Bond C

D. Insufficient information

Q-32. A German housing corporation needs to hedge against rising interest rates. It has chosen to use futures on 10-year German government bonds. Which position in the futures should the corporation take, and why?

A. Take a long position in the futures because rising interest rates lead to rising futures prices.

B. Take a short position in the futures because rising interest rates lead to rising futures prices.

C. Take a short position in the futures because rising interest rates lead to declining futures prices.

D. Take a long position in the futures because rising interest rates lead to declining futures prices.

3.10. Eurodollar Futures

3.10.1. 重要知识点

➤ This contract settles in cash and the minimum price change is one "tick", which is a price change of one basis point, or $25 per $1 million contract.

➤ The interest rate underlying this contract is essentially the 3-month (90-day)

forward LIBOR. If Z is the quoted price for a Eurodollar futures contract, the contract price is:

Eurodollar futures price = $10,000 × [100–(0.25)×(100 − Z)] = 10,000×[100–0.25F_t]

➤ Convexity adjustment: The daily marking to market aspect of the futures contract can result in differences between actual forward rates and those implied by futures contracts.

Forward rate = Futures rate – $0.5 × σ^2 × T × (T+0.25)$

3.10.2. 基础题

Q-33. Consider an FRA (forward rate agreement) with the same maturity and compounding frequency as a Eurodollar futures contract. The FRA has labor underlying. Which of the following statements are true about the relationship between the forward rate and the futures rate?

A. The forward rate is normally higher than the futures rate.

B. They have no fixed relationship.

C. The forward rate is normally lower than the futures rate.

D. They should be exactly the same.

Q-34. The four-year Eurodollar futures quote is 97.00. The volatility of the short-term interest rate (LIBOR) is 1.0%, expressed with continuous compounding. What is the equivalent forward rate, adjusted for convexity, given in ACT/360 day count with continuous compounding (i.e., the Eurodollar futures contract gives LIBOR in quarterly compounding ACT/360, so convert to continuous but a day count conversion is not needed)?

A. 2.90%

B. 2.95%

C. 2.99%

D. 3.00%

3.11. Forward and Futures Price

3.11.1. 重要知识点

3.11.1.1. Forward and Futures Price

➤ Forward Price for a Financial Asset that Provides no Income: $F = S(1 + R)^T$

➤ Forward Price for a Financial Asset that Paying a Known Cash Income: $F = (S − I)(1 + R)^T$

➤ Forward Price for a Financial Asset that Provides a Known Yield: $F = S \left(\frac{1+R}{1+Q} \right)^T$

> - Forward Price for a Commodity Asset with a Lease Rate: $F = S\left(\frac{1+R}{1+I}\right)^{T}$

> - Forward Price for a Commodity with Storage Cost & Convenience Yield: $F = (S + U)\left(\frac{1+R}{1+Y}\right)^{T}$

3.11.1.2. Arbitrage

> - If $F > S(1+R)^{T}$, borrow, buy spot, sell forward today; deliver asset, repay loan at end.

> - If $F < S(1+R)^{T}$, short spot, invest, buy forward today; collect loan, buy asset under futures contract, deliver to cover short sale.

3.11.1.3. Interest Rate Parity

$$F = S\left(\frac{1 + R_A}{1 + R_B}\right)^{T}$$

3.11.2. 基础题

Q-35. A stock index is valued at USD 750 and pays a dividend at the rate of 2% per annum. The 6-month futures contract on that index is trading at USD 757. The risk-free rate is 3.5% annually compounded. There are no transaction costs or taxes. Is the futures contract priced so that there is an arbitrage opportunity? If yes, which of the following numbers comes closest to the arbitrage profit you could realize by taking a position in one futures contract?

A. 4.18

B. 1.51

C. 12.60

D. There is no arbitrage opportunity.

Q-36. A trader in the arbitrage unit of a multinational bank finds that an asset is trading at USD 1,000, the price of a 1-year futures contract on that asset is USD 1,010, and the price of a 2-year futures contract is USD 1,025. Assume that there are no cash flows from the asset for 2 years. If the term structure of interest rates is flat at 1% per year (annually compounded), which of the following is an appropriate arbitrage strategy?

A. Short 2-year futures and long 1-year futures

B. Short 1-year futures and long 2-year futures

C. Short 2-year futures and long the underlying asset funded by borrowing for 2 years

D. Short 1-year futures and long the underlying asset funded by borrowing for 1 year

Q-37. A risk manager is deciding between buying a futures contract on an exchange and buying a forward contract directly from a counterparty on the same underlying asset. Both

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contracts would have the same maturity and delivery specifications. The manager finds that the futures price is less than the forward price. Assuming no arbitrage opportunity exists, what single factor acting alone would be a realistic explanation for this price difference?

A. The futures contract is more liquid and easier to trade.

B. The forward contract counterparty is more likely to default.

C. The asset is strongly negatively correlated with interest rates.

D. The transaction costs on the futures contract are less than on the forward contract.

Q-38. A 15-month futures contract on an equity index is currently trading at USD 3,767.52. The underlying index is currently valued at USD 3,625 and has a annually compounded dividend yield of 6% per year. The annually compounded risk-free rate is 5% per year. Assuming no transactions costs, what is the potential arbitrage profit per contract and the appropriate strategy?

A. USD 185, buy the futures contract and sell the underlying.

B. USD 4, buy the futures contract and sell the underlying.

C. USD 185, sell the futures contract and buy the underlying.

D. USD 4, sell the futures contract and buy the underlying.

Q-39. A risk analyst at a commodities trading firm is examining the supply and demand conditions for various commodities and is concerned about the volatility of the forward prices for silver in the medium term. Currently, silver is trading at a spot price of USD 20.35 per troy ounce and the six-month forward price is quoted at USD 20.50 per troy ounce. Assuming that after six months the lease rate rises above the continuously compounded interest rate, which of the following statements is correct about the shape of the silver forward curve after six months?

A. The forward curve will be downward sloping.

B. The forward curve will be upward sloping.

C. The forward curve will be flat.

D. The forward curve will be humped.

Q-40. Current spot USDCHF rate: 1.3680 (1.3680CHF = 1USD)

3-month USD interest rates: 1.05%

3-month Swiss interest rates: 0.35%

(Assume annually compounding)

A currency trader notices that the 3-month future price is USD 0.7350. In order to arbitrage, the trader should investment:

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A. Borrow CHF, buy USD spot, go long CHF futures

B. Borrow CHF, sell CHF spot, go short CHF futures

C. Borrow USD, buy CHF spot, go short CHF futures

D. Borrow USD, sell USD spot, go long CHF futures

Q-41. You are examining the exchange rate between the U.S. dollar and the Euro and have the following information:

● Current exchange rate is 1.25USD per EUR.

● Current USD-denominated 1-year risk-free interest rate is 4% per year (annually compounded).

● Current EUR-denominated 1-year risk-free interest rate is 7% per year (annually compounded).

According to the interest rate parity theorem, what is the 1-year forward exchange rate?

A. 0.78

B. 0.82

C. 1.22

D. 1.29

Q-42. A derivatives desk trades US Treasury bond futures contracts. A junior analyst is asked to monitor the bond markets and the process of delivering a bond against an expiring futures contract. The analyst studies how changes in market conditions determine which bonds are more likely to be the cheapest-to-deliver and how the process of delivery impacts the futures price. Which of the following observations will the analyst find to be correct?

A. As bond yields increase, short maturity bonds with low coupons will tend to be the cheapest-to-deliver.

B. The embedded options associated with delivery against a US Treasury futures contract tend to increase the value of the contract.

C. The "wild card play" benefits owners of long positions in expiring futures contracts by allowing them to determine when counterparties holding short positions will deliver.

D. A downward-sloping yield curve makes it more likely that short-maturity bonds will be cheapest-to-deliver.

Q-43. A junior trader at an investment company is studying the structure of futures markets and the related spot markets for their underlying assets. The trader wants to identify any relationships that exist between the price movements in each market and any specific trades that can be recommended based on these relationships. Which of the following

is correct regarding futures prices and spot prices?

A. Futures prices may vary widely from the spot price of the underlying asset, but the two prices will typically converge as a futures contract approaches maturity.

B. Arbitrageurs keep the futures price and the underlying spot price close to each other throughout the life of the contract.

C. If the futures price is above the underlying spot price during the delivery period, a trader can profit by buying futures contracts and selling the underlying asset in the spot market.

D. The S&P 500 futures contract has the most trading activity of any futures contract due to its requirement to take physical delivery on the delivery date.

Q-44. A commodity trader is researching factors that impact the prices of commodity futures contracts. In addition to the supply and demand dynamics, the advisor identifies storage costs, lease rates, and convenience yields as factors that can influence commodity futures prices. Which of the following statements best describes one of these factors?

A. Storage cost is the main factor influencing the prices of long-term commodity futures contracts on industrial metals.

B. Lease rates on commodities are typically equal to the relevant risk-free interest rate and have a lower bound of zero.

C. Storage costs of agricultural commodities cause futures prices to display a mixture of normal and inverted pricing patterns.

D. Convenience yield is a charge subtracted from the lease rate by the lender of a commodity.

3.12. Contango and Backwardation

3.12.1. 重要知识点

3.12.1.1. Backwardation

➢ Refers to a situation where the futures price is below the spot price. For this to occur, there must be a significant benefit to holding the asset.

3.12.1.2. Contango

➢ Refers to a situation where the futures price is above the spot price. If there are no benefits to holding the asset (e.g., dividends, coupons, or convenience yield), contango will occur because the futures price will be greater than the spot price.

3.12.2. 基础题

Q-45. The current price of Commodity X in the spot market is $42.47. Forward contracts for delivery of Commodity X in one year are trading at a price of $43.11. If the current annually compounded annual risk-free interest rate is 7.0%, calculate the implicit lease

rate for Commodity X. Holding the calculated implicit lease rate constant, would the forward market for Commodity X be in backwardation or contango if the annually compounded annual risk-free rate immediately fell to 5.0%?

A. The implicit lease rate is 1.49%. Holding this rate constant, the forward market would be in contango if the annually compounded annual risk-free rate immediately fell to 5.0%.

B. The implicit lease rate is 5.40%. Holding this rate constant, the forward market would be in backwardation if the annually compounded annual risk-free rate immediately fell to 5.0%.

C. The implicit lease rate is 1.49%. Holding this rate constant, the forward market would be in backwardation if the annually compounded annual risk-free rate immediately fell to 5.0%.

D. The implicit lease rate is 5.40%. Holding this rate constant, the forward market would be in contango if the annually compounded annual risk-free rate immediately fell to 5.0%.

Q-46. In commodity markets, the complex relationships between spot and forward prices are embodied in the commodity price curve. Which of the following statements is true?

A. In a backwardation market, the discount in forward prices relative to the spot price represents a positive yield for the commodity supplier.

B. In a backwardation market, the discount in forward prices relative to the spot price represents a positive yield for the commodity consumer.

C. In a contango market, the discount in forward prices relative to the spot price represents a positive yield for the commodity supplier.

D. In a contango market, the discount in forward prices relative to the spot price represents a positive yield for the commodity consumer.

Q-47. A commodities trader observes quotes for futures contracts as follow:

Spot Price	321
July, 2014	312
October, 2014	310
December, 2014	309

This commodity is trading:

A. As a normal futures market since the futures prices are consistent with the commodity's seasonality.

B. As an inverted futures market since more distant delivery contracts are trading at lower prices than nearer-term ones.

C. As a normal futures market because it is typical for more distant delivery contracts to trade lower than nearer-term delivery contracts.

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D.   Consistently with convergence as futures prices will rise when the delivery period nears.

3.13. Forward Contract Value

3.13.1. 基础题

Q-48.   Three months ago a company entered in a one-year forward contract to buy 100 ounces of gold. At the time, the one-year forward price was USD 1,000 per ounce. The nine-month forward price of gold is now USD 1,050 per ounce. The annually-compounded risk-free rate is 4% per year for all maturities, and there are no storage costs. Which of the following is closest to the value of the contract?

A.   USD 5,000

B.   USD 4,855

C.   USD 7,955

D.   USD 1,897

Q-49.   A French bank enters into a 6-month forward contract with an importer to sell GBP 40 million in 6 months at a rate of EUR 0.80 per GBP. If in 6 months the exchange rate is EUR 0.85 per GBP, what is the payoff for the bank from the forward contract?

A.   EUR -2,941,176

B.   EUR -2,000,000

C.   EUR 2,000,000

D.   EUR 2,941,176

Q-50.   Company XYZ operates in the U.S. On April 1, 2009, it has a net trade receivable of EUR 5,000,000 from an export contract to Germany. The company expects to receive this amount on Oct. 1, 2009. The CFO of XYZ wants to protect the value of this receivable. On April 1, 2009, the EUR spot rate is 1.34, and the 6-month EUR forward rate is 1.33. The CFO can lock in an exchange rate by taking a position in the forward contract. Alternatively, he can sell a 6-month EUR 5,000,000 call option with strike price of 1.34. The CFO thinks that selling an option is better than taking a forward position because if the EUR goes up, XYZ can take delivery of the USD at 1.34, which is better than the outright forward rate of 1.33. If the EUR goes down, the contract will not be exercised. So, XYZ will pocket the premium obtained from selling the call option.

What can be concluded about the CFO's analysis?

A.   CFO's analysis is correct. The company is better off whichever way the EUR rate goes.

B.   CFO's analysis is not correct. The company will suffer if the EUR goes up sharply.

C.   CFO's analysis is not correct. The company will suffer if the EUR moves within a narrow range.

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D.   CFO's analysis is not correct. The company will suffer if the EUR goes down sharply.

Q-51.   A risk manager for an asset management firm is conducting scenario analysis on the valuation of a 2-year forward contract on stock MTE assuming a potential change in interest rates. The manager has the following information:

- Current price of stock MTE: USD 67.68
- Annually compounded risk-free rate of interest: -0.70%
- Annualized dividend yield of stock MTE: 0.44%

Assuming the forward contract is currently fairly priced, and all dividends are reinvested into stock MTE, what is the best estimate of the change in the value of the forward contract (per share of MTE) if the risk-free rate of interest were to immediately increase by 1%?

A.   USD -1.46

B.   USD -1.37

C.   USD 1.33

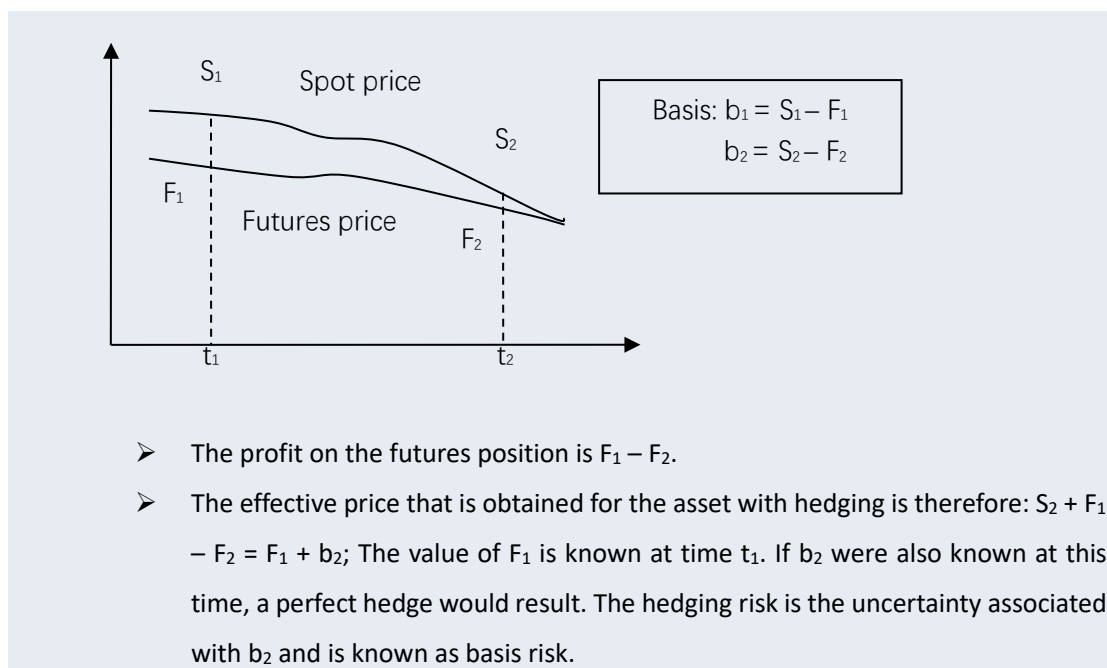D.   USD 1.43

Q-52.   A junior analyst at an investment firm is examining the terms and characteristics of options and forward derivative contracts. The analyst focuses on the distinctions between linear and non-linear derivative contracts when conducting the study. Which of the following statements regarding derivative contracts would most likely be correct for the analyst to make?

A.   The value of the underlying asset in a contract is determined by the value of the contract in both linear and non-linear derivatives.

B.   Options are linear derivatives that give the holder the right but not the obligation to buy or sell the underlying asset.

C.   Forward contracts are linear derivatives that require one party to the contract to make the payment at the pre-specified price and the other to deliver the underlying asset.

D.   The value of a forward contract is determined by both the price of the underlying asset and the volatility of the price.

3.14. Basis and Basis Risk

3.14.1. 重要知识点

> Define the basis and the various sources of basis risk, and explain how basis risks arise when hedging with futures.

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- ➤ The profit on the futures position is $F_1 - F_2$.
- ➤ The effective price that is obtained for the asset with hedging is therefore: $S_2 + F_1 - F_2 = F_1 + b_2$; The value of F_1 is known at time t_1. If b_2 were also known at this time, a perfect hedge would result. The hedging risk is the uncertainty associated with b_2 and is known as basis risk.

3.14.2. 基础题

Q-53. Which of the following statements are true with respect to basis risk?

I. Basis risk arises in cross-hedging strategies but there is no basis risk when the underlying asset and hedge asset are identical.

II. Short hedge position benefits from unexpected strengthening of basis.

III. Long hedge position benefits from unexpected strengthening of basis.

A. I and II

B. I and III

C. II only

D. III only

Q-54. The May 2011 spot price (S1) of wheat is $7.00 per bushel and the December 2011 futures price (F1) is $9.00. Going forward three months to August, assume the spot price (S2) of wheat increases to $7.30 and the December 2011 futures price (F2) increased to $9.10. What happens to the basis between May and August?

A. Basis strengthens by +$0.10

B. Basis weakens by +$0.10

C. Basis strengthens by +$0.20

D. Basis weakens by -$0.20

Q-55. A buffalo farmer is concerned that the price he can get for his buffalo herd will be less than he has forecasted. To protect himself from price declines in the herd, the farmer

has decided to hedge with live cattle futures. Specifically, he has entered into the appropriate number of cattle future position for September delivery that he believes will help offset any buffalo price declines during the winter slaughter season. The appropriate position and the likely sources of basis risk in the hedge are, respectively:

A. Short; choice of futures delivery date.

B. Short; choice of futures asset.

C. Short; choice of futures delivery date and asset.

D. Long; choice of futures delivery date and asset.

Q-56. You wish to hedge an investment in Zirconium using futures. Unfortunately, there are no futures that are based on this asset. To determine the best futures contract for you to hedge with, you run a regression of daily changes in the price of Zirconium against daily changes in the prices of similar assets which do have futures contracts associated with them. Based on your results, futures tied to which asset would likely introduce the least basis risk into your hedging position?

Change in price of Zirconium = α+ β (Change in price of Asset)			
Asset	**α**	**β**	**R^2**
A	1.25	1.03	0.62
B	0.67	1.57	0.81
C	0.01	0.86	0.35
D	4.56	2.30	0.45

A. Asset A

B. Asset B

C. Asset C

D. Asset D

Q-57. Pear, Inc. is a manufacturer that is heavily dependent on plastic parts shipped from Malaysia. Pear wants to hedge its exposure to plastic price shocks over the next 7 ½ months. Futures contracts, however, are not readily available for plastic. After some research, Pear identifies futures contracts on other commodities whose prices are closely correlated to plastic prices. Futures on Commodity A have a correlation of 0.85 with the price of plastic, and futures on Commodity B have a correlation of 0.92 with the price of plastic. Futures on both Commodity A and Commodity B are available with 6-month and 9-month expirations. Ignoring liquidity considerations, which contract would be the best to minimize basis risk?

A. Futures on Commodity A with 6 months to expiration

B. Futures on Commodity A with 9 months to expiration

C. Futures on Commodity B with 6 months to expiration

D. Futures on Commodity B with 9 months to expiration

3.15. Hedging Strategy

3.15.1. 重要知识点

3.15.1.1. Optimal Hedge Ratio

$$h^* = \rho_{S,F} \frac{\sigma_S}{\sigma_F}$$

3.15.1.2. Hedge Effectiveness

$$R^2 = h^{*2} \frac{\sigma_F^2}{\sigma_S^2}$$

3.15.1.3. Optimal Number of Futures Contracts

$$N^* = \frac{h^* Q_A}{Q_F}$$

3.15.1.4. Hedging with Stock Index Futures

$$N^* = \beta \times \frac{P}{A}$$

3.15.1.5. Adjusting Portfolio Beta

➢ $\text{number of contracts} = (\beta^* - \beta) \times \dfrac{\text{portfolio value}}{\text{value of futures contract}}$

3.15.1.6. Duration-Based Hedge Ratio

➢ $N^* = \dfrac{PD_p}{FD_F} = \dfrac{DV01_P}{DV01_F}$

3.15.2. 基础题

Q-58. The hedge ratio is the ratio of derivatives to a spot position (or vice versa that achieves an objective such as minimizing or eliminating risk. Suppose that the standard deviation of quarterly changes in the price of a commodity is 0.57, the standard deviation of quarterly changes in the price of a futures contract on the commodity is 0.85, and the correlation between the two changes is 0.3876. What is the optimal hedge ratio for a 3-month contract?

A. 0.1893

B. 0.2135

C. 0.2381

D. 0.2599

Q-59. On Nov 1, Jimmy Walton, a fund manager of a USD 60 million US medium-to-large cap equity portfolio, considers locking up the profit from the recent rally. The S&P 500 index and its futures with the multiplier of 250 are trading at 900 and 910, respectively. Instead

of selling off his holdings, he would rather hedge two-thirds of his market exposure over the remaining 2 months. Given that the correlation between Jimmy's portfolio and the S&P 500 index futures is 0.89 and the volatilities of the equity fund and the futures are 0.51 and 0.48 per year respectively, what position should he take to achieve his objective?

A. Sell 250 futures contracts of S&P 500

B. Sell 169 futures contracts of S&P 500

C. Sell 167 futures contracts of S&P 500

D. Sell 148 futures contracts of S&P 500

Q-60. The current value of the S&P 500 index futures is 1457, and each S&P futures contract is for delivery of 250 times the index. A long-only equity portfolio with market value of USD 300,100,000 has beta of 1.1. To reduce the portfolio beta to 0.75, how many S&P futures contract should you sell?

A. 288 contracts

B. 618 contracts

C. 906 contracts

D. 574 contracts

Q-61. A trader executes a $420 million 5-year pay fixed swap (duration 4.433) with one client and a $385 million 10 year receive fixed swap (duration 7.581) with another client shortly afterwards. Assuming that the 5-year rate is 4.15% and 10-year rate is 5.38% and that all contracts are transacted at par, how can the trader hedge his position?

A. Buy 4,227 Eurodollar contracts

B. Sell 4,227 Eurodollar contracts

C. Buy 7,185 Eurodollar contracts

D. Sell 7,185 Eurodollar contracts

Q-62. A bronze producer will sell 1,000 mt (metric tons) of bronze in three months at the prevailing market price at that time. The standard deviation of the change in the price of bronze over a 3-month period is 2.6%. The company decided to use 3-month futures on copper to hedge the exposure. The copper futures contract is for 25mt of copper. The standard deviation of the futures price is 3.2%. The correlation between 3-month changes in the futures price and the price of bronze is 0.77. To hedge its price exposure, how many futures contracts should the company buy/sell?

A. Sell 38 futures

B.   Buy 25 futures

C.   Buy 63 futures

D.   Sell 25 futures

Q-63.   A risk manager at an investment company is discussing stock index arbitrage with a group of junior risk analysts. The manager explains why an arbitrage trading strategy is an important factor in the efficient operation of financial markets and how an index arbitrage strategy is implemented. Which of the following statements is correct regarding stock index arbitrage?

A.   It involves purchasing one stock index futures contract and selling a different stock index futures contract.

B.   It involves purchasing a basket of stocks that are members of an index while selling other stocks in the same index.

C.   It ensures that the price of the index will always correspond to the value of a portfolio of the underlying stocks, even if the portfolio is not tradable.

D.   It involves selling a stock index futures contract and purchasing the portfolio of stocks underlying the index.

Q-64.   A financial officer at a commodity producing company is researching accounting rules related to hedging activities. The manager compares the application and impact of using either normal or hedge accounting as well as the tax treatment of hedging activities. Which statement is correct regarding the given type of accounting treatment for hedging transactions?

A.   The application of normal accounting rules to hedging transactions can increase the volatility of reported earnings.

B.   Hedging transactions are generally treated the same for both tax and accounting purposes.

C.   Under hedge accounting, the entire gain or loss on a hedge is realized in the year it occurs.

D.   The only requirement for a company to be able to use hedge accounting is that this practice be disclosed on its financial statements.

3.16. Strip Hedge and Stack Hedge

3.16.1. 基础题

Q-65.   An oil producer has an obligation under an agreement to supply 75,000 barrels of oil every month for one year at a fixed price. He wishes to hedge his liability to address the event of an upward surge in oil prices. The producer has opted for a stack and roll hedge rather than a strip hedge. Which of the following two statements are correct?

I.   A strip hedge increases transaction costs owing to active trading each month.

II. A strip hedge tends to have wider bid-ask spreads as compared to a stack & roll hedge.

A. I only

B. II only

C. I and II

D. Neither

Q-66. The spot price of oil is $106, the one-month futures price is $102 and the 12-month futures price is $98. If the spot price and the oil futures curve do not shift at all during the entire one-year period, while the oil producer employs the stack-and-roll hedge (e.g., at the end of the one year, the spot price is unchanged at $106), what will be the net performance of rolling the hedge forward without regard to the underlying future sale of spot oil (ignoring transaction costs)?

A. Losses due to the roll yield

B. Approximately breakeven (no gain or loss)

C. Gains due to the roll yield

D. Not enough information

Q-67. An analyst at a mining company is reviewing the potential cash flow and accounting impact of a 3-year hedge on the company's copper production. The hedge was established by selling 100 three-year futures contracts at USD 3.00 per pound of copper on December 31, 2022, with each contract representing 25,000 pounds of copper. The analyst uses the following information:

Date	Futures price (USD)
December 31, 2022	3.00
December 31, 2023	2.95
December 31, 2024	3.10
December 31, 2025	3.15

The company uses hedge accounting and reports cash flows due to variation margin on the hedge at the end of each calendar year. Which of the following is the best estimate to reported cash flow on December 31, 2024?

A. A cash inflow of USD 125,000

B. A cash outflow of USD 250,000

C. A cash outflow of USD 375,000

D. A cash outflow of USD 500,000

3.17. FX

3.17.1. 重要知识点

3.17.1.1. Foreign Exchange Markets

- ➢ Currency pairs are typically indicated as XXXYYY or XXX/YYY (with XXX as the base currency and YYY as the quote currency).
- ➢ Forward rates are quoted with the same base currency as spot exchange rates. They are usually shown as points that are multiplied by 1/10,000 and then added to the spot quote.
- ➢ **Outright (Forward) vs. Swap**
- ● **Outright (Forward):** A forward foreign exchange transaction
- ● **Swap:** FX swap refers to buying (selling) a foreign currency in the spot market and then selling (buying) in the forward market.
- ➢ **FX Risk**
- ● **Transaction Risk:** Risk related to receivables and payables.
- ● **Translation Risk:** Risk arises from assets and liabilities denominated in a foreign currency.
- ● **Economic Risk:** Risk that an enterprise's future cash flow will be affected by exchange rate movements.

3.17.2. 基础题

Q-68. The interest rate in XXX is 1% and in YYY 4%. The XXXYYY spot rate is 1. 3000. How would three-month forward rate be quoted points?

A. 67

B. 78

C. 92

D. 95

Q-69. A large international bank has branches in four different countries. The CFO of the bank is considering issuing a bond in one of those countries, and believes that the country with the lowest real interest rate would present the best terms to the bank. Relevant information is in the table below:

Country	Nominal interest rate	Inflation
A	3.9%	1.9%
B	4.1%	2.0%
C	4.2%	2.3%
D	4.6%	2.5%

Assuming that all other parameters are equal, in which of the four countries should the bank issue the bond?

A. Country A

B.   Country B

C.   Country C

D.   Country D

Q-70. A quantitative analyst at a foreign exchange (FX) trading company is developing a new factor model to be used for estimating potential risk exposures on FX trades. The analyst is evaluating potential factors to use in the model, and their effects on the performance of the model. Which of the following statements is most likely correct for the analyst to consider when developing the model?

A.   Using a large number of underlying factors will allow the model to correctly predict future exchange rates.

B.   The most important factor in predicting a country's interest rates is the political stability of the country.

C.   The pair-wise exchange rates for currencies of developed countries can be assumed to be constant for terms shorter than 3 months.

D.   The value of a country's currency will be negatively correlated with a factor representing changes in that country's money supply.

3.18. Swaps

3.18.1. 重要知识点

3.18.1.1. Interest Rate Swap

➤   Plain vanilla interest rate swap: exchanges fixed for floating-rate payments over the life of the swap.

➤   At inception, the value of the swap is zero.

➤   After inception, the value of the swap is the difference between the present value of the remaining fixed-and floating-rate payments.

➤   Note that the swap rate is the average of the bid and ask quotes.

➤   Valuation using Forward Rates.

3.18.1.2. Currency Swaps

➤   Valuation using Bond portfolio.

$$V_{swap}(DC) = B_{DC} - (S_0 \times B_{FC})$$

➤   Valuation using Forward Exchange Rates.

3.18.2. 基础题

Q-71. You are required to estimate the value of an overnight indexed swap that has three years left in its life and involves paying a fixed rate of 5% at the end of each quarter and

receiving the rate implied by the overnight rate when it is compounded day-by-day during the quarter. The notional principal is USD 20 million. The current quote for a three-year overnight index swap is bid 3.80, ask 3.88. The risk-free rate is 3.6% for all maturities. All rate are compounded quarterly.

A. -679,591

B. -656,938

C. -634,285

D. -633.819

Q-72. You are required to estimate the value of an interest rate swap that has 2.5 years left in its life. Suppose that a fixed rate of 5% is paid and Libor is received every three months. The notional principal is USD 20 million. Now we can find a new 2-year swap where 2.96% is received and Libor is paid. Also, we can find a new 3-year one with a swap rate of 3.075%. Suppose the risk-free rate is 3.6% for all maturities and all rate are compounded quarterly.

A. -916,522

B. -924,458

C. -943,899

D. -971,276

Q-73. Two companies, C and D, have the borrowing rates shown in the following table.

Borrowing Rates for C and D		
Company	Fixed Borrowing	Floating Borrowing
C	10%	LIBOR+ 50bps
D	12%	LIBOR+ 100bps

According to the comparative advantage argument, what is the total potential savings for C and D if they enter into an interest rate swap?

A. 0.5%

B. 1.0%

C. 1.5%

D. 2.0%

Q-74. An oil driller recently issued USD 250 million of fixed-rate debt at 4.0% per annum to help fund a new project. It now wants to convert this debt to a floating-rate obligation using a swap. A swap desk analyst for a large investment bank that is a market maker in swaps has identified four firms interested in swapping their debt from floating-rate to fixed-rate. The following table quotes available loan rates for the oil driller and each firm:

Firm	Fixed-rate (in %)	Floating-rate (in %)
Oil driller	4.0	6-month LIBOR + 1.5
Firm A	3.5	6-month LIBOR + 1.0
Firm B	6.0	6-month LIBOR + 3.0
Firm C	5.5	6-month LIBOR + 2.0
Firm D	4.5	6-month LIBOR + 2.5

A swap between the oil driller and which firm offers the greatest possible combined benefit compared with the driller directly issues a floating debt and the counterparty financed with a fixed rate?

A. Firm A

B. Firm B

C. Firm C

D. Firm D

Q-75. Savers Bancorp entered into a swap agreement over a 2-year period on August 9, 2008, with which it received a 4.00% fixed rate and paid LIBOR plus 1.20% on a notional amount of USD 6.5 million. Payments were to be made every 6 months. The table below displays the actual annual 6-month LIBOR rates over the 2-year period.

Date	6-month LIBOR
Aug 9,2008	3.11%
Feb 9,2009	1.76%
Aug 9,2009	0.84%
Feb 9,2010	0.39%
Aug 9,2010	0.58%

Assuming no default, how much did Savers Bancorp receive on August 9, 2010?

A. USD 72,150

B. USD 78,325

C. USD 117,325

D. USD 156,650

Q-76. Suppose that some time ago, a financial institution entered into a swap where it agreed to make semi-annual payments at a rate of 3.0% per annum and receive LIBOR on a notional principal of $400.0 million. The swap now has a remaining life of only nine months (0.75 years). Payments will therefore be made 0.25 and 0.75 years from today. The risk-free rates with continuous compounding is assumed to be the LIBOR zero rate, and currently, it is 2.20% for all maturities. Because the LIBOR zero rate curve is flat at 2.20%, the six-month forward rate beginning in three months, F(0.25, 0.75), is also 2.20% with continuous compounding and therefore is equal to $2 \times [e^{0.0220/2} - 1] =$

2.2121% with semi-annual compounding. The LIBOR rate applicable to the exchange in 0.25 years was determined 0.25 years ago; suppose it was 3.0% with semi-annual compounding (LIBOR has dropped in the meantime).Which is nearest to the present value of the swap to the financial institution?

A. -$1.550 million

B. -$287,300

C. +1.883 million

D. +2.940 million

Q-77. Consider the following 3-year currency swap, which involves exchanging annual interest of 2.75% on 10 million US dollars for 3.75% on 15 million Canadian dollars. The spot rate is 1.52 CAD per USD. The term structure is flat in both countries. Calculate the value of the swap in USD if interest rates (continuous compounding) in Canada are 5% and in the United States are 4%. Round to the nearest dollar.

A. $152,000

B. $145,693

C. $131,967

D. $127,818

Q-78. Consider a currency swap where interest on British pounds at the rate of 3% is paid and interest on euros at 2% is received. The British pound principal is 1.0 million pounds and the euro principal is 1.1 million euros. The most recent exchange has just occurred and the interest is exchanged every six months. There are two years are remaining in the life of the swap. The current exchange rate is 1.15 (1.15 euro per pound). Suppose that the forward exchange rates (euro per pound) for year 0.5, 1, 1.5 and 2 are 1.1443, 1.1387, 1.1330 and 1.1275 respectively. The risk-free rates in pounds are 2.5%. All rates are compounded semi-annually. What is the value of the swap (Pounds Paid) in pounds?

A. -43,824.76

B. +43,824.76

C. -29,591.90

D. +29,591.90

Q-79. As an asset manager, Sarah Peck wishes to reduce her exposure to fixed-income securities and increase her exposure to large-cap stocks. She enters into an equity swap with a dealer on the terms that she will pay the dealer a fixed rate of 5% and receive from him the return on the large-cap stock index. Assume that payments are made annually and that the notional principal is EUR 50 million. If the large-cap stock index had

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a value of 10,320 at the beginning of the year and a value of 11,219 at the end of the year, what is the net payment made at the end of the year and which party makes the net payment?

	Net payment made	Party making net payment
A.	EUR 1.86 million	Asset manager
B.	EUR 2.50 million	Dealer
C.	EUR 1.86 million	Dealer
D.	EUR 2.50 million	Asset manager

Q-80. The yield curve is upward sloping and a portfolio manager has a long position in 10-year Treasury notes funded through overnight repurchase agreements. The risk manager is concerned with the risk that market rates may increase further and reduce the market value of the position. What hedge could be put on to reduce the position's exposure to rising rates?

A. Enter into a 10-year pay-fixed and receive-floating interest rate swap.

B. Enter into a 10-year receive-fixed and pay-floating interest rate swap.

C. Establish a long position in 10-year Treasury note futures.

D. Buy a call option on 10-year Treasury note futures.

Q-81. A currency derivatives trader at a hedge fund is describing the mechanics of currency swaps to a group of junior analysts. The trader uses an example of a fixed-for-fixed USD for CNY currency swap with the following terms:

- Notional amount in USD: USD 10 million
- Notional amount in CNY: CNY 65 million
- Interest rate in USD: 1.0%
- Interest rate in CNY: 2.5%
- Time to maturity: 4 years
- Frequency of interest payments: Annual

Assuming the hedge fund receives interest in CNY, which of the following conclusions would the analysts find to be most likely correct?

A. Interest payments will be exchanged periodically for the duration of the swap, but the notional amounts will not be exchanged.

B. The hedge fund will pay CNY 65 million and receive USD 10 million at the initiation of the swap.

C. The swap is structured to have a positive mark-to-market value for the hedge fund at the initiation of the swap.

D. Holding all else constant, if the CNY depreciates against the USD, the mark-to-market

value of the swap will increase for the hedge fund.

3.19. Basic Characteristics of Option

3.19.1. 重要知识点

3.19.1.1. Option Factors & Pricing Bounds

Factor	European Call	European Put	American Call	American Put
S	+	-	+	-
X	-	+	-	+
T	?	?	+	+
σ	+	+	+	+
r	+	-	+	-
D	-	+	-	+

Option	Proxy	Min Value	Max value
European call	c	$\max(0, S_0 - PV(K))$	S_0
American call	C	$\max(0, S_0 - PV(K))$	S_0
European put	p	$\max(0, PV(K) - S_0)$	$PV(K)$
American put	P	$\max(0, K - S_0)$	K

3.19.1.2. Put-call Parity

European option: $p + S = c + PV(K)$

American option: no exact price relationship

3.19.2. 基础题

Q-82. The current stock price of a share is USD 100 and the continuously compounding risk-free rate is 12% per year. The maximum possible prices for a 3-month European call option, American call option, European put option, and American put option, all with strike price USD 90, are:

A. 100,100,87.34, 90

B. 100,100,90, 90

C. 97.04,100, 90, 90

D. 97.04, 97.04, 87.34, 87.34

Q-83. Jeff is an arbitrage trader, and he wants to calculate the implied dividend yield on a stock while looking at the over-the-counter price of a 5-year put and call (both European-style) on that same stock. He has the following data:

- Initial stock price = USD 85
- Strike price = USD 90
- Continuous risk-free rate = 5%
- Underlying stock volatility = unknown
- Call price = USD 10
- Put price = USD 15

What is the continuous implied dividend yield of that stock?

A. 2.48%

B. 4.69%

C. 5.34%

D. 7.71%

Q-84. The price of a six-month, USD 25 strike price, European call option on a stock is USD 3. The stock price is USD 24. A dividend of USD 1 is expected in three months. The continuously compounded risk-free rate for all maturities is 5% per year. Which of the following is closest to the value of a put option on the same underlying stock with a strike price of USD 25 and a time to maturity of six months?

A. USD 3.60

B. USD 2.40

C. USD 4.37

D. USD 1.63

Q-85. Which of the following correctly describes the impact of dividends on option value?

A. Dividends have no effect on European call options but reduce the value of American call options.

B. Dividends increase the value of European put options but decrease the value of American put options.

C. Dividends decrease the value of both European and American call options, but the value of American put options is unaffected.

D. With dividends, the value of American put options exceeds the value without dividends.

3.20. Trading Strategies Involving Options

3.20.1. 重要知识点

3.20.1.1. Simple Strategies

- ➢ Covered Call and Protective Put
- ➢ Principal Protected Notes(PPN)

3.20.1.2. Spread Strategies

- ➢ Bull and Bear Spread
- ➢ Box Spread
- ➢ Butterfly Spread

3.20.1.3. Combination Strategies

- ➢ Straddle and Strangle

3.20.2. 基础题

Q-86. Consider the following bearish option strategy of buying one at-the-money put with a strike price of $43 for $6, selling two puts with a strike price of $37 for $4 each and buying one put with a strike price of $32 for $1. If the stock price plummets to $19 at expiration, calculate the net profit/loss per share of the strategy.

- A. -2.00 per share
- B. Zero – no profit or loss
- C. 1.00 per share
- D. 2.00 per share

Q-87. Which option combination most closely simulates the economics of a short position in a futures contract?

- A. Payoff of a long call plus a short put
- B. Profit of a long call plus a short put
- C. Payoff of a long put plus short call
- D. Profit of long put plus short call

Q-88. A butterfly spread involves positions in options with three different strike prices. It can be created by buying a call option with a low strike of X1; buying a call option with a high strike X3; and selling two call options with a strike X2 halfway between X1 and X3. What can be said about the upside and downside of the strategy?

- A. Both the upside and downside is unlimited.
- B. Both the upside and downside is limited.
- C. The upside is unlimited but the downside is limited.
- D. The upside is limited but the downside is unlimited.

Q-89. The payoff on a calendar spread is most similar to which of the following option

strategies?

A. Bull spread

B. Bear spread

C. Long straddle

D. Butterfly spread

Q-90. An investor sells a January 2014 call on the stock of XYZ Limited with a strike price of USD 50 for USD 10, and buys a January 2014 call on the same underlying stock with a strike price of USD 60 for USD 2. What is the name of this strategy, and what is the maximum profit and loss the investor could incur at expiration?

	Strategy	Maximum Profit	Maximum Loss
A.	Bear spread	USD 8	USD 2
B.	Bull spread	USD 8	Unlimited
C.	Bear spread	Unlimited	USD 2
D.	Bull spread	USD 8	USD 2

Q-91. An option trader at an equity hedge fund is assessing the cost structure of the fund's portfolio of options. The trader examines the types of positions the fund trades with its prime brokers and investigates whether the fund can reduce the upfront costs of its option positions. How can the trader transform a long option into a zero-cost derivative product?

A. Arranging with the option seller to pay an amount equal to the upfront option premium at maturity rather than at option initiation.

B. Entering into an agreement to purchase the payoff of the option at maturity for an amount equal to the future value of the current option premium.

C. Combining the purchase of the option with a sale of other options such that the net premium is zero and the combined payoff is identical to the payoff of the original option.

D. Purchasing the option and selling the underlying stock such that the net upfront cash flow is zero and the payoff is identical to the payoff of the original option.

Q-92. A portfolio manager at company ABC is examining the company's outstanding FX exposures as of June 1, 2023. The manager decides to hedge a net receivable of EUR 5,000,000 due on December 1, 2023. On June 1, 2023, the EUR spot rate is USD 1.07 per EUR 1, and the 6-month EUR forward rate is USD 1.10 per EUR 1. The manager investigates whether it is better to lock in the exchange rate by taking a position in the forward contract and locking the selling price in 6 months or to sell a 6-month EUR 5,000,000 call option with a strike price of USD 1.07 per EUR 1. Which of the following

statements is most likely correct?

A. ABC would be better off by selling an option contract regardless of how large the change in the FX rate is and in which direction EUR moves relative to USD.

B. ABC would be better off by entering into a forward contract if EUR appreciates against USD by an amount significantly larger than USD 0.03 per EUR 1 and the call option premium is more than 0.03.

C. ABC would be better off by entering into a forward contract if EUR appreciates against USD by less than USD 0.03 per EUR 1.

D. ABC would be better off by entering into a forward contract if EUR depreciates against USD by an amount significantly larger than USD 0.03 per EUR 1 and the call option premium is less than 0.06.

3.21. Exotic Options

3.21.1. 重要知识点

#### 3.21.1.1. Compound option: option on another option.

➢ Call on a call: right to buy a call option at a set price for a set period of time.

➢ Call on a put: right to buy a put option at a set price for a set period of time.

➢ Put on a call: right to sell a call option at a set price for a set period of time.

➢ Put on a put: right to sell a put option at a set price for a set period of time.

3.21.1.2. Chooser option

➢ Owner chooses whether option is call or put after initiation.

3.21.1.3. Barrier option

➢ Payoff and existence depend on price reaching a certain barrier level.

➢ Down-and-out call (put): ceases to exist if the underlying asset price hits the barrier level, which is set below the current stock value.

➢ Down-and-in call (put): only comes into existence if the underlying asset price hits the barrier level, which is set below the current stock value.

➢ Up-and-out call (put): ceases to exist if the underlying asset price hits a barrier level, which is set above the current stock value.

➢ Up-and-in call (put): only comes into existence if the underlying asset price hits the above current stock price barrier level.
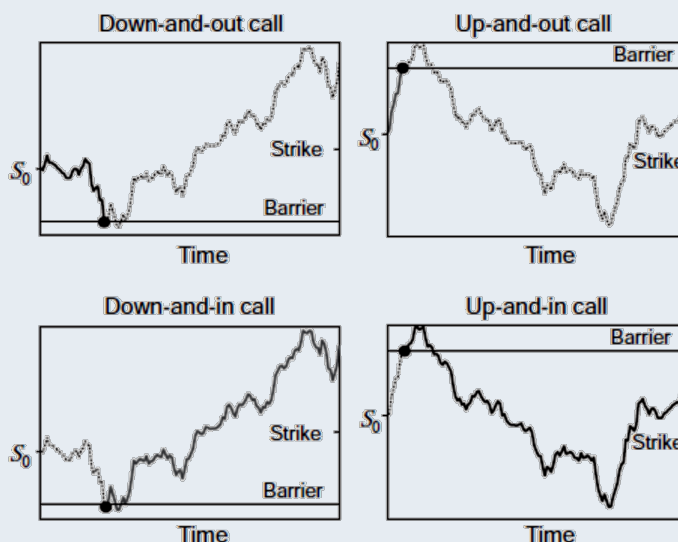
Paths for Knock-Out and Knock-In Call Options

3.21.1.4. Binary option

➢ Pay either nothing or a fixed amount.

➢ Cash-or-nothing call: a fixed amount, Q, is paid if the asset ends up above the strike price.

➢ Asset-or-nothing call: pays the value of the stock when the contract is initiated if the stock price ends up above the strike price at expiration.

3.21.1.5. Lookback option

➢ Payoff depends on the maximum (call) or minimum (put) value of the underlying asset over the life of the option. Can be fixed or floating depending on the specification of a strike price.

3.21.1.6. Asian option

➢ Payoff depends on average of the underlying asset price over the life of the option; less volatile than standard option.

3.21.2. 基础题

Q-93. A trader writes the following 1-year European-style barrier options as protection against large movements in a non-dividend paying stock that is currently trading at EUR 40.96.

Option	Price (EUR)
Up-and-in barrier call, with barrier at EUR 45	3.52
Up-and-out barrier call, with barrier at EUR 45	1.24
Down-and-in barrier put, with barrier at EUR 35	2.00
Down-and-out barrier put, with barrier at EUR 35	1.01

All of the options have the same strike price. Assuming the risk-free rate is 2% per annum, what is the common strike price of these options?

A. EUR 39.00

B.   EUR 40.00

C.   EUR 41.00

D.   EUR 42.00

Q-94.   A 1-year forward contract on a stock with a forward price of USD 100 is available for USD 1.50. The table below lists the prices of some barrier options on the same stock with a maturity of 1 year and strike of USD 100. Assuming a continuously compounded risk-free rate of 5% per year. What is the price of a European put option on the stock with a strike of USD 100.

Option	Price
Up-and-in barrier call, barrier USD 95	USD 5.21
Up-and-out barrier call, barrier USD 95	USD 1.40
Down-and-in barrier put, barrier USD 80	USD 3.5

A.   USD 2.00

B.   USD 4.90

C.   USD 5.11

D.   USD 6.61

Q-95.   Looking at a risk report. Mr. Woo finds that the options book of Ms. Yu has only long positions and yet has a negative delta. He asks you to explain how that is possible. What is a possible explanation?

A.   The book has a long position in up-and-in call options.

B.   The book has a long position in binary options.

C.   The book has a long position in up-and-out call options.

D.   The book has a long position in down-and-out call options.

Q-96.   Of the following options, which one does not benefit from an increase in the stock price when the current stock price is $100 and the barrier has not yet been crossed:

A.   A down-and-out call with barrier at $90 and strike at $110

B.   A down-and-in call with barrier at $90 and strike at $110

C.   An up-and-in put with barrier at $110 and strike at $100

D.   An up-and-in call with barrier at $110 and strike at $100

Q-97.   Trader A purchased a 3-month floating lookback call option on ABA stock three months ago. Trader B purchased a 3-month fixed lookback call option on the same stock during the same time period as Trader A. ABA stock finished at $50 at the end of the three-month option term, and the initial strike price was equal to $40. The minimum stock

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price over the investment horizon was $35，and the maximum stock price over the investment horizon was $53.The payoff difference between the floating lookback call and the fixed lookback call is closest to:

A. $2.

B. $3.

C. $8.

D. $10.

Q-98. A trader has purchased an asset-or-nothing put option position on 5,000 shares of stock KRP. The stock is currently trading at USD 52 per share. The option has a strike price of USD 49 and a maturity of 1 month. If the price of the stock at expiration is USD 45, which of the following is the best estimate to the payoff of the asset-or-nothing put option position?

A. USD 20,000

B. USD 35,000

C. USD 225,000

D. USD 245,000

Q-99. A junior analyst at a large bank is examining an existing portfolio of option contracts. The analyst notices that the portfolio holds a large number of both exchange-traded and OTC positions and focuses on the similarities and differences between the two. Which of the following would the analyst most likely identify as a difference between exchange-traded options and OTC options?

A. Most exchange-traded options are European-style, while most options traded OTC are American-style.

B. Options traded OTC have flexible terms, while the terms of exchange-traded options are generally standardized.

C. Exchange-traded options typically have longer maturities than those traded OTC.

D. Foreign exchange and interest rate options are primarily exchange-traded, while options on individual equities are usually OTC.

Q-100. A company needs to hedge foreign exchange positions with different maturity dates. Currently, it is using a series of options with varying expiration dates. Which option could potentially provide a more cost-effective hedging solution?

A. Asian options, which are based on average exchange rates over a specific period, offering a cheaper alternative.

B. Forward contracts, which lock in a future exchange rate for a specified amount of currency.

C. Futures contracts, which involve an agreement to buy or sell a currency at a predetermined price on a specified date.

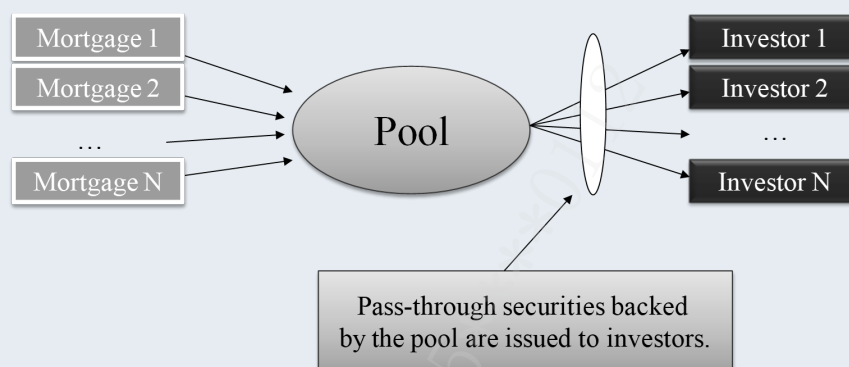D. Swaps, which allow the exchange of one currency for another at a predetermined rate for a specified period.

3.22. Mortgage and MBS

3.22.1. 重要知识点

3.22.1.1. Fixed Rate Mortgage Payments

$$X \sum_{n=1}^{12T} \frac{1}{\left(1 + \frac{y}{12}\right)^n} = B(0) \; ; \; X \frac{12}{y} \left[1 - \frac{1}{\left(1 + \frac{y}{12}\right)^{12T}}\right] = B(0)$$

3.22.1.2. Mortgage Pass-through Securities

Pass-through securities backed by the pool are issued to investors.

3.22.1.3. Prepayment of Mortgage Loans

$$CPR_n = 1 - (1 - SMM_n)^{12}$$

3.22.1.4. Dollar Rolls

➢ Consider an investor who has just purchased a mortgage pool but wants to finance that purchase over the next month. One alternative is an MBS repo. The investor could sell the repo, i.e., sell the pool today while simultaneously agreeing to repurchase it after a month.

➢ An alternative for financing mortgages is the dollar roll. The buyer of the roll sells a TBA for one settlement month and buys the same TBA for the following settlement month. Two differences: 1) The buyer of the roll may not get back in the later month the same pool delivered in the earlier month. 2) The buyer of the roll does not receive any interest or principal payments from the pool over the roll.

3.22.2. 基础题

Q-101. If a pool of mortgage loans begins the month with a balance of $10,500,000, has a scheduled principal payment of $54,800, and ends the month with a balance of $9,800,000, what is the CPR for this month?

- A. 6.18%
- B. 42.24%
- C. 53.47%
- D. 66.67%

Q-102. How would you describe the typical price behavior of a low premium mortgage pass-through security?

- A. It is similar to a U.S. Treasury bond.
- B. It is similar to a plain-vanilla corporate bond.
- C. When interest rates fall, its price increase would exceed that of a comparable duration U.S. Treasury bond.
- D. When interest rates fall, its price increase would lag that of a comparable duration U.S. Treasury bond.

Q-103. Bennett Bank extends a 5% APR (annual percentage rate) USD 100,000 30-year mortgage requiring monthly payments. If the mortgage is structured so that it requires interest-only payments for the first 5 years, after which point it becomes a self-amortizing mortgage, what would be the portion of the monthly payment applied to the principal in the 61st month?

- A. USD 167.92
- B. USD 174.60
- C. USD 584.59
- D. USD 591.27

Q-104. Consider a 30-year mortgage with an initial interest rate of 5%, compounded monthly, and a principal amount of USD 100,000. After 5 years, the interest rate decreases to 3.5%. Assuming the refinancing process keeps the principal amount and maturity unchanged, what is the reduction in the monthly repayment amount?

- A. $87.78
- B. $97.53
- C. $112.40
- D. $129.67

Q-105. A fixed-income portfolio manager purchases a seasoned 5.5% agency mortgage-Backed

security with a weighted average loan age of 60 months. The current balance on the loans is USD 20 million, and the conditional prepayment rate is assumed to be constant at 0.4% per year. Which of the following is closest to the expected principal prepayment this month?

A. USD 1,000
B. USD 7,000
C. USD 10,000
D. USD 70,000

Q-106. Which of the following factors may contribute to increased prepayments in Mortgage-Backed Securities (MBS)?

A. Stagnation in housing prices
B. Sharp changes in housing prices
C. Increasing interest rates
D. Approaching original distribution day

Q-107. Consider an investor who wants to finance the purchase of a mortgage pool over a one month period. One alternative is to sell an MBS repo, in which case the investor could sell the pool today while simultaneously agreeing to repurchase it after a month. This trade has the same economics as a secured loan: the investor effectively borrows cash today by posting the pool as collateral, and upon paying back the loan with interest after a month, retrieves the collateral. An alternative is the "dollar roll". In the dollar roll, the buyer of the roll sells a TBA for one settlement month (the "earlier month") and buys the same TBA for the following settlement month (the "later month").

For example, the investor who just purchased a 30-year 4% FNMA pool might sell the FNMA 30-year 4% January TBA and buy the FNMA 30-year 4% February TBA. Delivering the pool just purchased through the sale of the January TBA, which raises cash, and purchasing a pool through the February TBA, which returns cash, is very close to the economics of a secured loan.

But there are two important differences between dollar roll and repo financing:

I. The buyer of the roll may not get back in the later month the same pool delivered in the earlier month. The buyer of the roll delivers a particular pool, for example, in January but will have to accept whatever eligible pool is delivered in the next February. By contrast, an MBS repo seller is always returned the same pool that was originally posted as collateral.

II. The buyer of the roll does not receive any interest or principal payments from the pool over the roll. For example, the buyer of the Jan/Feb roll, who delivers the pool in January,

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does not receive the January payments of interest and principal. By contrast, a repo seller receives any payments of interest and principal over the life of the repo. While the prices of TBA contracts reflect the timing of payments, so that the buyer of a roll does not, in any sense, lose a month of payments relative to a repo seller, the risks of the two transactions are different. The buyer of a roll does not have any exposure to prepayments over the month being higher or lower than what had been implied by TBA prices while the repo seller does.

Which of these two differences is (are) correct?

A. Neither is correct.

B. I is true but II is incorrect.

C. I is incorrect but II is true.

D. Both are correct.

Q-108. Which of the following accurately describes a characteristic of to-be-announced (TBA) trading in mortgage-backed securities (MBS)?

A. TBAs involve agreements on specific pools of mortgages at predetermined prices.

B. TBAs allow sellers to choose the exact mortgage pools to deliver at settlement.

C. TBAs are forward contracts where buyers and sellers agree on issuer, maturity, coupon, price, par value, and settlement month.

D. TBAs are less actively traded compared to specified pools due to their complex settlement process.

Q-109. What is a key difference between a dollar roll transaction and a traditional repurchase agreement (repo)?

A. In a dollar roll, the initiating party sells securities and agrees to buy them back at a higher price, similar to a repo.

B. Dollar rolls involve the exchange of securities with the same characteristics between parties.

C. Dollar rolls may involve receiving different securities in the second month, unlike repos where the same securities are repurchased.

D. Dollar roll transactions add interest to the repurchase price, unlike repos where interest is not considered.

Q-110. Mortgage-Backed securities (MBS) are a class of securities where the underlying is a pool of mortgages. Assume that the mortgages are insured, so that they do not have default risk. The mortgages have prepayment risk because the borrower has the option to repay the loan early (at any time) usually due to favorable interest rate changes. From an

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investor's point of view, a mortgage-backed security is equivalent to holding a long position in a non-prepayable mortgage pool and which of the following?

A. A long American call option on the underlying pool of mortgages.

B. A short American call option on the underlying pool of mortgages.

C. A short European put option on the underlying pool of mortgages.

D. A long American put option on the underlying pool of mortgages.

Q-111. Jack recently completed a Monte Carlo simulation analysis of a CMO tranche. Jack's analysis includes six equally weighted paths, with the present value of each calculated using four different discount rates, which are shown in the following table. If the actual market price of the CMO tranche being valued is 70.17, what is the tranche's option-adjusted spared (OAS)?

Representative Path	PV if Spread is 50 bps	PV if Spread is 60 bps	PV if Spread is 70 bps	PV if Spread is 75 bps
1	70	68	66	65
2	73	70	68	66
3	68	66	64	63
4	71	69	68	67
5	77	75	73	71
6	75	73	71	70

A. 50 basis points

B. 60 basis points

C. 70 basis points

D. 75 basis points

Q-112. In regard to the prepayment option embedded in a mortgage, the borrower (the homeowner) is most similar to:

A. Corporate issuer of a bond with a put option

B. Corporate issuer of a bond with a call option

C. Corporate issuer of a bond with an interest rate cap

D. Corporate issuer of a bond with an interest rate floor

Q-113. A homeowner has a 30-year, 5% fixed-rate mortgage with a current balance of USD 250,000. Mortgage rates have been decreasing. If the existing mortgage was refinanced into a new 30-years, 4% fixed rate mortgage, which of the following is closest to the amount that the homeowner would save in monthly mortgage payments?

A. USD 145

B. USD 150

C.   USD 155

D.   USD 160

3.23.   Financial Institutions

3.23.1.   重要知识点

3.23.1.1.   Banks

- ➢ Private Placement
- ➢ Public Offering
  - ■ Best Efforts
  - ■ Firm Commitment
- ➢ The Originate-to-Distribute Model
- ➢ Three Main Types of Risk Facing Banks
  - ■ Market Risk
  - ■ Credit Risk
  - ■ Operational Risk

3.23.1.2.   Insurance Companies

- ➢ Insurance is usually classified as life insurance and nonlife insurance, with health insurance often being considered to be a separate category. Nonlife insurance is also referred to as property-casualty insurance.

- ➢ A life insurance contract typically lasts a long time and provides payments to the policyholder's beneficiaries that depend on when the policyholder dies.

- ➢ A property-casualty insurance contract typically lasts one year (although it may be renewed) and provides compensation for losses from accidents, fire, theft, and so on.

Loss Ratio : Payouts/Premiums	Expense Ratio : Expenses/Premiums
Combined Ratio : Loss Ratio + Expense Ratio	Combined Ratio after Dividends: Combined Ratio + Dividend Yield
Operating Ratio : Combined Ratio after Dividend – Investment Income	

- ➢ A pension plan is a form of insurance arranged by a company for its employees. It is designed to provide the employees with income for the rest of their lives once they have retired.

3.23.1.3.   Hedge Funds vs. Mutual Funds

- ➢ Mutual funds, which are called "unit trusts" in some countries, serve the needs of relatively small investors, while hedge funds seek to attract funds from wealthy individuals and large investors such as pension funds.

- ➢ Hedge funds are subject to much less regulation than mutual funds because they

> accept funds only from financially sophisticated individuals and organizations. This gives them a great deal of freedom to develop sophisticated, unconventional, and proprietary investment strategies. Hedge funds are sometimes referred to as alternative investments.

> ➢ Hedge funds are free to use a wider range of trading strategies than mutual funds and are usually more secretive about what they do. Mutual funds are required to explain their investment policies in a prospectus that is available to potential investors.

3.23.2. 基础题

Q-114. The minimum level of capital a bank needs to maintain, according to its own estimates, models, and risk assessments, is best described as its:

A. Equity capital.

B. Financial capital.

C. Economic capital.

D. Regulatory capital.

Q-115. Which of the following actions in the banking system is most likely intended to address the problem of moral hazard?

A. Deposit insurers charge risk-based premiums.

B. Banks increase loans to higher-risk borrowers.

C. Governments implement deposit insurance programs.

D. Banks increase the interest rates they offer to depositors.

Q-116. To maintain confidence in the banking system, many countries have introduced deposit insurance. However, a serious consideration in deposit insurance that can make the insurance contract riskier is the so-called moral hazard problem. Which of the following actions is most likely causing the moral hazard problem in the deposit insurance scenario?

A. Enforcing strict limitations on borrowing.

B. Setting the risk-based deposit insurance premium.

C. Implement regulatory measures that ensure banks maintain sufficient capital reserves in proportion to the risks they undertake.

D. Providing a certain amount of protection to a depositor against losses arising from a potential bank failure.

Q-117. An investment bank is most likely to earn a trading profit from buying and selling securities if it arranges a:

A. Dutch auction.

B. Private placement.

C. Best efforts offering.

D. Firm commitment offering.

Q-118. The bids and bidders in a Dutch auction to sell 20,000 shares are as follows:

Bidder	Number of Shares	Price (USD)
A	3,000	80
B	2,000	73
C	5,000	90
D	6,000	85
E	9,000	70
F	4,000	84
G	8,000	86

At what price are the shares sold?

A. 90

B. 85

C. 70

D. 84

Q-119. The purpose of a "Chinese wall" in banking is to:

A. Prevent a bank failure from endangering other banks.

B. Prevent a bank's departments from sharing information.

C. Restrict companies from offering both banking and securities services.

D. Restrict companies from engaging in both commercial and investment banking.

Q-120. A drawback of the originate-to-distribute banking model is that it has led to:

A. Too little liquidity in certain sectors.

B. Too much liquidity in certain sectors.

C. Looser credit standards in certain sectors.

D. Tighter credit standards in certain sectors

Q-121. In Solvency II, which of the following is true?

A. If capital falls below the solvency capital requirement, an insurance company is not allowed to take on further business.

B. If capital falls below the solverncy capital requirement, an insurance company's policies may be transferred to another insurance company.

C. Insurance companies are only required to formulate a solvency capital plan if capital falls below the minimum capital requirement.

D.   None of the above.

Q-122. The relevant interest rate for insurance contracts is 2% per annum (semiannual compounding applies) and all premiums are paid annually at the beginning of the year. A $2,000,000 term insurance contract is being proposed for a 40-year-old male in average health. Assume that payouts occur halfway throughout the year. Using the mortality rates estimated by the U.S. Social Security Administration, which of the following amounts is closest to the insurance company's breakeven premium for a two-year term?

Age	Male		
	Probability of Death within 1 Year	**Survival Probability**	**Life Expectancy**
40	0.002092	0.95908	38.53
41	0.002240	0.95708	37.61

A. $4,246.

B. $4,287.

C. $4,332.

D. $8,482.

Q-123. The following information pertains to a property and casualty (P&C) insurance company:

- Investment income   5%
- Dividends   2%
- Loss ratio   74%
- Expense ratio   23%

Based on the information provided, what is this company's operating ratio?

A.   90%

B.   94%

C.   97%

D.   99%

Q-124. Which of the following problems would most likely be a concern for life insurance companies that are worried about differentiating between good risks and bad risks?

A.   Adverse selection.

B.   Catastrophic risk.

C.   Longevity risk.

D.   Moral hazard.

Q-125. Imagine you are an insurance underwriter assessing applications for a new car insurance

policy. You notice that some applicants have a history of multiple traffic violations and accidents. Which of the following terms best describes the risk that these applicants pose to the insurance company?

A. Investment risk

B. Underwriting risk

C. Operational risk

D. Adverse selection

Q-126. Which of the following characteristics is a key differentiator between mutual funds and hedge funds?

A. Professional asset management.

B. Immediate access to withdrawals from the fund.

C. Charging a fee for providing investment services.

D. Easy diversification for an investor.

Q-127. Consider an open-end mutual fund that owns $1.1billion in equities, $350million in bonds, and $35million in cash. They owe $1.85million in management fees payable at this point in the quarter and they have 39.635million shares outstanding. What is this fund's NAV?

A. $27.75

B. $37.47

C. $37.51

D. $37.42

Q-128. A hedge fund charges 2 plus 20%. Investors want a return after fees of 20%. How much does the hedge fund have to earn, before fees, to provide investors with this return? Assume that the incentive fee is paid on the net return after management fees have been subtracted.

A. 27%

B. 15%

C. 21.6%

D. 20%

Q-129. Quadholding Mutual is a mutual fund in the United States who reports the following sequence of per annum returns over the last five years: +7.0%, +15.0%, +20.0%, +5.0%, +18.0%. Each of the following statements about this mutual fund is true EXCEPT which is false?

A. Quadholding's five-year geometric mean must be less than 13.0%.

B. Unlike a hedge fund, Quadholding must disclose its investment policies, must limit it its use of leverage, must calculate NAV daily, and must make its shares redeemable at any time.

C. The trading strategies of the Quadholding were questionable, and they brought it negative returns.

D. Quadholding is heavily regulated primarily by the Securities and Exchange Commission (SEC) who does not permit the illegal practice of "late trading;" although investors can legally engage in "market timing" the fund but only if such trades are based on publicly available information.

Q-130. In the U.S., mutual funds and ETFs are heavily regulated by the SEC. Complete and accurate financial information must be provided to prospective investors. There are also rules to prevent conflicts of interest and fraud. Despite these safeguards, there have been instances of undesirable behavior. Which of the following statements is not true about the undesirable behavior?

A. Late trading of mutual fund shares is an illegal practice occurs when investors placing trades after 4 p.m. receive the 4 p.m. price. These late traders can use the information revealed after 4 p.m. to guide their trades. In fact, there have been several prosecutions leading to large fines and the involved employees losing their jobs.

B. Market timing is illegal in fund management which involves an open-end mutual fund investor embarking on large trades motivated by the fact that some of the security prices used to calculate an NAV are stale.

C. Front running is the illegal practice of trading with advance knowledge of a block transaction that will influence the price of the underlying security.

D. Directed brokerage is an informal arrangement between a mutual fund and a broker where the mutual fund will use the broker for its trades if the broker recommends the mutual fund to its clients.

Solutions

Financial Markets and Products

Q-1.   Solution: A

$$R_{forward} = \frac{R_2 T_2 - R_1 T_1}{T_2 - T_1} = \frac{5.0\% \times 4 - 4.6\% \times 3}{4 - 3} = 6.2\%$$

Q-2.   Solution: A

With an upward sloping curve, the coupon curve is the lowest, the zero-coupon curve is above the coupon curve and the forward curve is above the zero-coupon curve. The order is reversed if the curve is downward sloping.

Q-3.   Solution: D

The forward rate can be inferred from $(1 + R_4)^4 = (1 + R_3)^3(1 + F_{3,4})$. Solving, this gives $F_{3,4}$ = (85.16/79.81) − 1 = 0.067.

Q-4.   Solution: B

$$e^{5\%} \times e^{F_{1,2}} = e^{6\% \times 2}$$

$$5\% + F_{1,2} = 6\% \times 2, \quad F_{1,2} = 7\%$$

Q-5.   Solution: C

1-year forward rate one year from today = $1.07^2/1.045$ − 1 = 9.56%

1-year forward rate two years from today = $1.09^3/1.07^2$ − 1 = 13.11%

2-year forward rate one year from today = $(1.09^3/1.045)^{0.5}$ − 1 = 11.32%

Q-6.   Solution: D

Computing the 2-year forward swap rate starting in three years:

$$(1+4.50\%)^5 = (1+3.50\%)^3 \times (1+r)^2$$

r = 6.02%

Q-7.   Solution: D

The forward curve will be above the spot curve when the spot curve is rising. The forward curve will also cross the spot curve when the spot curve reaches its maximum (or extreme) value. The forward curve will be below the spot curve when the spot curve is declining. The only chart that reflects these three conditions is choice D.

Q-8.   Solution: A

The promises of corporate bond issuers and the rights of investors who buy them are set forth in great detail in contracts generally called indentures. The indenture is made out to the corporate trustee as a representative of the interests of bondholders; that is, the trustee acts in a fiduciary

capacity for investors who own the bond issue.

Q-9.   Solution: D

Trustees are not required to take actions to monitor indenture covenant compliance.Trustees can only perform the actions indicated in the indenture but are typically under no obligation to exercise the powers granted by the indenture even at the request of

bondholders. It is true that the trustee is paid by the debt issuer, not by bond holders or

their representatives.

Q-10.   Solution: C

Since zero-coupon bonds have no coupons, there is nothing to reinvest. They are subject to all of the other risks listed, however.

Q-11.   Solution: A

According to the Trust Indenture Act, if a corporate issuer fails to pay interest or principal, the trustee may declare a default and take such action as may be necessary to protect the rights of bondholders. Trustees can only perform the actions indicated in the indenture, but are typically under no obligation to exercise the powers granted by the indenture even at the request of bondholders. The trustee is paid by the debt issuer, not by bond holders or their representatives.

Q-12.   Solution: C

A) Incorrect. High-yield bonds are often issued by young and growing companies lacking a strong financial track record.

B) Incorrect. Investment-grade bonds can indeed become high-yield bonds if the financial situation of the issuing firm deteriorates.

C) Correct. High-yield bonds are typically rated below BBB grade, indicating a higher risk of default.

D) Incorrect. Step-up bonds involve an increasing coupon rate over time, not deferred interest payments. Deferred-coupon bonds are the ones that pay no interest for a specified time period.

Q-13.   Solution: B

Cash Price $(Y) = 100 - P \times \frac{n}{360} = 100 - 5.2 \times \frac{182}{360} = 97.3711$, such that for \$1 million in face

value, Cash price $= 97.3711 \times 1{,}000{,}000/100 = \$973{,}711.11$.

Q-14.   Solution: C

Step 1: Compute semiannual zero rates for the 1-and 3-year bonds.

1-year bond: FV = 100; N = 2; PMT = 0, PV = -95.18, CPT: I/Y = 2.5008 × 2 = 5.0%

3-year bond: FV = 100; N = 6; PMT = 0, PV = -83.75, CPT: I/Y = 3 × 2 = 6%

Step 2: Use linear interpolation on zero rates for 2-year bond

(6% − 5%)/2 = 0.5%, zero rates for 2-year bonds = 5% + 0.5% = 5.5%

Step3: Compute 2-year bond price

FV = I00; N = 4; PMT = 0, I/Y = 2.75(5.5/2), CPT: PV = -89.72

Q-15.   Solution: C

The expected value of the zero coupon bond one year from now is given by:

$$5\% \times \frac{100}{1+(4\%+0.004)} + 85\% \times \frac{100}{1+(4\%+0.008)} + 10\% \times \frac{100}{1+(4\%+0.015)} = 95.37$$

Q-16.   Solution: C

The dirty price of the bond 90 days ago is calculated as N = 10, I/Y = 2.5, PMT = 30, FV = 1,000; CPT→PV = 1,043.76. Adjusting the PV for the fact that there are only 90 days until the receipt of the first coupon, then the dirty price now is $1,043.76 \times 1.025^{(90/180)} = 1056.73$. Clean price = dirty price − accrued interest = $1056.73 − 30 \times (90/180) = 1041.73$.

Q-17.   Solution: D

We first need the invoice price. We can price the bond as of the last coupon date: PV (at 2/15/2014) = -PV(2.0%, 7, 325, 10000) = $10,809.00,

Then we can compound this forward to settlement date, with the given yield, such that: Invoice (aka, Full) Price = PV(at 7/1/2014) = $10,809.00 \times (1 + 4\%/2)^{136/181} = \$10,971.03$.

Finally, we extract the bond's quoted price:

As $AI = \$10,000 \times 6.5\%/2 \times 136/181 = \$244.20$,

Quoted Price = Invoice Price - AI = $\$10,971.03 − \$244.20 = \$10,726.83$.

Q-18.   Solution: B

Q-19.   Solution: D

Loss mutualization is a feature of central clearing, whereby losses arising from a party's default are spread across all other members. Bilaterally cleared OTC derivatives do not have a loss mutualization feature.

Q-20.   Solution: B

Exchanges set specific prices and standardize contracts. They do not negotiate prices bilaterally. Price negotiation through a bilateral process is a feature of the OTC derivatives market.

Q-21.   Solution: A

Dell's reservations describe moral hazard and procyclicality, respectively. In central clearing, moral hazard is the risk that members have less incentive to monitor risk knowing that the CCP assumes most of the risks of the transactions. Procyclicality describes a scenario where a CCP increases margin requirements (initial margin) in volatile markets or during a crisis, which may aggravate systemic risk. Offsetting describes the elimination of duplicate bilateral contracts by transacting through a CCP, which improves flexibility and reduces costs. Adverse selection is the risk that participants with a better understanding of product risks and pricing will trade more products whose risks the CCP underprices, and fewer products whose risks the CCP overprices.

Q-22.   Solution: D

Clearinghouse members are required to provide not only original and variation margin to maintain their own and customer positions, but also must maintain a large guaranty deposit with the clearinghouse. The deposit, or reserve, must be maintained with the clearinghouse as long as the firm is a member of the clearinghouse. The deposit can be made with cash, securities, or letters of credit. The clearinghouse has access to the funds at all times to meet the financial needs of any defaulting member.

Q-23.   Solution: A

Futures market physical delivery is made easier by having the clearinghouse as the counterparty on every trade. Direct deliveries can be made by a short to a long even though the two parties never actually trade with one another. The clearinghouse receives delivery notices from sellers (shorts) and assigns the notices to buyers (longs).

Q-24.   Solution: B

An FRA defined as $t_1 \times t_2$ involves a forward rate starting at time t_1 and ending at time t_2. The buyer of this FRA locks in a borrowing rate for months 3 to 5.This is equivalent to borrowing for five months and reinvesting the funds for the first two months.

Q-25.   Solution: C

The payoff to the company $= \$10\,MM \times (6.0\% - 5.0\%) \times 0.25 = \$25,000$; i.e., if LIBOR goes up, the companies borrowing cost will increase but the FRA will hedge by paying the company But the FRA settles at T = 1.0, such that payoff $= \$25,000 / (1 + 6.0\% \times 0.25) = \$24,631$

Q-26.   Solution: B

Step 1: Initial margin $\$12,500 \times 60 = \$750,000$; Maintenance margin$\$10,000 \times 60 = \$600,000$

Step 2: The first day lose = $(1,000 - 995) \times 250 \times 60 = \$75,000$,

So the first day value = $750,000 – $75,000 = $675,000>$600,000

It will not require a variation margin to bring the position to the proper margin level.

Q-27.   Solution: B

Q-28.   Solution: A

The maintance margin = 75% × $14,000 = $10,500 per contract;the margin call occurs when the loss is $3,500 per contract or $35 per ounce.

That is, if gold drops from $1,400 to $1,365 then value of margin account,per contract,drop $3,500 ($35 × 100) which is 25% of the initial margin.

Q-29.   Solution: C

In regard to (A), a market order sells immediately and does not meet the first objective.

In regard to (B), a sell limit will try to execute if the price rises to $37 and does not meet the first objective.

In regard to (C), the stop-loss becomes a market order once the stock drops to $30 and therefore best meets the second objective.

In regard to (D), the stop becomes a limit at $30 and risks not being filled so does not meet the second objective as well as the stop-loss.

Q-30.   Solution: A

A market-if-touched order executes at the best available price once a trade occurs at the specified or better price. A stop order executes at the best available price once a bid/offer occurs at the specified or worse price. A discretionary order allows a broker to delay execution of the order to get a better price. A fill-or-kill order executes the order immediately or not at all.

Q-31.   Solution: C

Cost of bond A: (102-14/32) – (103-17/32) × 0.98 = 0.9769

Cost of bond B: (106-19/32) – (103-17/32) × 1.03 = -0.0435

Cost of bond C: (98-12/32) – (103-17/32) × 0.952 = -0.1868

Q-32.   Solution: C

Government bond futures decline in value when interest rates rise, so the housing corporation should short futures to hedge against rising interest rates.

Q-33.   Solution: C

Futures rate exceeds the forward rate.

Q-34.   Solution: A

futures rate = forward rate + $\left(\dfrac{1}{2}\right)\sigma^2\, t_1\, t_2$

futures rate (annual) = (100 - 97)% = 3%

futures rate (quarterly) = 3% $\times \dfrac{90}{360}$ = 0.75%

futures rate (continuous)= ln(1.0075) $\times \dfrac{360}{90}$ =2.99%

forward rate = 2.99% - (1/2) (1%^{2}) (4) (4.25) = 2.90%

Q-35.   Solution: B

The formula for computing the forward price on a financial asset is:

$$F_0 = S_0\left(\dfrac{1 + R}{1 + Q}\right)^{T} = 750\left(\dfrac{1 + 3.5\%}{1 + 2\%}\right)^{0.5} = 755.49$$

$F_{actual} = 757$

Q-36.   Solution: C

The 1-year futures price should be 1,000 × (1+1%)$^{0.01}$ = 1,010

The 2-year futures price should be 1,000 × (1+1%)$^{0.01\times2}$ = 1,020.10

The current 2-year futures price in the market is overvalued compared to the theoretical price. To lock in a profit, you would short the 2 year futures, borrow USD 1,000 at 1%, and buy the underlying asset. At the end of the 2nd years, you will sell the asset at USD 1,025 and return the borrowed money with interest, which would be 1,000 × (1+1%)$^{0.01\times2}$ = 1,020.10, resulting in a USD 4.90 gain.

Q-37.   Solution: C

When an asset is strongly negatively correlated with interest rates, futures prices will tend to be slightly lower than forward prices. When the underlying asset increases in price, the immediate gain arising from the daily futures settlement will tend to be invested at a lower than average rate of interest due to the negative correlation. In this case futures would sell for slightly less than forward contracts, which are not affected by interest rate movements in the same manner since forward contracts do not have a daily settlement feature.

The other three choices would all most likely result in the futures price being higher than the forward price.

Q-38.   Solution: C

This is an example of index arbitrage. The no-arbitrage value of the futures contract can be calculated as the future value of the spot price: $S_0 \times \left(\dfrac{1+R}{1+Q}\right)^{T}$,where S_0 equals the current spot price and T equals the time in years.

$$F_0 = 3,625 \times \left(\frac{1+5\%}{1+6\%}\right)^{1.25} = 3,582.30$$

Since this value is different from the current futures contract price, a potential arbitrage situation exists.

Since the futures price is higher than the future value of the spot price in this case, one can short sell the higher priced futures contract, and buy the underlying stocks in the index at the current price. The arbitrage profit would equal 3,767.52 - 3,582.30 = USD 185.22.

Q-39.   Solution: A

A is correct. The forward price is computed as: $F = S \times \left(\frac{1+R}{1+l}\right)^T$

Therefore, as the risk-free rate falls below the lease rate (R < l), we can see from the forward price formula above that F < S, and the forward curve will be in backwardation.

Q-40.   Solution: C

Step 1. The spot is quoted in terms of Swiss Francs per USD,

theoretical future price of USD $= 1.368 \times \left(\frac{1+0.35\%}{1+1.05\%}\right)^{0.25} = 1.3656\,CHF$

Step 2. 3-month future price is USD 0.7350 → 1/0.7350 = 1.3605 CHF

Step 3. 1.3656 CHF > 1.3605 CHF → USD future contract is undervalued

Step 4. Arbitrage strategies: borrow USD (buy CHF) spot, buy USD (short CHF) future.

Q-41.   Solution: C

$$F_0 = 1.25 \times \left(\frac{1+4\%}{1+7\%}\right)^1 = 1.22$$

Q-42.   Solution: D

D is correct. A downward-sloping yield curve tends to favor short-maturity bonds as these are more likely to be the cheapest to deliver.

A is incorrect. An increase in yields tends to favor long-maturity low coupon bonds as the cheapest to deliver.

B is incorrect. There are two embedded options associated with the delivery of a futures contract – the ability to use the cheapest to deliver bond and the "wild card play" where a short counterparty can choose when to deliver the bond. Both of these options benefit the short counterparty and therefore lower the futures price.

C is incorrect. The short counterparty has the right to determine when during the month they will deliver the bond as part of the wild card play. They can also send a notification to deliver after the 2pm closing time so can also exploit a time difference between the settlement of the futures at 2pm and the closing of the bond market later to try and buy the bond cheaper and deliver at the futures price.

Q-43.   Solution: A

A is correct. Futures prices typically converge toward the spot price of the underlying asset as a futures contract approaches maturity.

B is incorrect. Arbitrageurs will play a vital role in the convergence of futures prices and underlying spot prices during the delivery period.

C is incorrect. If the futures price is above the underlying spot price during the delivery period, an opportunistic trader should sell the futures contract and buy the asset in the spot market.

D is incorrect. The S&P 500 futures contract is cash settled so there is no trading activity related to taking physical delivery.

Q-44.   Solution: C

C is correct. The seasonal nature of supply causes producers to store agricultural commodities, incurring storage costs and causing futures prices to display both normal and inverted pricing patterns in the term structure.

A is incorrect. Storage costs of commodities are generally very low compared to the price of the commodity and can therefore be ignored. F = S*exp[(C-Y)*T], where C is a cost of carry and Y is the convenience yield.

B is incorrect. The lease rate for an investment commodity is the interest rate charged to borrow the underlying asset, occasionally the lease rate is negative and may therefore allow arbitrageurs to buy the metal and sell it forward for a profit.

D is incorrect. The convenience yield is added to the lease rate and measures the extent to which an owner of a consumption asset values holding quantities of the asset readily available as inventory.

Q-45.   Solution: B

$$42.47\left(\frac{1+7\%}{1+l}\right)^1 = 43.11$$

Step1: Calculate implicit lease rate = 5.4%.

Step2: The forward price ($43.11) is higher than the spot price ($42.47), the market for Commodity X is currently in contango.

Step 3: If annual risk-free rate immediately fell to 5.0%, holding the lease rate constant, forward price is lower than the spot price, the market would be in backwardation.

Q-46.   Solution: B

When forward prices are as a discount to spot prices, a backwardation market is said to exist. The relatively high spot price represents a convenience yield to the consumer that holds the commodity for immediate consumption.

Q-47.   Solution: B

Q-48.   Solution: B

The forward price is computed as follows:

$$F_0 = 100 \times \frac{(F_0 - K)}{(1 + R)^T} = 100 \times \frac{(1050 - 1000)}{(1 + 4\%)^{0.75}} = 4,855$$

Q-49.   Solution: B

The value of the contract for the bank at expiration: 40,000,000 GBP × 0.80 EUR per GBP

The cost to close out the contract for the bank at expiration: 40,000,000 GBP × 0.85 EUR per GBP

Therefore, the final payoff in EUR to the bank can be calculated as: 40,000,000 × (0.80 − 0.85) = -2,000,000 EUR.

Q-50.   Solution: D

The CFO's analysis is incorrect because there is unlimited downside risk. The option premium received is a fixed amount, and if the EUR declines sharply, the value of the underlying receivable goes down as well. If instead the EUR moves in a narrow range, that would be good, but there is no guarantee of course that this will occur.

Q-51.   Solution: C

C is correct. We first need to calculate the forward price: F = S*[(1+R)/(1+Q)]T = 67.68 *[(1-0.70%)/(1+ 0.44%)]2 = USD 66.15

Now, for an existing contract, the value is S/(1+Q)T - K/(1+R), so if R changes by 1%, the new value is F = 67.68 [(1+0.30%) / (1+0.44%)]2 = USD 67.49

And the difference is 67.49 – 66.15 = USD 1.34. Value change $= 1.34/(1 + 0.3\%)^2 = 1.33$

A is incorrect, -USD 1.46 is the result if R & Q are mixed up.

B is incorrect, -USD 1.37 is the result of change in the risk-neutral forward price if R&Q are mixed

up.

D is incorrect. USD 1.43 is the change in the risk-neutral forward price for the equity.

Q-52.   Solution: C

C is correct. Forward contracts are linear derivatives because their payoff is linearly related to the value of the under-lying asset at maturity and both parties are obligated to fulfill terms of the contract

A is incorrect. The value of underlying determines the value of the derivative contract, not the other way around.

B is incorrect. Options are an example of non-linear derivatives because the payoff is not linearly related to the stock price but is zero if the option is not exercised.

D is incorrect. Forward contracts are linear derivatives whose value is determined only by the price of the underlying, interest rate and time, not volatility of underlying. $F = S(1 + R)^T$

Q-53.   Solution: C

"II" is the only true statement. A short hedge position or a short forward contract benefits from any unexpected decline in future prices and subsequent strengthening of basis. An increase in basis is known as a strengthening of the basis. The payoff to the short hedge position is spot price at maturity (S_2) and the difference between futures price i.e., ($F_1 - F_2$). Thus, payoff = $S_2 + F_1 - F_2 = F_1 + b_2$, where b_2 is the basis.

Basis risk can also arise if underlying asset and hedge asset are identical. This can happen if the maturity of the hedge contract and the delivery date of asset do not match. A long hedge position benefits from weakening of basis.

Q-54.   Solution: C

Basis T1 = $7.00 - $9.00 = -$2.00.

Basis T2 = $7.30 - $9.10 = -$1.80

Basis change = -1.80 - (-2.00) = +0.20

Q-55.   Solution: C

The farmer needs to be short the futures contracts. The two sources of basis risk confronting the farmer will result from the fact that he is using a cattle contract to offset the price movement of his buffalo herd. Cattle prices and buffalo prices may not be perfectly positively correlated. As a result, the correlation between buffalo and cattle prices will have an impact on the basis of the cattle futures contract and spot buffalo meat. Also the delivery date is a problem in this situation, because the farmer's hedge horizon is winter, which probability will not commence until December or January. In order to maintain a hedge during this period, the farmer will have to enter into

another futures, which will introduce an additional source of basis risk.

Q-56.   Solution B

Futures on an asset whose price changes are most closely correlated with the asset you are looking to hedge will have the least basis risk. This is determined by examining the R^2 of the regressions and choosing the highest one. R^2 is the most applicable statistic in the above chart to determine correlation with the price of Zirconium.

Q-57.   Solution: D

In order to minimize basis risk, one should choose the futures contract with the highest correlation to price changes, and the one with the closest maturity, preferably expiring after the duration of the hedge.

Q-58.   Solution: D

The optimal hedge ratio can be determined by the formula:

$$h = \rho_{s,f} \times \frac{\sigma_s}{\sigma_f} = 0.3876 \times \frac{0.57}{0.85} = 0.2599$$

Q-59.   Solution: C

The optimal hedge ratio is the product of the coefficient of correlation between the change in the spot price and the change in futures price, and the ratio of the volatility of the equity fund and the futures.

Two-thirds of the equity fund is worth USD 40 million. The optimal hedge ratio computed:

h = 0.89 × (0.51 / 0.48) = 0.945

Computing the number of futures contracts:

N = 0.945 × 40,000,000 / (910 × 250) = 166.26 ≈ 167, round up to nearest integer.

Q-60.   Solution: A

This is as in the previous question, but the hedge is partial, i.e. for a change of 1.10 to 0.75. So,

$$N = (\beta_{new} - \beta_{old}) \times \frac{\text{size of spot position}}{\text{size of one futures contract}} = (0.75 - 1.1) \times \frac{300,100,000}{250 \times 1,457} = -288$$

Q-61.   Solution: B

Step1. First swap is equivalent to a short position in a bond with similar coupon characteristics and maturity offset by a long position in a floating-rate note.

Its DV01=420×4.433×0.0001=0.186.

Step2. Second swap is equivalent to a long position in a bond with similar coupon characteristics

and maturity offset by a short position in a floating-rate note.

Its DV01=385×7.581×0.0001=0.291.

Step3. Net DV01 of portfolio = -0.186+ 0.291 = 0.105m = 105,683

Step4. The optimal number is $N^* = -DV01_S/DV01_F = -105,683/25 = -4,227$ (Note that the DVBP of the Eurodollar futures is about 25.)

Q-62.   Solution: D

To hedge the exposure, the company should sell futures and not buy.

The number of contracts to sell is:

$$N = \text{hedge ratio} \times \frac{1,000}{25} = 0.77 \times \frac{2.6\%}{3.2\%} \times \frac{1,000}{25} = 25$$

Q-63.   Solution: D

D is correct. Stock index arbitrage involves the purchase or sale of a stock index future while simultaneously offsetting this by taking positions in the components of the index.

A is incorrect. This is an example of a long/short trade, or a pairs trade, rather than stock index arbitrage.

B is incorrect. This is an example of a long/short trade, or a pairs trade, rather than stock index arbitrage.

C is incorrect. When a portfolio underlying an index is not tradable, it is possible that the price of the index diverges from the value of the underlying index.

Q-64.   Solution: A

A is correct. Under normal accounting rules the volatility in reported earnings can increase, opposite of what would be expected with hedging activity. This is because the gain or loss on the hedges is reported every year rather than in the period when the gain or loss on the instrument being hedged is being reported as in hedge accounting.

B is incorrect. Many jurisdictions, the US in particular, treat hedging transactions differently for tax and accounting purposes.

C is incorrect. Under hedge accounting, the entire gain or loss on a hedge is realized at the same time as the item being hedged.

D is incorrect. There are very strict rules regarding whether a company can use hedge accounting, including that any hedge be fully documented and be effective, with an economic relationship not dominated by the effect of credit risk.

Q-65.   Solution: B

Statement II is correct. A strip hedge tends to have lower liquidity and wider bid-ask spreads owing to longer maturity contracts.

A strip hedge involves hedging a stream of obligations by offsetting each individual obligation with a futures contract matching the maturity and quantity of the obligation. Stacking futures contracts in the near-term contract and rolling over into the new near-term contracts is referred to as a stack and roll.

Statement I is incorrect. A strip hedge involves one time buying of futures contracts to match the maturity of liabilities.

Q-66. Solution: A

In backwardation, the roll yield generates losses for the short position; i.e., the short will generally enter each one month contract at $102 and exit near the spot (convergence!) at $106. The roll yield is profitable to the long position in backwardation.

Q-67. Solution : C

C is correct. This is an outflow of USD 375,000 = (2.95-3.10)*100*25,000.

A is incorrect. This cash inflow would occur on Dec 31, 2023. First fiscal year: (3-2.95)*25,000*100 = 125,000.

B is incorrect. This is the accounting treatment of the gain or loss on the hedge: (3.00-3.10)*25,000*100 = -250,000.

D is incorrect. This is the accounting treatment of the gain or loss on the hedge over 3 years. (3.00-3.15)*25,000*100 = -500,000

Q-68. Solution: D

The forward rate is: $1.3000 \times \frac{1.04^{0.25}}{1.01^{0.25}} = 1.3095$.

The forward rate would be quoted as 95.

Q-69. Solution: C

C is correct. Using the formula Rreal = (1+Rnom)/(1+Rinfl)-1 generates the following results:

Country	Nominal interest rate	Inflation	Real interest rate
A	3.9%	1.9%	2.0%
B	4.1%	2.0%	2.1%
C	4.2%	2.3%	1.9%
D	4.6%	2.5%	2.0%

Therefore, C has the lowest real interest rate.

Q-70. Solution: D

D is correct. As described in the text, "If Country A increases its money supply by 25% while Country B keeps its money supply unchanged, the value of Country A's currency will tend to decline by 25%

relative to Country B's currency."

A is incorrect. Future exchange rates cannot be predicted with any precision.

B is incorrect. While political instability would weaken a currency, supply and demand are the most important factors.

C is incorrect. Exchange rates should be assumed to change even in short-term time horizons.

Q-71.   Solution: B

The swap rate is the average of 3.8 and 3.88, or 3.84%.

$$V = \sum_{t=1}^{12} -\frac{(20{,}000{,}000 \times (5\% - 3.84\%) \times 0.25)}{\left(1 + \frac{3.6\%}{4}\right)^t} = \sum_{t=1}^{12} \frac{-58{,}000}{\left(1 + \frac{3.6\%}{4}\right)^t} = -656{,}938$$

Q-72.   Solution: C

The new 2.5-year swap rate is the average of 2.96 and 3.075, or 3.0175%.

$$V = \sum_{t=1}^{10} -\frac{(20{,}000{,}000 \times (5\% - 3.0175\%) \times 0.25)}{\left(1 + \frac{3.6\%}{4}\right)^t} = \sum_{t=1}^{10} \frac{-99{,}125}{\left(1 + \frac{3.6\%}{4}\right)^t} = -943{,}899$$

Q-73.   Solution: C

The difference of the differences is (12% − 10%) − [LIBOR + 1% − (LIBOR + 0.5%)] = 1.5%.

Q-74.   Solution: C

Since the oil driller is swapping out of a fixed-rate and into a floating-rate, the larger the difference between the fixed spread and the floating spread the greater the combined benefit. See table below:

Firm	Fixed-rate	Floating-rate	Fixed-spread	Floating-spread	Possible Benefit
Oil driller	4.0	1.5			
Firm A	3.5	1.0	-0.5	-0.5	-0.0
Firm B	6.0	3.0	2.0	1.5	0.5
Firm C	5.5	2.0	1.5	0.5	1.0
Firm D	4.5	2.5	0.5	1.0	-0.5

Q-75.   Solution: B

The proper interest rate to use is the 6-month LIBOR rate at February 9, 2010, since it is the 6-month LIBOR that will yield the payoff on August 9, 2010. Therefore the net settlement amount on August 9th, 2010 is as follows:

Savers receives: 6,500,000×4.00%×0.5 years, or USD 130,000

Savers pays 6,500,000×(0.39% + 1.20%)×0.5, or USD 51,675.

Therefore Savers would receive the difference, or 78,325.

Q-76. Solution: A

We can value this swap as two bonds (see upper panel below). Although it might be easier to recognize that the exchange in three months will be zero, such that only the cash flow at nine months needs to be evaluated: The floating rate pays $0.5 \times \$400$ million $\times 2 \times [e^{0.0220/2} - 1] = \$4.42429$ million, and the fixed-rate pays $\$6.00$; so the future (and final) net cash flow exchange is $\$1.57571$, which has a present value of $\$1.54993$ million.

Q-77. Solution: C

$B_{USD} = 275,000\ e^{-0.04 \times 1} + 275,000\ e^{-0.04 \times 2} + 10,275,000\ e^{-0.04 \times 3} = USD9,631,182$

$B_{CAD} = 562,500\ e^{-0.05 \times 1} + 562,500\ e^{-0.05 \times 2} + 15,562,500\ e^{-0.05 \times 3} = CAD14,438,805$

$V_{swap}(USD) = 9,631,182 - 14,438,805/1.52 = USD131,967$

Q-78. Solution: A

The exchanges are:

Time	Pounds Paid	Euros Received	Value in Pounds
0.5	15,000	11,000	11,000/1.1443-15,000=-5,387.1362
1.0	15,000	11,000	11,000/1.1387-15,000=-5,339.8612
1.5	15,000	11,000	11,000/1.1330-15,000=-5,291.2621
2.0	1,015,000	1,111,000	1,111,000/1.1275-1,015,000=-29,634.1463

The GBP value of the swap is:

$$\frac{-5,387.1362}{1+2.5\%/2} + \frac{-5,339.8612}{(1+2.5\%/2)^2} + \frac{-5,291.2621}{(1+2.5\%/2)^3} + \frac{-29,634.1463}{(1+2.5\%/2)^4} = -43,824.76$$

Q-79. Solution: C

Cash Flows for Peck:

(Inflow at the return (%) on stock index – Outflow at 5%) × Notional principal

Return on stock index = (11219/10320) – 1 = 0.0871 or 8.71%

Net amount owed by the dealer to Peck = 50 M × (0.0871 – 0.05) = 50,000,000 × 0.0371 = EUR 1.86 million.

Q-80. Solution: A

Q-81. Solution: B

B is correct. With a currency swap, the notional amounts are exchanged in an opposite direction

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from the interest rate payments at the initiation of the swap. Therefore, if the hedge fund is collecting interest in CNY, it will pay CNY 65 million and receive USD 10 million at the initiation of the swap.

A is incorrect. Unlike an interest rate swap, the principal amounts are actually exchanged at the initiation of a currency swap.

C is incorrect. The swap will typically have a zero mark-to-market value upon initiation.

D is incorrect. Since the hedge fund initially pays CNY and receives USD, at the end of the swap the fund will pay USD and receive CNY. If the CNY depreciates in the meantime, the fund would receive less on settlement than it would have if it simply converted the USD to CNY in the spot market, so the mark-to-market value would decrease.

Q-82.   Solution: A

For European and American call options, the maximum possible price is equal to current stock price. The option price can never be higher than the stock. The stock price is thus the "upper bound". For a European Put, the upper bound is the present value of strike price, while for American put it is equal to the strike price.

Q-83.   Solution: C

We can use the Put-Call parity here to easily solve for the continuous dividend yield.

We have $c + Ke^{-rt} = Se^{-qt} + p$, so $85e^{-q \times 5} = 10 + 90e^{-5\% \times 5} - 15$, Solving for q, we get 5.34%.

Q-84.   Solution: C

From the equation for put-call parity, this can be solved by the following equation:

p = c + PV(K) + PV(D) - S$_0$

where PV represents the present value, so that:

PV(K) = Ke^{-rT} and PV(D) = D × e^{-rt}

Where:

p represents the put price,

c is the call price,

K is the strike price of the put option,

D is the dividend,

S$_0$ is the current stock price.

T is the time to maturity of the option, and

t is the time to the next dividend distribution.

Calculating PV (K), the present value of the strike price, results in a value of $25 \times e^{-0.05 \times 0.5}$ or 24.38, while PV (D) is equal to $1 \times e^{-0.05 \times 0.25}$ or 0.99. Hence p = 3 + 24.38 + 0.99 - 24 = USD 4.37.

Q-85.   Solution: D

Dividends can have a significant impact on option values. While they generally reduce the value of call options due to the reduction in stock price, they can increase the value of put options. This is because dividends effectively reduce the stock price, making it more likely for the put option to be exercised. Therefore, in situations where dividends are present, the value of American put options can be greater than in scenarios without dividends.

Q-86.   Solution: D

The easiest thing to do is to find the net profit or loss for each position and then add them together, recognizing whether a position is short or long.

For 1 long $43 strike put position: $[1 \times (43 - 19)] - 6 = 18$

For 2 short $37 strike puts position: $-[2 \times (37 - 19)] + (2 \times 4) = -28$

For 1 long $32 strike put position: $[1 \times (32 - 19)] - 1 = 12$

The sum of these profit/loss numbers is a $2 gain

Q-87.   Solution: C

Payoff of the long put = Max[0, K − S(t)] and payoff of short call = -Max[0, S(t) − K] = Min[K − S(t),0], such that the combination payoff = K − S(t)

In regard to D, please note: Profit = the payoff − initial investment [net premium]

Sometime also profit = payoff − FV (initial investment)

Q-88.   Solution: B

The pay-off structure to this strategy leaves the upside and downside potential at the difference between the premium collected on the calls sold and the premium paid on the calls purchased.

Q-89.   Solution: D

A calendar spread is created by transacting in two options that have different expirations. Both options have the same strike price. The strategy sells the short-dated option and buys the long-dated option. The investor profits only if the stock remains in a narrow range, but losses are limited. Overall, the payoff is most similar to the butterfly spread.

Q-90.   Solution: A

This strategy of buying a call option at a higher strike price and selling a call option at lower strike price with the same maturity is known as a bear spread. To establish a bull spread, one would buy the call option at a lower price and sell a call on the same security with the same maturity at a higher strike price.

71-81

The cost of the strategy will be:

USD − 10 + USD 2 = USD − 8 (a negative cost, which represents an inflow of USD 8 to the investor) The maximum payoff occurs when the stock price S_T ≤ USD 50 and is equal to USD 8 (the cash inflow from establishing the position) as none of the options will be exercised. The maximum loss occurs when the stock price S_T ≥ 60 at expiration, as both options will be exercised. The investor would then be forced to sell XYZ shares at 50 to meet the obligations on the call option sold, but could exercise the second call to buy the shares back at 60 for a loss of USD -10. However, since the investor received an inflow of USD 8 by establishing the strategy, the total profit would be USD 8 - USD 10 = USD -2.

When the stock price is USD 50 < S_T ≤ USD 60, only the call option sold by the investor would be exercised, hence the payoff will be 50 - S_T. Since the inflow from establishing the original strategy was USD 8, the net profit will be 58 - S_T, which would always be higher than USD -2.

Q-91. Solution: B

B is correct. This describes the process that transforms a regular upfront premium option into a zero-cost derivative product. The option purchaser essentially agrees to buy the option payoff for a premium equal to the future value of the upfront option premium.

A is incorrect. The option buyer would not be able to pay the same premium at maturity as they would at option initiation. The premium would be increased by an interest charge.

C is incorrect. A single option can be packaged with other options to make the net premium zero but the payoff will not remain identical. Generally, there is a trade-off involving the cost of the position and the payoff of the position. For example, if the payoff of a call could be structured with a package of options resulting in no cost, there would be no need for outright calls. This is not the process described to make any derivative a zero-cost product.

D is incorrect. It is not going to have the same payoff.

Q-92. Solution: D

D is correct. When the FX rate falls by more than 0.03, the maximum gain from the option is limited to the option premium, while the gain from the forward is much larger than the gain from the option because the gain from the forward is linear, increasing with the rate until the rate falls to 0. Therefore, the gain from the forward is much larger than the gain from the option

A is incorrect. For example if FX rate is below USD 1.07 for EUR 1, the profit on the option is limited to the premium received, but the profit on the forward is larger.

B is incorrect. This is incorrect because the strike price for the call, 1.07 is different from the forward strike price of 1.10 and ABC receives premium for the option. B can be correct if the call option premium is less than 0.03.

C is incorrect. If the rate is in the range USD 1.07 to USD 1.10 for EUR 1, ABC is still in premium for forward, but has to make a payment on the option, so depending on the amount of premium received by ABC on the option, either scenario can be better off.

Q-93.   Solution: B

The sum of the price of an up-and-in barrier call and an up-and-out barrier call is the price of an otherwise equivalent European call. The price of the European call is EUR 3.52 + EUR 1.24 = EUR 4.76.

The sum of the price of a down-and-in barrier put and a down-and-out barrier put is the price of an otherwise equivalent European put. The price of the European put is EUR 2.00 + EUR 1.01 = EUR 3.01.

Using put-call parity, where C represents the price of a call option and P the price of a put option,

$C + Ke^{-rT} = P + S$

$K = e^{rT} (P + S - C)$

Hence, $K = e^{0.02} \times (3.01 + 40.96 - 4.76) = 40.00$

Q-94.   Solution: C

The sum of the price of up-and-in barrier call and up-and-out barrier call is the price of an otherwise the same European call. The price of the European call is therefore USD 5.21 + USD 1.40 = USD 6.61. The put-call parity relation gives Call – put = Forward (with same strikes and maturities). Thus 6.61 – put = 1.50. Thus put = 6.61 – 1.50 = 5.11

Q-95.   Solution: C

As the underlying assets' price increases the up-and-out call options become more vulnerable since they will cease to exist when the barrier is reached. Hence their price decreases. This is negative delta.

Q-96.   Solution: B

A down-and-out call where the barrier has not been touched is still alive and hence benefits from an increase in *S*, so a. is incorrect. A down-and-in call only comes alive when the barrier is touched, so an increase in *S* brings it away from the barrier. This is not favorable, so b. is correct. An up-and-in put would benefit from an increase in *S* as this brings it closer to the barrier of $110, so c. is not correct. Finally, an up-and-in call would also benefit if *S* gets closer to the barrier.

Q-97.   Solution:A

A floating lookback call pays the difference between the expiration price and the minimum price of the stock over the horizon of the option. Therefore, its payoff is equal to: $50- $35 = $15. A fixed

lookback call has a payoff function equal to the difference between the maximum price during the option's life and the strike price. Therefore, its payoff is equal to: $53-$40 = $13. The payoff difference between the two exotic options is equal to $2.

Q-98.   Solution: C

C is correct. In an asset-or-nothing put, if the price is below the strike the option holder is paid an amount equal to the price of the asset, which in this case is USD 45 *5,000 = USD 225,000.

A is incorrect. This is the payoff from a standard put option, which would pay (49-45) = USD 4/share, or USD 20,000.

B is incorrect. If the strike is mistaken to be 52 and it was a standard put option, the price would be USD 7/share = USD 35,000.

D is incorrect. This is simply 49 * 5,000.

Q-99.   Solution: B

B is correct. Exchange-traded options are standardized while OTC options can be tailored to the specific needs of the customer.

A is incorrect. Most (though not all) exchange-traded options are American. By contrast, many of the options traded in the over-the-counter market are European.

C is incorrect. The size of the typical options transaction in the OTC market is large and the options often last longer than those traded on exchanges.

D is incorrect. Options on individual equities are primarily traded on exchanges, while options in FX and interest rate markets are primarily traded in OTC markets.

Q-100.   Solution: A

Asian options, as described, provide a cost-effective way to hedge against exchange rate fluctuations compared to the other options listed. While forward contracts, futures contracts, and swaps are commonly used hedging strategies, they may involve higher costs or different risk profiles compared to Asian options, which utilize the averaging feature to potentially reduce costs.

Q-101.   Solution: C

We use the following formulas: SMM = (prepayment/beg. bal − scheduled principal payment) and $(1 − SMM)^{12} = (1 − CPR)$.

Prepayment = actual payment − scheduled payment = ($10,500,000 − $9,800,000) − $54,800 = $700,000 − $54,800 = $645,200

So: $645,200/($10,500,000 − $54,800) = 0.06177 and CPR = $1 − (1 − 0.06177)^{12}$ = 0.5347 = 53.47%

Q-102.   Solution: D

MBSs are unlike regular bonds, Treasuries, or corporates, because of their negative convexity. When rates fall, homeowners prepay early, which means that the price appreciation is less than that of comparable duration regular bonds.

Q-103.   Solution: A

N = (30 − 5) × 12, I/Y = 5 ÷12, PV = -100, 0000, FV =0, CPT PMT = -584.59

Interest in the 61st month = 100,000 × 5% / 12 = 416.67

Principal in the 61st month = 584.59 − 416.67 = 167.92

Q-104.   Solution: A

$N = 30 \times 12, I/Y = 5\%/12, PV = 100,000, FV = 0, CPT\ PMT = -536.82$

$N = 30 \times 12, I/Y = 3.5\%/12, PV = 100,000, FV = 0, CPT\ PMT = -449.04$

$536.82 - 449.04 = 87.78$

Q-105.   Solution: B

SMM=1 − (1 − 0.004)^(1/12) = 0.0334%

N=60, I/Y=5.5/12, PV=-20,000,000, FV=0 CPT PMT=382,023.24

PRN=290,256.58

Expected principal prepayment = (20,000,000 -290,356.58)* 0.0334%=6583.02

Q-106.   Solution: B

A) Stagnation in housing prices: This is an incorrect option. Stagnation in housing prices, where there are no significant changes, is less likely to motivate mortgage holders to refinance or default, thus not contributing significantly to increased prepayments in MBS.

B) Sharp changes in housing prices: This is the correct answer. Sharp changes in housing prices may lead mortgage holders to take action such as refinancing or defaulting, thereby increasing prepayments in MBS.

C) Increasing interest rates: Refinancing arises when a borrower prepays a mortgage in order to refinance the underlying property. The most likely reason for this is a decline in interest rates.

D) Approaching original distribution day: While nearing the original distribution day may affect the market to some extent, it is not directly related to prepayment behavior.

Q-107.   Solution: D

Both are correct.

Q-108.   Solution: C

TBAs are forward contracts where parties agree on various parameters such as issuer, maturity,

coupon, price, par value, and settlement month, providing flexibility and liquidity in trading MBS. The seller has a cheapest deliverable option, which means they can choose from qualified pools that meet specified standards, but the exact pool is not determined until shortly before delivery.

Q-109.   Solution: C

Unlike repos where the same securities are repurchased, dollar rolls may involve receiving different securities in the second month, providing flexibility but also introducing potential differences in prepayment properties. Dollar roll transactions do not add interest to the repurchase price. On the contrary, the initiator loses one month's interest payment from the sold securities, while the counterparty receives one month's interest.

Q-110.   Solution: B

Prepayment risk is equivalent to an American call option because the borrower can repay at any time and the position is short because the option lies with the borrower.

Q-111.   Solution: B

The problem tells us that the market price of the CMO tranche is 70.17. The OAS is the spread that is added to the interest rates along the interest rate path that makes the market and the theoretical value equal. The price of the CMO will be the weighted average of the values of each interest path. Because we are told in the problem that the paths are equally weighted, we simple find the arithmetic average for each path and choose the theoretical value that equals the market price. In this case, the average of the 60bp spread column is

$$\frac{68 + 70 + 66 + 69 + 75 + 73}{6} = \frac{421}{6} = 70.17$$

The OAS must be 60 bps.

Q-112.   Solution: B

In a previous section it was noted that mortgage obligors generally have the ability to prepay their loans before they mature either by selling the property or by refinancing the loan to lower their interest rate or monthly payment. For the holder of the mortgage asset, the borrower's prepayment option creates a unique form of risk. In cases where the obligor refinances the loan in order to capitalize on a drop in market rates, the investor has a high-yielding asset payoff that can be replaced only with an asset carrying a lower yield. Prepayment risk is analogous to "call risk" for a corporate and municipal bond in terms of its impact on returns, and it also creates uncertainty with respect to the timing of investor cash flows.

Q-113.   Solution: B

Calculate the mortgage payment factors for the 30-year, 5% and 4% fixed rate mortgages, then calculate the mortgage payment savings.

N=30×12, I/Y=5/12, PV=250,000, FV=0, CPT PMT=-1342

N=30×12, I/Y=4/12, PV=250,000, FV=0, CPT PMT=-1194

1342 – 1194 = 148

Q-114.   Solution: C

Economic capital refers to a bank's own assessment of the minimum level of capital it needs to maintain. Economic capital is often less than regulatory capital, which is the minimum level a bank must maintain to comply with capital adequacy regulations.

Q-115.   Solution: A

Charging risk-based premiums is a measure intended to address the problem of moral hazard, which exists when insured parties take greater risks than they would take in the absence of insurance.

Q-116.   Solution: D

Deposit insurance is a mechanism introduced by many countries to instill confidence in the banking system by providing protection to depositors against losses resulting from bank failures. However, the presence of deposit insurance can lead to moral hazard, where insured parties may take on more risks due to the safety net provided by the insurance.

Enforcing strict limitations on borrowing by banks could actually mitigate moral hazard rather than exacerbate it. By limiting banks' ability to borrow excessively, this action reduces the likelihood of risky behavior and promotes prudent lending practices.

Setting the deposit insurance premium based on the level of risk can help mitigate moral hazard. It ensures that banks with riskier profiles pay higher premiums, which incentivizes them to manage their risks more effectively to avoid higher costs. Therefore, this action is less likely to contribute to the moral hazard problem.

The moral hazard is also lessened by regulations that ensure that a bank's required capital increases with the risks it takes.

Q-117.   Solution: D

With a firm commitment offering, an investment bank buys an entire issue of securities from the issuer and attempts to sell them to the public at a higher price. In a private placement or a best efforts offering, an investment bank earns fee income rather than trading income. Dutch auction is a method of price discovery for an initial public offering that does not involve buying and reselling shares.

Q-118.   Solution: D

We first arrange them in descending order of bids.

Bidder	Number of Shares	Price (USD)
C	5,000	90
G	8,000	86
D	6,000	85
F	4,000	84
A	3,000	80
B	2,000	73
E	9,000	70

For a Dutch auction, we need to find the highest price at which at least 20,000 shares can be sold.

In descending order of bids, we gradually accumulate the number of shares until we reach or exceed 20,000 shares.

Bidder C; Number of Shares 5,000; Price (USD) 90 (Total: 5,000 shares)

Bidder C + G; Number of Shares 13,000; Price (USD) 86 (Total: 13,000 shares)

Bidder C + G + D; Number of Shares 19,000; Price (USD) 85 (Total: 19,000 shares)

Bidder C + G + D + F; Number of Shares 23,000; Price (USD) 84 (Total: 20,000 shares)

Therefore, the shares are sold at a price of $84.

Q-119.   Solution: B

Chinese walls are internal controls to prevent a banking company's commercial banking, securities, and investment banking operations from sharing information.

Q-120.   Solution: C

One drawback to the originate-to-distribute model is that it has led to looser credit standards in certain sectors, such as residential mortgages. A benefit of the model is that it has increased liquidity in certain sectors.

Q-121.   Solution: D

If capital falls below the solvency capital requirement, a plan to bring it back up must be formulated. If it falls below the minimum capital requirement, the insurance company may not be allowed to take on more business and its policies may be transferred.

Q-122.   Solution: B

One-year term:

The expected payout for a one-year term is 0.002092 * $2,000,000 = $4,184. Assuming the payout occurs in six months, the breakeven premium is $4,184 / 1.01 = $4,142.57.

Two-year term:

The expected payout for a two-year term is the sum of the expected payouts in both the first year and the second year. The probability of death in the second year is (1 - 0.002092)* 0.00224 = 0.0022353, so the expected payout in the second year is 0.0022353*$2,000,000 =$4,470.63. If the payout occurs in 18 months, then the present value is $4,470.63 /(1.01)^3 = $4,339.15. The total present value of the payouts is then $4,142.57 + $4,339.15 = $8,481.72.

The first premium payment occurs immediately (i.e., beginning of the first year) so it is certain to be received. However, the probability of the second premium payment being made at the beginning of the second year is the probability of not dying in the first year, which is 1 - 0.002092 = 0.997908. The present value of the premium payments is as follows (using Y as the breakeven premium): Y + (0.997908Y / 1.01^2) = 1.978245Y.

Computing the breakeven annual premium equates the present value of the payouts and the premium payments as follows: 8,481.72 = 1.978245Y. Solving for Y, the breakeven annual premium is $4,287.50.

Response A ($4,246) is not correct because it performs the computation on the assumption that all payouts occur at the end of the year instead of halfway throughout the year. Response C ($4,332) is not correct because it did not apply any discounting (at the 1% semiannual rate). Response D ($8,482) is not correct because it is simply the total present value of the payouts.

Q-123.   Solution: B

The operating ratio is computed as follows:

loss ratio (74%) + expense ratio (23%) + dividends (2%) - investment income (5%) =94%

The combined ratio is computed as follows:

loss ratio (74%) + expense ratio (23%) = 97%

The combined ratio after dividends is computed as follows:

loss ratio (74%) + expense ratio (23%) + dividends (2%) = 99%

Q-124.   Solution: A

Adverse selection describes the situation where an insurer is unable to differentiate between a good risk and a bad risk. In the context of life insurance, by charging the same premiums to all policyholders (healthy and unhealthy individuals), the insurer may end up insuring more bad risks (e.g., unhealthy individuals). To mitigate adverse selection, a life insurance company might require physical examinations prior to providing coverage. Property and casualty insurance companies typically have a greater amount of equity than a life insurance company because of the highly unpredictable nature of P&C claims (both timing and amount).

Q-125.   Solution: D

Adverse selection refers to the situation where insurance is more likely to be purchased by high-risk individuals. In this scenario, the applicants with a history of traffic violations and accidents represent a higher risk for the insurance company due to their likelihood of future claims. This risk is captured by the concept of adverse selection. Options A, B, and C relate to different types of risks within the insurance industry but do not specifically address the situation of higher-risk individuals selectively purchasing insurance. Therefore, option D, adverse selection, is the most appropriate term to describe the risk posed by these applicants.

Q-126.   Solution: B

Mutual funds must offer immediate access to withdrawals from their fund. This is an SEC requirement. Hedge funds have advance notification and lock-up periods, which prevent immediate access to withdrawals from the fund.

Q-127.   Solution: D

$$\text{NAV} = \frac{(\$1,100 + \$350 + \$35) - 1.85}{39.635} = \$37.42$$

Investors who wish to buy or sell this fund will transact at exactly $37.42 per share, which is not calculated until after the market closes on the trading day in question. If they wanted to invest $25,000, then they would buy exactly 668.092(=$25,000/$37.42) shares after the market closes on the relevant trading day.

Q-128.   Solution: A

If the return is $X(> 2\%)$, the investors pay $0.02 + 0.2(X - 0.02)$ in fees. It must therefore be the case that $X - 0.02 - 0.2(X - 0.02) = 0.2$. So that $0.8X = 0.216$ or $X = 0.27$. A return of 27% is necessary.

Q-129.   Solution: C

In regard to (A), (B) and (D), each is TRUE.

- In regard to true (A), the geometric mean is 12.841%, which is less than the arithmetic mean by about one-half the variance of the series
- In regard to true (B), hedge funds, because their investors are supposedly sophisticated, are subject to less regulation than a mutual fund. Mutual funds must make its shares redeemable at any time; must calculate their NAV daily; must disclose their investment policies; and cannot use leverage without limit.

Q-130.   Solution: B

Market timing can be not illegal. For example, suppose that it is now 3:45 p.m. and prices in

markets have been rising during the last few hours. The existence of stale prices means that shares in the mutual fund are probably worth slightly more than the NAV, and therefore buying at the 4 p.m. NAV is attractive. Similarly, if prices in markets have been falling, selling at the 4 p.m. NAV is attractive. Market timing trades of this sort are not illegal, but they must be quite large to be worthwhile.