Lesson 4.2 Quiz: Derivatives, Options, and Risk Transfer

Module 4: The Risk Problem

Prof. Dr. Joerg Osterrieder

Digital Finance — BSc Course (v2026.05)

Q1: What Is a Derivative?

Which statement **best** describes a financial derivative?

- (A) A bank deposit with a variable maturity date
- (B) A contract whose value is derived from an underlying asset, rate, or index
- (C) A stock that has been split into smaller units
- (D) A bond that pays a floating interest rate

Q1: What Is a Derivative?

Which statement **best** describes a financial derivative?

- (A) A bank deposit with a variable maturity date
- (B) A contract whose value is derived from an underlying asset, rate, or index
- (C) A stock that has been split into smaller units
- (D) A bond that pays a floating interest rate

[Answer hidden – compile with \solutionstrue to reveal]

Q2: Obligation vs. Right

What is the key difference between a **forward contract** and an **option**?

A. Options are always more expensive than forwards
B. Forwards require both parties to trade; options give the buyer the right to walk away
C. Forwards have longer maturities than options
D. Forwards are traded on exchanges; options are OTC

Q2: Obligation vs. Right

What is the key difference between a **forward contract** and an **option**?

- (A) Options are always more expensive than forwards
- (B) Forwards require both parties to trade; options give the buyer the right to walk away
- (C) Forwards have longer maturities than options
- (D) Forwards are traded on exchanges; options are OTC

[Answer hidden – compile with \solutionstrue to reveal]

Q3: Why Options Require a Premium

Why does the buyer of an option pay an **upfront premium**, while the buyer of a forward does not?

- (A) Options are riskier than forwards
- (B) The option buyer has the right to walk away — this asymmetry has value
- (C) Options always expire worthless, so the premium compensates the seller
- (D) Forwards are regulated, so premiums are prohibited

Q3: Why Options Require a Premium

Why does the buyer of an option pay an **upfront premium**, while the buyer of a forward does not?

- (A) Options are riskier than forwards
- (B) The option buyer has the right to walk away — this asymmetry has value
- (C) Options always expire worthless, so the premium compensates the seller
- (D) Forwards are regulated, so premiums are prohibited

[Answer hidden – compile with \solutionstrue to reveal]

Q4: Interest Rate Swap

In a plain-vanilla interest rate swap, what do the two parties exchange?

A. Stocks for bonds
B. The principal amount of their loans
C. Credit risk for market risk
D. Fixed interest payments for floating interest payments on the same notional

Q4: Interest Rate Swap

In a plain-vanilla interest rate swap, what do the two parties exchange?

- (A) Stocks for bonds
- (B) The principal amount of their loans
- (C) Credit risk for market risk
- (D) Fixed interest payments for floating interest payments on the same notional

[Answer hidden – compile with \solutionstrue to reveal]

Q5: Yield Curve Inversion

An **inverted yield curve** means that:

A. Short-term interest rates are higher than long-term rates
B. Long-term interest rates are higher than short-term rates
C. The yield curve has no predictive power
D. All interest rates are equal

Q5: Yield Curve Inversion

An **inverted yield curve** means that:

- (A) Short-term interest rates are higher than long-term rates
- (B) Long-term interest rates are higher than short-term rates
- (C) The yield curve has no predictive power
- (D) All interest rates are equal

[Answer hidden – compile with \solutionstrue to reveal]

Q6: No-Arbitrage Principle

The no-arbitrage principle states that:

- (A) Speculators cannot make profits in efficient markets
- (B) Markets never have pricing errors
- (C) Two portfolios with the same future payoffs must have the same price today
- (D) Derivatives are always fairly priced

Q6: No-Arbitrage Principle

The no-arbitrage principle states that:

- (A) Speculators cannot make profits in efficient markets
- (B) Markets never have pricing errors
- (C) Two portfolios with the same future payoffs must have the same price today
- (D) Derivatives are always fairly priced

[Answer hidden – compile with \solutionstrue to reveal]

Q7: Call Option Payoff

You buy a call option with strike price \$50 and pay a premium of \$3. At expiration, the stock trades at \$58. What is your **net profit**?

A. \$8
B. \$5
C. \$3
D. \$0

Q7: Call Option Payoff

You buy a call option with strike price \$50 and pay a premium of \$3. At expiration, the stock trades at \$58. What is your **net profit**?

- (A) \$8
- (B) \$5
- (C) \$3
- (D) \$0

[Answer hidden – compile with \solutionstrue to reveal]

Q8: Put Option – Maximum Loss

You buy a put option with strike \$100 for a premium of \$7. What is your **maximum possible loss**?

A. \$7
B. Unlimited
C. \$93
D. \$100

Q8: Put Option – Maximum Loss

You buy a put option with strike \$100 for a premium of \$7. What is your **maximum possible loss**?

A. \$7
B. Unlimited
C. \$93
D. \$100

[Answer hidden – compile with \solutionstrue to reveal]

Q9: BSM Inputs

Which of the following is **NOT** one of the 5 inputs to the Black–Scholes–Merton model?

- (A) Current stock price (S)
- (B) Time to expiration (T)
- (C) Expected future stock price
- (D) Volatility (σ)

Q9: BSM Inputs

Which of the following is **NOT** one of the 5 inputs to the Black–Scholes–Merton model?

A. Current stock price (S)
B. Time to expiration (T)
C. Expected future stock price
D. Volatility (σ)

[Answer hidden – compile with \solutionstrue to reveal]

Q10: Moneyness

A call option has a strike price of \$80 and the stock currently trades at \$92. This option is:

A. Worthless
B. At-the-money
C. In-the-money
D. Out-of-the-money

Q10: Moneyness

A call option has a strike price of \$80 and the stock currently trades at \$92. This option is:

- **A** Worthless
- **B** At-the-money
- **C** In-the-money
- **D** Out-of-the-money

[Answer hidden – compile with \solutionstrue to reveal]

Q11: Delta Interpretation

A call option has Delta $= 0.65$. If the stock rises by \$2, approximately how much does the option price increase?

A. \$0.65
B. \$3.30
C. \$1.30
D. \$2.00

Q11: Delta Interpretation

A call option has Delta $= 0.65$. If the stock rises by \$2, approximately how much does the option price increase?

- (A) \$0.65
- (B) \$3.30
- (C) \$1.30
- (D) \$2.00

[Answer hidden – compile with \solutionstrue to reveal]

Q12: Duration Calculation

A bond has a duration of 7 years. If interest rates rise by 0.5%, by approximately how much does the bond price fall?

- A 7.0%
- B 3.5%
- C 14.0%
- D 0.5%

Q12: Duration Calculation

A bond has a duration of 7 years. If interest rates rise by 0.5%, by approximately how much does the bond price fall?

A. 7.0%
B. 3.5%
C. 14.0%
D. 0.5%

[Answer hidden – compile with \solutionstrue to reveal]

Q13: Theta Interpretation

An option has Theta $= -\$0.08$. What happens to the option value if **one day passes** with no other changes?

- (A) The option gains \$0.08
- (B) The option expires
- (C) Nothing — Theta only matters at expiration
- (D) The option loses \$0.08

Q13: Theta Interpretation

An option has Theta $= -\$0.08$. What happens to the option value if **one day passes** with no other changes?

- (A) The option gains \$0.08
- (B) The option expires
- (C) Nothing — Theta only matters at expiration
- (D) The option loses \$0.08

[Answer hidden – compile with \solutionstrue to reveal]

Q14: FX Hedging Instrument Choice

A German exporter will receive \$5 million in exactly 90 days (a **certain** cash flow). Which hedging instrument is most appropriate?

- **A** A 90-day FX forward contract
- **B** An interest rate swap
- **C** A currency put option
- **D** No hedge is needed for a certain cash flow

Q14: FX Hedging Instrument Choice

A German exporter will receive \$5 million in exactly 90 days (a **certain** cash flow). Which hedging instrument is most appropriate?

- **A** A 90-day FX forward contract
- **B** An interest rate swap
- **C** A currency put option
- **D** No hedge is needed for a certain cash flow

[Answer hidden – compile with \solutionstrue to reveal]

Q15: Vega and Volatility

If market volatility suddenly spikes (e.g., due to a geopolitical crisis), what happens to the price of a call option with high Vega, **all else being equal**?

- (A) It increases because higher volatility raises the probability of a large payoff
- (B) It stays the same because Vega only affects put options
- (C) It decreases because uncertainty is bad for option holders
- (D) It expires immediately

Q15: Vega and Volatility

If market volatility suddenly spikes (e.g., due to a geopolitical crisis), what happens to the price of a call option with high Vega, **all else being equal**?

- (A) It increases because higher volatility raises the probability of a large payoff
- (B) It stays the same because Vega only affects put options
- (C) It decreases because uncertainty is bad for option holders
- (D) It expires immediately

[Answer hidden – compile with \solutionstrue to reveal]

Q16: Forward vs. Option Trade-off

A company can hedge its FX exposure using either a forward (zero cost) or an option (premium = \$50,000). Under what scenario does the **option** turn out to be the better choice?

- (A) The exchange rate stays exactly at the forward rate
- (B) The option is always better because it limits downside
- (C) The exchange rate moves in the company's favor (favorable move)
- (D) The exchange rate moves against the company (adverse move)

Q16: Forward vs. Option Trade-off

A company can hedge its FX exposure using either a forward (zero cost) or an option (premium = \$50,000). Under what scenario does the **option** turn out to be the better choice?

- (A) The exchange rate stays exactly at the forward rate
- (B) The option is always better because it limits downside
- (C) The exchange rate moves in the company's favor (favorable move)
- (D) The exchange rate moves against the company (adverse move)

[Answer hidden – compile with \solutionstrue to reveal]

Q17: Convexity Advantage

Two bonds have the same duration (8 years) and the same yield, but Bond X has higher convexity. If rates move significantly in either direction, which bond performs better in price terms?

- A. It depends on whether rates rise or fall
- B. The bond with lower convexity always wins
- C. They perform identically since they have the same duration
- D. Bond X (higher convexity) performs better regardless of direction

Q17: Convexity Advantage

Two bonds have the same duration (8 years) and the same yield, but Bond X has higher convexity. If rates move significantly in either direction, which bond performs better in price terms?

- (A) It depends on whether rates rise or fall
- (B) The bond with lower convexity always wins
- (C) They perform identically since they have the same duration
- (D) Bond X (higher convexity) performs better regardless of direction

[Answer hidden – compile with \solutionstrue to reveal]

Q18: Delta Hedging Cost

A trader sells a call option and Delta-hedges by buying shares. The stock then oscillates up and down repeatedly but ends at the original price. Does the hedger make or lose money?

- (A) It depends entirely on the option premium collected
- (B) Makes money from selling high and buying low during rebalancing
- (C) Breaks even — the stock returned to its starting price
- (D) Loses money from buying high and selling low during rebalancing

Q18: Delta Hedging Cost

A trader sells a call option and Delta-hedges by buying shares. The stock then oscillates up and down repeatedly but ends at the original price. Does the hedger make or lose money?

- (A) It depends entirely on the option premium collected
- (B) Makes money from selling high and buying low during rebalancing
- (C) Breaks even — the stock returned to its starting price
- (D) Loses money from buying high and selling low during rebalancing

[Answer hidden – compile with \solutionstrue to reveal]

Q19: BSM Limitations

The BSM model assumes constant volatility. In reality, implied volatility varies by strike price (the "volatility smile"). What does this tell us?

A. Implied volatility should be constant if markets are efficient
B. BSM is useless and should never be used
C. The volatility smile only appears in commodity markets
D. Markets price in a higher probability of extreme moves than BSM assumes

Q19: BSM Limitations

The BSM model assumes constant volatility. In reality, implied volatility varies by strike price (the "volatility smile"). What does this tell us?

- (A) Implied volatility should be constant if markets are efficient
- (B) BSM is useless and should never be used
- (C) The volatility smile only appears in commodity markets
- (D) Markets price in a higher probability of extreme moves than BSM assumes

[Answer hidden – compile with \solutionstrue to reveal]

Q20: Hedging Strategy Evaluation

A mid-size airline burns 50 million gallons of fuel annually. The CFO proposes hedging 100% of fuel costs with forwards for the next 3 years. What is the strongest **counter-argument**?

- **A** A 100% forward hedge locks out any savings if fuel prices drop, potentially putting the airline at a competitive disadvantage vs. unhedged rivals
- **B** Airlines should only hedge with options, never forwards
- **C** Forwards are too expensive for airlines
- **D** Fuel hedging is prohibited by regulators

Q20: Hedging Strategy Evaluation

A mid-size airline burns 50 million gallons of fuel annually. The CFO proposes hedging 100% of fuel costs with forwards for the next 3 years. What is the strongest **counter-argument**?

- **A** A 100% forward hedge locks out any savings if fuel prices drop, potentially putting the airline at a competitive disadvantage vs. unhedged rivals
- **B** Airlines should only hedge with options, never forwards
- **C** Forwards are too expensive for airlines
- **D** Fuel hedging is prohibited by regulators

[Answer hidden – compile with \solutionstrue to reveal]