

Liquidity and Treasury Risk Measurement and Management - Answers

Question 1

You are holding 100 SkyTrek Company shares with a current price of \$30. By considering the mean and standard deviation of the stock, you compute its value at risk (VaR) as \$150. You also note that the bid-ask spread of the stock varies over time, and the daily mean and volatility of this spread are 0.5% and 1%, respectively. Both the return and the spread are normally distributed. What is the daily liquidity-adjusted VaR (LVaR) under a stressed market scenario, assuming the confidence parameter of the spread is equal to 3?

- A) \$103.50.
- B) \$172.62.
- C) \$193.15.
- D) **\$202.50. ✓**

Explanation

Normal VaR = \$150 (Note that a negative sign is implied here because we are dealing with the value at risk.)

$$\text{Cost of liquidation} = \text{portfolio value} \times [(\text{spread mean} + 3 \times \text{spread volatility})] / 2$$

$$\text{Cost of liquidation} = \$3,000 \times (0.5\% + 3 \times 1\%) / 2 = \$52.5$$

$$\text{LVaR} = \$150 + \$52.5 = \$202.50$$

(Book 4, Module 66.1, LO 66.a)

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Question 2

Global Transportation, Inc., recently traded at an ask price of \$45 and a bid price of \$44.50. The sample standard deviation of the bid-ask spread was 0.0001. The 99% spread risk factor for a purchase of Global Transportation is closest to:

- A) 0.0057. ✓
- B) 0.2541.
- C) 25.41.
- D) 0.1111.

Explanation

The formula for the expected transactions cost 99% confidence interval is:

$$\pm P \times \frac{1}{2}(s + 2.33\sigma_s)$$

where:

P = an estimate of the next day asset mid-price, usually set to P , the most recent price observation.

s = expected or typical bid-ask spread calculated as (ask price – bid price) / midprice

σ_s = sample standard deviation of the spread

The $\frac{1}{2}(s + 2.33\sigma_s)$ component of the confidence interval is called the 99% spread risk factor.

$$\text{Midprice} = (45 + 44.50) / 2 = 44.75$$

$$s = (45 - 44.5) / 44.75 = 0.0112$$

$$\text{spread risk factor} = \frac{1}{2}[0.0112 + 2.33(0.0001)] = 0.0057$$

(Book 4, Module 67.3, LO 67.f)

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Question 3

The following dealer banks have financed significant fractions of their assets using repo agreements. The following table shows the quarter-end financing of four broker-dealer financial instruments. All values are in USD billions.

	Bank A	Bank B	Bank C	Bank D
Financial instruments owned	648	832	525	751
Pledged as collateral	326	386	249	372

Which bank is least vulnerable to a liquidity crisis?

- A) Bank A.
- B) Bank B. ✓**
- C) Bank C.
- D) Bank D.

Explanation

Calculate the percentage of repo borrowings of total assets:

- Bank A: $326 / 648 = 50.31\%$
- Bank B: $386 / 832 = 46.39\%$
- Bank C: $249 / 525 = 47.43\%$
- Bank D: $372 / 751 = 49.53\%$

Bank B has the lowest proportion of repo financing, so it is the least vulnerable to a liquidity crisis.

(Book 4, Module 73.1, LO 73.a)

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Question 4

Surveys of banks after the Global Financial Crisis (GFC) of 2007–2009 revealed several challenges related to the implementation of liquidity management information systems. Which of the following statements identifies the biggest problem that arose in liquidity transfer pricing (LTP) during the financial crisis?

- A) High levels of default on short-term liabilities.
- B) Reliance on short-term funding for long-term illiquid assets. ✓**
- C) Senior management monitoring LTP on a monthly basis.
- D) Centralized treasury centers, which were responsible for all wholesale funding.

Explanation

The biggest problem that arose from the GFC resulted from reliance on short-term funding for long-term illiquid assets. Therefore, a major challenge was properly accounting for the cost of liquidity in funding illiquid assets and crediting business units that create benefits of liquidity through deposits.

(Book 4, Module 79.1, LO 79.b)

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Question 5

As the U.S. dollar funding shortage became more acute during the financial crisis of 2007–2009, the international policy response primarily relied on:

- A) unsecured U.S. dollar loans from the U.S. Federal Reserve to central banks globally.
- B) the U.S. Federal Reserve providing loans to commercial banks through U.S. dollar auctions.
- C) uncollateralized U.S. dollar swap lines between the U.S. Federal Reserve and central banks globally.
- D) **U.S. dollar swap lines between the U.S. Federal Reserve and central banks globally, collateralized by foreign currencies. ✓**

Explanation

In response to the U.S. dollar funding shortage, central banks entered into reciprocal swap arrangements with the U.S. Federal Reserve to obtain the U.S. dollars, collateralized by central banks' foreign currencies. In turn, central banks made these funds available to other banks through local U.S. dollar auctions.

(Book 4, Module 80.2, LO 80.c)

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Question 6

An asset-liability committee (ALCO) member at South Bank, based on recent announcements by the Federal Reserve, is expecting declining short-term interest rates in the next quarter to six months. The bank has a positive interest sensitive gap over the 3-month and 6-month horizons. The main risk to the bank's net interest income and net interest margin is most likely:

- A) gap risk.
- B) price risk.
- C) market risk.
- D) **reinvestment risk.** ✓

Explanation

A fundamental risk that banks must manage is interest rate risk. As interest rates change in the market, the institution's yield on earning assets (i.e., returns on loans and securities) and cost of funds (i.e., the cost of borrowing from depositors and other lenders) will also change. This causes changes to interest income and interest expense on the bank's income statement (i.e., the bank's net interest income). A type of interest rate risk called reinvestment risk occurs when interest rates fall and banks must reinvest cash flows at new, lower rates. Also, interest rate movements cause the values of securities and loans to change, called price or market risk. As interest rates rise, the values of fixed-income securities and fixed-payment loans fall. In this case, given the positive gap (i.e., the bank is asset sensitive), falling rates will cause the bank to reinvest incoming cash flows from repricing loans and securities at lower rates. Because the cost of funds is less sensitive to rate changes (i.e., a lower dollar amount will reprice), the bank's net interest income and net interest margin will fall. This specific type of risk is called reinvestment risk and is part of the broader category of interest rate risk.

(Book 4, Module 82.1, LO 82.a)

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