# Solutions for End-of-Chapter Questions and Problems: Chapter Twelve

1. How does the degree of liquidity risk differ for different types of financial institutions?

Due to the nature of their asset and liability contracts, depository institutions are the FIs most exposed to liquidity risk. Mutual funds, hedge funds, pension funds, and PC insurance companies are the least exposed. In the middle are life insurance companies.

1. What are the two reasons liquidity risk arises? How does liquidity risk arising from the liability side of the balance sheet differ from liquidity risk arising from the asset side of the balance sheet? What is meant by fire-sale prices?

Liquidity risk occurs because of situations that develop from economic and financial transactions that are reflected on either the asset side of the balance sheet or the liability side of the balance sheet of an FI. Asset side risk arises from transactions that result in a transfer of cash to some other asset, such as the exercise of a loan commitment or a line of credit. Liability side liquidity risk arises from transactions whereby a creditor, depositor, or other claim holder demands cash in exchange for the claim. The withdrawal of funds from a bank is an example of such a transaction. Another type of asset side liquidity risk arises from the FI’s investment portfolio. During a sell-off, liquidity dries up and investment securities can be sold only at fire-sale prices. A fire-sale price refers to the price of an asset that is less than the normal market price because of the need or desire to sell the asset immediately under conditions of financial distress.

1. What are core deposits? What role do core deposits play in predicting the probability distribution of net deposit drains?

Core deposits are those deposits that will stay with the DI over an extended period of time. These deposits are relatively stable sources of funds and consist mainly of demand, savings, and retail time deposits. Because of their stability, a higher level of core deposits will increase the predictability of forecasting net deposit drains from the DI.

1. The probability distribution of the net deposit drains of a DI has been estimated to have a mean of 2 percent and a standard deviation of 1 percent. Is this DI increasing or decreasing in size? Explain.

This DI is decreasing in size because less core deposits are being added to the DI than are being withdrawn. On average, the rate of decrease of deposits is 2 percent. If the distribution is normal, we can state with 95 percent confidence that the rate of decrease of deposits will be between 0 percent and 4 percent (i.e., plus or minus two standard deviations).

5. How is the DI's distribution pattern of net deposit drains affected by the following?

a. The holiday season.

The entire distribution shifts to the right (an increase in the expected amount of withdrawals) as individuals spend more. Moreover, the standard deviation decreases as the distribution narrows.

b. Summer vacations.

The entire distribution shifts to the right (an increase in the expected amount of withdrawals) as individuals spend more. Moreover, the standard deviation decreases as the distribution narrows.

c. A severe economic recession.

The entire distribution shifts to the right and may have a positive mean value as withdrawals average more than deposits. However, as the opportunity cost of holding money declines, some depositors may increase their net deposits. The impact will be to widen the distribution.

d. Double-digit inflation.

The entire distribution shifts to the right and may have a positive mean value as withdrawals average more than deposits. Inflation may cause a general flight from cash that will cause the distribution to narrow.

6. What are two ways a DI can offset the liquidity effects of a net deposit drain of funds? How do the two methods differ? What are the operational benefits and costs of each method?

If the DI has a net deposit drain, it needs to either increase its liabilities (by borrowing funds or issuing equity, i.e., purchased liquidity management) or reduce its assets (i.e., stored liquidity management). An institution can reduce its assets by drawing down on its cash reserves, selling securities, or calling back (or not renewing) its loans. It can increase liabilities by issuing more federal funds, long-term debt, or equity. If a DI offsets the drain by increasing liabilities, the size of the firm remains the same. However, if it offsets the drain by reducing its assets, the size of the firm is reduced. If it has a net negative deposit drain, then it needs to follow the opposite strategy.

The operational benefit of addressing a net deposit drain is to restore the financial stability and health of the DI. However, this process does not come without costs. On the asset side, liquidating assets may occur only at fire-sale prices that will result in realized losses of value, or asset-mix instability. Further, not renewing loans may result in the loss of profitable relationships that could have negative effects on profitability in the future. On the liability side, entering the borrowed funds market normally requires paying market interest rates that are above those rates that it had been paying on low interest deposits.

7. What are two ways a DI can offset the effects of asset-side liquidity risk such as the drawing down of a loan commitment?

A DI can use either purchased liquidity management or stored liquidity management. Purchased liquidity management involves borrowing funds in the money/purchased funds market. Stored liquidity management involves selling cash-type assets, such as Treasury bills, or simply reducing excess cash reserves to the minimum level required to meet regulatory imposed reserve requirements.

8. A DI with the following balance sheet (in millions) expects a net deposit drain of $15 million.

Assets Liabilities and Equity

Cash $10 Deposits $68

Loans 50 Equity 7

Securities 15

Total assets $75 Total liabilities and equity $75

Show the DI's balance sheet if the following conditions occur:

a. The DI purchases liabilities to offset this expected drain.

If the DI purchases liabilities, then the new balance sheet is:

Cash $10 Deposits $53

Loans 50 Purchased liabilities 15

Securities 15 Equity 7

Total assets $75 Total liabilities and equity $75

b. The stored liquidity management method is used to meet the expected drain.

If the DI liquidates assets to meet the deposit withdrawals, a possible balance sheet may be:

Loans $50 Deposits $53

Securities 10 Equity 7

Total assets $60 Total liabilities and equity $60

DIs will most likely use some combination of these two methods.

9. AllStarBank has the following balance sheet (in millions):

Assets Liabilities and Equity Cash $30 Deposits $110 Loans 90 Borrowed funds 40

Securities 50 Equity 20 Total assets $170 Total liabilities and equity $170

AllStarBank’s largest customer decides to exercise a $15 million loan commitment. How will the new balance sheet appear if AllStar uses the following liquidity risk strategies?

a. Stored liquidity management.

Assets Liabilities and Equity Cash $15 Deposits $110 Loans 105 Borrowed funds 40

Securities 50 Equity 20 Total assets $170 Total liabilities and equity $170

b. Purchased liquidity management.

Assets Liabilities and Equity Cash $30 Deposits $110 Loans 105 Borrowed funds 55

Securities 50 Equity 20 Total assets $185 Total liabilities and equity $185

10. A DI has assets of $10 million consisting of $1 million in cash and $9 million in loans. The DI has core deposits of $6 million, subordinated debt of $2 million, and equity of $2 million. Increases in interest rates are expected to cause a net drain of $2 million in core deposits over the year?

a. The average cost of deposits is 6 percent and the average yield on loans is 8 percent. The DI decides to reduce its loan portfolio to offset this expected decline in deposits. What will be the effect on net interest income and the size of the DI after the implementation of this strategy?

Assuming that the decrease in loans is offset by an equal decrease in deposits, the change in net interest income = (0.06 – 0.08) x $2 million = -$40,000. The average size of the firm will be $8 million after the drain.

b. If the interest cost of issuing new short-term debt is expected to be 7.5 percent, what would be the effect on net interest income of offsetting the expected deposit drain with an increase in interest-bearing liabilities?

Change in net interest income = (0.06 – 0.075) x $2 million = -$30,000.

c. What will be the size of the DI after the drain if the DI uses this strategy?

The average size of the firm will be $10 million after the drain.

d. What dynamic aspects of DI management would support a strategy of replacing the deposit drain with interest-bearing liabilities?

Purchasing interest-bearing liabilities may cost significantly more than the cost of replacing the deposits that are leaving the DI. However, using interest-bearing deposits protects the DI from decreasing asset size or changing the composition of the asset side of the balance sheet.

1. Define each of the following four measures of liquidity risk. Explain how each measure would be implemented and utilized by a DI.

a. Sources and uses of liquidity.

This statement identifies the total sources of liquidity as the amount of cash-type assets that can be sold with little price risk and at low cost, the amount of funds the DI can borrow in the money/purchased funds market, and any excess cash reserves over the necessary reserve requirements. The statement also identifies the amount of each category the DI has utilized. The difference is the amount of liquidity available for the DI. This amount can be tracked on a day-to-day basis.

b. Peer group ratio comparisons.

DIs can easily compare their liquidity with peer group institutions by looking at several easy to calculate ratios. High levels of the loan to deposit and borrowed funds to total asset ratios will identify reliance on borrowed funds markets, while heavy amounts of loan commitments to assets may reflect a heavy amount of potential liquidity needs in the future.

c. Liquidity index.

The liquidity index measures the amount of potential losses suffered by a DI from a fire-sale of assets compared to a fair market value established under the conditions of normal sale. The lower is the index, the less liquidity the DI has on its balance sheet. The index should always be a value between 0 and 1.

d. Financing gap and financing requirement.

The financing gap can be defined as average loans minus average deposits, or alternatively, as negative liquid assets plus borrowed funds. A negative financing gap implies that the DI must borrow funds or rely on liquid assets to fund the non-liquid assets. Thus, the financing requirement can be expressed as the financing gap plus liquid assets. This relationship implies that some level of loans and core deposits as well as some amount of liquid assets determine the need for the DI to borrow or purchase funds.

12. A DI has $10 million in T-bills, a $5 million line of credit to borrow in the repo market, and $5 million in excess cash reserves (above reserve requirements) with the Fed. The DI currently has borrowed $6 million in fed funds and $2 million from the Fed’s discount window to meet seasonal demands.

a. What is the DI’s total available (sources of) liquidity?

The DI’s available sources of liquidity are $10m + $5m + $5m = $20 million.

b. What is the DI’s current total uses of liquidity?

The DI’s current uses of liquidity are $6m + $2m = $8 million.

c. What is the net liquidity of the DI?

The DI’s net liquidity is $20m - $8m = $12 million.

d. What conclusions can you derive from the result?

The net liquidity of $12 million suggests that the DI can withstand unexpected withdrawals of $12 million without having to reduce its less liquid assets at potential fire-sale prices.

13. A DI has the following assets in its portfolio: $10 million in cash reserves with the Fed, $25 million in T-bills, and $65 million in mortgage loans. If the DI has to liquidate the assets today, it will receive only $98 per $100 of face value of the T-bills and $90 per $100 of face value of the mortgage loans. Liquidation at the end of one month (closer to maturity) will produce $100 per $100 of face value of the T-bills and $97 per $100 of face value of the mortgage. Calculate the one-month liquidity index for this DI using the above information.

*I* = ($10m/$100m)(1.00/1.00) + ($25m/$100m)(0.98/1.00) + ($65m/$100m)(0.90/0.97) = 0.948

14. A DI has the following assets in its portfolio: $20 million in cash reserves with the Fed, $20 million in T-bills, and $50 million in mortgage loans. If the assets need to be liquidated at short notice, the DI will receive only 99 percent of the fair market value of the T-bills and 90 percent of the fair market value of the mortgage loans. Liquidation at the end of one month (closer to maturity) will produce $100 per $100 of face value of the T-bills and the mortgage loans. Calculate the liquidity index using the above information.

*I* = ($20m/$90m)(1.00/1.00) + ($20m/$90m)(0.99/1.00) + ($50m/$90m)(0.90/1.00) = 0.942

15. Conglomerate Corporation has acquired Acme Corporation. To help finance the takeover, Conglomerate will liquidate the overfunded portion of Acme’s pension fund. The face values and current and one-year future liquidation values of the assets that will be liquidated are given below:

Liquidation Values

**Asset Face Value t = 0 t = 1 year**IBM stock $10,000 $9,900 $10,500

GE bonds 5,000 4,000 4,500

Treasury securities 15,000 13,000 14,000

Calculate the one-year liquidity index for these securities.

*I* = ($10,000/$30,000)($9,900/$10,500) + ($5,000/$30,000)($4,000/$4,500) + ($15,000/$30,000)($13,000/$14,000) = 0.927

16. Plainbank has $10 million in cash and equivalents, $30 million in loans, and $15 in core deposits.

a. Calculate the financing gap.

Financing gap = average loans – average deposits = $30 million - $15 million = $15 million

b. What is the financing requirement?

Financing requirement = financing gap + liquid assets = $15 million + $10 million = $25 m

c. How can the financing gap be used in the day-to-day liquidity management of the bank?

A rising financing gap on a daily basis over a period of time may indicate future liquidity problems due to increased deposit withdrawals and/or increased exercise of loan commitments. Sophisticated lenders in the money markets may be concerned about these trends and they may react by imposing higher risk premiums for borrowed funds or stricter credit limits on the amount of funds lent.

17. How can an FI’s liquidity plan help reduce the effects of liquidity shortages? What are the components of a liquidity plan?

A liquidity plan requires forward planning so that an optimal mix of funding can be implemented to reduce costs and unforeseen withdrawals. In general, a plan could incorporate the following:

(a) Assigning a team that will take charge in the event of a liquidity crisis.

(b) Identifying the account holders that will most likely withdraw funds in the event of a crisis.

(c) Estimating the size of the run-offs and the sources of borrowing to stem the run-offs.

(d) Establishing maximum limits for borrowing by subsidiaries and affiliates, including inter-affiliate loans, and the maximum risk premium to be paid during crisis borrowing.

(e) Specifying the sequencing of asset disposal in the event of a crisis.

Planning will ensure an orderly procedure to stem the rush of withdrawals and avert a total breakdown during a crisis. This is very important for firms that rely on deposits or short-term funds as a source of borrowing because of the difficulty in rolling over debt in periods of crisis.

18. Central Bank has the following balance sheet (in millions of dollars).

Liquidity Run-off

**Assets** level **Liabilities and Equity** factor

Cash $ 20 Level 1 Stable retail deposits $190 3%

Deposits at the Fed 30 Level 1 Less stable retail deposits 70 10

Treasury bonds 145 Level 1 CDs maturing in 6 months 100 0

Qualifying marketable securities 50 Level 1 Unsecured wholesale funding from:

GNMA bonds 60 Level 2A Stable small business deposits 125 5

Loans to AA- corporations 540 Level 2A Less stable small business deposits 100 10

Mortgages 285 Nonfinancial corporates 450 75

Premises 35 Equity 130

Total $1,165 Total $1,165

Cash inflows over the next 30 days from the bank’s performing assets are $7.5 million. Calculate the LCR for Central Bank.

The liquidity coverage ratio for Central Bank is calculated as follows:

Level 1 assets = $20 + $30 + $145 + $50 = 245

Level 2 assets = ($60 + $540) x 0.85 = $510.00 Capped at 40% of Level 1 = $245 x 0.40 = 98

Stock of highly liquid assets $343

Cash outflows:

Stable retail deposits $190 x 0.03 = $5.70

Less stable retail deposits $70 x 0.10 = 7.00

CDs maturing in 6 months $100 x 0.00 = 0.00

Stable small business deposits $125 x 0.05 = 6.25

Less stable small business deposits $100 x 0.10 = 10.00

Non-financial corporates $450 x 0.75 = 337.50

Total cash outflows over next 30 days $366.45

Total cash inflows over next 30 days 7.50

Total net cash outflows over next 30 days $358.95

Liquidity coverage ratio = $343m/$358.95m = 95.56%. The bank is not in compliance with liquidity requirements based on the LCR.

19. WallsFarther Bank has the following balance sheet (in millions of dollars).

Liquidity Run-off

**Assets** level **Liabilities and Equity** factor

Cash $ 12 Level 1 Stable retail deposits $ 55 3%

Deposits at the Fed 19 Level 1 Less stable retail deposits 20 10

Treasury securities 125 Level 1 Unsecured wholesale funding from:

GNMA securities 94 Level 2A Stable small business deposits 80 5

Loans to AA rated corporations 138 Level 2A Less stable small business deposits 49 10

Loans to BB rated corporations 106 Level 2B Nonfinancial corporates 250 75

Premises 20 Equity 60

Total $514 Total $514

Cash inflows over the next 30 days from the bank’s performing assets are $5.5 million. Calculate the LCR for WallsFarther Bank.

The liquidity coverage ratio for WallsFarther Bank is calculated as follows:

Level 1 assets = $12 + $19 + $125 = 156

Level 2A assets = ($94 + $138) x 0.85 = $197.20 Capped at 40% of Level 1 = $156 x 0.40 = 62.4

Level 2B assets = $106 x 0.85 = $90.10 40% cap on Level 2 assets already met 0.0

Stock of highly liquid assets $218.4

Cash outflows:

Stable retail deposits $55 x 0.03 = $ 1.65

Less stable retail deposits $20 x 0.10 = 2.00

Stable small business deposits $80 x 0.05 = 4.00

Less stable small business deposits $49 x 0.10 = 4.90

Non-financial corporates $250 x 0.75 = 187.50

Total cash outflows over next 30 days $200.05

Total cash inflows over next 30 days 5.50

Total net cash outflows over next 30 days $194.55

Liquidity coverage ratio = $218.4m/$194.55m = 112.26%. The bank is in compliance with liquidity requirements based on the LCR.

20. FirstBank has the following balance sheet (in millions of dollars).

Required stable Available stable

Funding funding

**Assets** factor **Liabilities and Equity** factor

Cash $ 12 0% Stable retail deposits $ 55 90%

Deposits at the Fed 19 5 Less stable retail deposits 20 80

Treasury securities 125 5 Unsecured wholesale funding from:

GNMA securities 94 20 Stable small business deposits 80 90

Loans to A rated corporations 138 65 Less stable small business deposits 49 80

(maturity > 1 year) Nonfinancial corporates 250 50

Loans to B rated corporations 106 50

(maturity < 1 year)

Premises 20 100 Equity 60 100

Total $514 Total $514

Calculate the NSFR for FirstBank.

The net stable funding ratio for FirstBank is calculated as follows:

Available amount of stable funding =

$60 x 1.00 + ($55 + $80) x 0.90 + ($20 + $49) x 0.80 + $250 x 0.50 = $361.7m

Required amount of stable funding =

$12 x 0.00 + ($19 + $125) x 0.05 + $94 x 0.20 + $138 x 0.65 + $106 x 0.50 + $20 x 1.00 = $188.70m

Net stable funding ratio = $361.7m/$188.70m = 191.68%. The bank is in compliance with liquidity requirements based on the NSFR.

21. BancTwo has the following balance sheet (in millions of dollars).

Required stable Available stable

funding funding

**Assets** factor **Liabilities and Equity** factor

Cash $ 20 0% Stable retail deposits $190 90%

Deposits at the Fed 30 5 Less stable retail deposits 70 80

Treasury bonds 145 5 CDs maturing in 6 months 100 0

Qualifying marketable securities 50 0 Unsecured wholesale funding from:

(maturity < 1 year) Stable small business deposits 125 90

FNMA bonds 60 20 Less stable small business deposits 100 80

Loans to AA- corporations 540 65 Nonfinancial corporates 450 50

(maturity > 1 year) Equity 130 100

Mortgages (unencumbered) 285 65 Total $1,165

Premises 35 100

Total $1,165

Calculate the NSFR for BancTwo.

The net stable funding ratio for BancTwo is calculated as follows:

Available amount of stable funding = $130 x 1.00 + ($190 + $125) x 0.90 + ($70 + $100) x 0.80 + $450 x 0.50 = $774.50m

Required amount of stable funding =

$20 x 0.00 + ($30 + $145) x 0.05 + $60 x 0.20 + ($540 + $285) x 0.65 + $35 x 1.00 = $592.00m

Net stable funding ratio = $774.50m/$592.00m = 130.83%. The bank is in compliance with liquidity requirements based on the NSFR.

22. What is a bank run? What are some possible withdrawal shocks that could initiate a bank run? What feature of the demand deposit contract provides deposit withdrawal momentum that can result in a bank run?

A bank run is an unexpected increase in deposit withdrawals from a DI. Bank runs can be triggered by several economic events including (a) concerns about solvency relative to other DIs, (b) failure of related DIs, and (c) sudden changes in investor preferences regarding the holding of nonbank financial assets. The first-come, first-serve (full pay or no pay) nature of a demand deposit contract encourages priority positions in any line for payment of deposit accounts. Thus, even though money may not be needed, customers have an incentive to withdraw their funds.

23. The following is the balance sheet of a DI (in millions):

Assets Liabilities and Equity

Cash $ 2 Demand deposits $50

Loans 50

Premises and equipment 3 Equity 5

Total $55 Total $55The asset-liability management committee has estimated that the loans, whose average interest rate is 6 percent and whose average life is three years, will have to be discounted at 10 percent if they are to be sold in less than two days. If they can be sold in 4 days, they will have to be discounted at 8 percent. If they can be sold later than a week, the DI will receive the full market value. Loans are not amortized; that is, principal is paid at maturity.

a. What will be the price received by the DI for the loans if they have to be sold in two days. In four days?

Price of loan = PVAn=3,k=10($3m) + PVn=3, k=10($50m) = $45.03m if sold in two days.

Price of loan = PVAn=3,k=8($3m) + PVn=3, k=8($50m) = $47.42m if sold in four days.

b. In a crisis, if depositors all demand payment on the first day, what amount will they receive? What will they receive if they demand to be paid within the week? Assume no deposit insurance.

If depositors demand to withdraw all their money on the first day, the DI will have to dispose of its loans at fire-sale prices of $45.03 million. With its $2 million in cash, it will be able to pay depositors on a first-come basis until $47.03 million has been withdrawn. The rest will have to wait until liquidation to share the remaining proceeds.

Similarly, if the run takes place over a four-day period, the DI may have more time to dispose of its assets. This could generate $47.42 million. With its $2 million in cash it would be able to satisfy on a first-come basis withdrawals up to $49.42 million.

24. What government safeguards are in place to reduce liquidity risk for DIs?

Deposit insurance and the Federal Reserve’s discount window both help in the event of a liquidity drain and both help to prevent liquidity drains from occurring.

25. What are the levels of defense against liquidity risk for a life insurance company? How does liquidity risk for a property-casualty insurer differ from that for a life insurance company?

The initial defense against liquidity risk for life insurance companies is the amount of premium income and returns on the asset portfolio. As additional policies are surrendered, the insurance company may need to sell some of the relatively liquid assets such as government bonds. In the case of extreme liquidity pressures, the company may need to begin to liquidate the less-liquid assets in the portfolio, possibly at distressed prices.

Property-casualty insurance covers short-term contingencies, and thus the assets of PC insurers generally are more short-term than for life insurance companies, and the policy premium adjustments come at shorter intervals. As a result, although the degree and timing of contingency payout is more uncertain for PC companies, the flexibility to deal with liquidity pressures is better.

26. How is the liquidity problem faced by investment funds different from that faced by DIs and insurance companies? How does the liquidity risk of an open-end mutual fund compare with that of a closed-end fund?

In the case of a liquidity crisis in DIs and insurance firms, there are incentives for depositors and policyholders to withdraw their money or cash in their policies as early as possible. Latecomers will be penalized because the financial institution may be out of liquid assets. They will have to wait until the institution sells its assets at fire-sale prices, resulting in a lower payout. In the case of investment funds, the net asset value for all shareholders is lowered or raised as the market value of assets change, so that everybody will receive the same price if they decide to withdraw their funds. Hence, the incentive to engage in a run is minimized.

Closed-end funds are traded directly on stock exchanges, and therefore little liquidity risk exists since any fund owner can sell the shares on the exchange. An open-end fund is exposed to more risk since those shares are sold back to the fund which must provide cash to the seller.

27. A mutual fund has the following assets in its portfolio: $40 million in fixed-income securities and $40 million in stocks at current market values. In the event of a liquidity crisis, the fund can sell the assets at a 96 percent of market value if they are disposed of in two days. The fund will receive 98 percent if the assets are disposed of in four days. Two shareholders, A and B, own 5 percent and 7 percent of equity (shares), respectively.

a. Market uncertainty has caused shareholders to sell their shares back to the fund. What will the two shareholders receive if the mutual fund must sell all of the assets in two days? In four days?

Value of fixed-income securities if sold in two days $40m x 0.96 = $38.4m

Value of stocks if sold in two days $40m x 0.96 = $38.4m

Total $76.8m

Shareholder A will receive $76.8m x 0.05 = $3.84m down from the current value of $4.00m. Shareholder B will receive $76.8m x 0.07 = $5.376m down from the current value of $5.60m.

Value of fixed-income securities if sold in four days $40m x 0.98 = $39.2m

Value of stocks if sold in two days $40m x 0.98 = $39.2m

Total $78.4m

Shareholder A will receive $78.4m x 0.05 = $3.92m down from the current value of $4.00m. Shareholder B will receive $78.4m x 0.07 = $5.488m down from the current value of $5.60m.

b. How does this situation differ from a bank run? How have bank regulators mitigated the problem of bank runs?

This differs from a run on a bank in that in the mutual fund the claimants of the assets all receive the same amount, as a percentage of their investments. In the case of bank runs, the first to withdraw receives the full amount, leaving the likelihood that some depositors may not receive any money at all. One way of mitigating this problem is for regulators to offer deposit insurance such as that provided by the FDIC. This reduces the incentive to engage in runs.

28. A mutual fund has $1 million in cash and $9 million invested in securities. It currently has 1 million shares outstanding.

a. What is the net asset value (NAV) of this fund?

NAV = Market value of shares/number of shares = $10m/1m = $10 per share

b. Assume that some of the shareholders decide to cash in their shares of the fund. How many shares at its current NAV can the fund take back without resorting to a sale of assets?

At the current NAV, it can absorb up to $1 million, or 100,000 shares.

c. As a result of anticipated heavy withdrawals, the fund sells 10,000 shares of IBM stock currently valued at $40. Unfortunately, it receives only $35 per share. What is the net asset value after the sale? What are the cash assets of the fund after the sale?

The loss by selling 10,000 shares of IBM at $35 instead of $40 = -$5 x 10,000 = -$50,000.

New NAV = $9,950,000 /1m = $9.95

Cash = $1 million + $350,000 = $1.35 million and $8.60 million in securities.

d. Assume that after the sale of IBM shares, 100,000 shares are sold back to the fund. What is the current NAV? Is there a need to sell more securities to meet this redemption?

If 100,000 shares are redeemed, it needs to pay $9.95 x 100,000 = $995,000. Its NAV will remain the same, i.e., ($9,950,000 - $995,000)/900,000 = $9.95. The mutual fund does not need to sell any extra shares since it has $1.35 million in cash to pay the $995,000.

**Integrated Mini Case: Measuring Liquidity Risk**

A DI has the following balance sheet (in millions).

Assets Liabilities and Equity

Cash $9 Deposits $75

Loans 95 Purchased funds 40

Securities 26 Equity 15

Total assets $130 Total liabilities and equity $130

The DI’s securities portfolio includes $16 million in T-bills and $10 million in GNMA securities. The DI has a $20 million line of credit to borrow in the repo market and $5 million in excess cash reserves (above reserve requirements) with the Fed. The DI currently has borrowed $22 million in Fed funds and $18 million from the Fed discount window to meet seasonal demands.

1. What is the DI’s total available (sources of) liquidity?

The DI’s available resources for liquidity purposes are $16m + $10m + $5m +$20m = $51 million.

2. What is the DI’s current total uses of liquidity?

The DI’s current use of liquidity is $22m + $18m = $40 million.

3. What is the net liquidity of the DI?

The DI’s net liquidity is $51 million - $40 million = $11 million.

4. Calculate the financing gap.

Financing gap = average loans – average deposits = $95 million - $75 million = $20 million

5. What is the financing requirement?

Financing requirement = financing gap + liquid assets = $20 million + $35 million = $55m

6. The DI expects a net deposit drain of $20 million. Show the DI's balance sheet if the

following conditions occur:

a. The DI purchases liabilities to offset this expected drain.

If the DI purchases liabilities, then the new balance sheet is:

Cash $ 9 Deposits $55

Loans 95 Purchased liabilities 60

Securities 26 Equity 15

Total assets $130 Total liabilities and equity $130

b. The stored liquidity management method is used to meet the expected drain (the DI does not want the cash balance to fall below $5 million, and securities can be sold at their fair value).

If the DI uses reserve asset adjustment, a possible balance sheet may be:

Cash $ 5 Deposits $55

Loans 95 Purchased liabilities 40

Securities 10 Equity 15

Total assets $110 Total liabilities and equity $110

7. In the event of an unexpected and severe drain on deposits in the next 3 days, and 10 days, the DI will liquidate assets in the following manner:

Liquidation Values ($ millions)

**Asset Fair Value t = 3 days t = 10 days**Cash $ 9 $ 9 $ 9

Treasury bills 16 14 15.5

GNMAs 10 8 9

Loans 95 65 75

Calculate the 3-day and 10-day liquidity index for the DI.

I3-day = ($9m/$130m)($9m/$9m) + ($16m/$130m)($14m/$16m) +

($10m/$130m)($8m/$10m) + ($95m/$130m)($65m/$95m) = 0.7385

I10-day = ($9m/$130m)($9m/$9m) + ($16m/$130m)($15.5m/$16m) +

($10m/$130m)($9m/$10m) + ($95m/$130m)($75m/$95m) = 0.8346