Solutions 5

Chapter 18: Liability and Liquidity Management – Reserve Requirements

8. City Bank has estimated that its average daily demand deposit balance over the recent 14-day reserve computation period was $225 million. The average daily balance with the Fed over the 14-day maintenance period was $11 million, and the average daily balance of vault cash over the two-week computation period was $7.5 million.

a. Under the rules effective in 2009, what is the amount of average daily reserves required to be held during the reserve maintenance period for these demand deposit balances?

Reserve requirements = (0 x $10.3m) + ($44.4m - $10.3m)(0.03) + ($225m - $44.4m)(0.10)
= 0 + $1.023m + $18.06m = $19.083 million

After subtracting the average daily balance of vault cash of $7.5 million, the bank needs to maintain a daily average of $11.583 million ($19.083 million - $7.5 million) during the maintenance period.

b. What is the average daily balance of reserves held by the bank over the maintenance period? By what amount were the average reserves held higher or lower than the required reserves?

The average daily balance over the maintenance period was $11 million. Therefore, average reserves held were short $0.583 million.

c. If the bank had transferred $20 million of its deposits every Friday over the two-week computation period to one of its offshore facilities, what would be the revised average daily reserve requirement?

For the 14-day period, the sum of its daily average is = $225m x 14 = $3,150m. If $20 million is transferred on Friday, the total reduction is $120 million over two weekends
($20m \times 3 \text{ days} \times 2 \text{ weekends})$, and the total 14-day balance is $3,030m. The average daily deposits will be $216.4286$ million.

Reserve requirements \( = (0 \times 10.3m) + (44.4m - 10.3m)(0.03) + (216.4286m - 44.4m) (0.10) = 0 + 1.023m + 17.2029m = 18.2259 \text{ million.} \) City Bank needs to maintain average reserves of $10.7259 \text{ million} (18.2259 \text{ million} - 7.5 \text{ million})$ during the maintenance period. Since it had $11 \text{ million} \text{ of reserves, extra reserves of } 0.2741 \text{m per day can be carried forward to the next reserve maintenance period.}

9. Assume that the 14-day reserve computation period for problem (8) above extended from May 18 through May 31.

a. What is the corresponding reserve maintenance period under the rules effective in 2009?

The reserve maintenance period would extend from June 17 through June 30. The period begins 30 days after the beginning of the reserve computation period. This makes it easier for bank managers to meet their reserve requirements. By beginning two weeks and two days after the end of the computation period, managers can more easily make up for any errors in their forecast of reserve requirements.

b. Given your answers to parts (a) and (b) of problem (8), what would the average required reserves need to be for the maintenance period for the bank to be in reserve compliance?

The average required reserves necessary to be in compliance is $11.583 \text{ million}$ and they could be as low as $10.820m \text{ ($11.583m - $19.083m(0.04)) or as high as $12.346m ($11.583m + $19.083m(0.04)).}$

10. The average demand deposit balance of a local bank during the most recent reserve computation period is $325 \text{ million. The amount of average daily reserves at the Fed during the reserve maintenance period is $26.5 \text{ million, and the average daily vault cash corresponding to the maintenance period is $4.3 \text{ million.}}$

a. What is the average daily reserve balance required to be held by the bank during the maintenance period?

$$\text{Reserve requirements} = (0 \times 10.3m) + (44.4m - 10.3m)(0.03) + (325m - 44.4m) (0.10) = 0 + 1.023m + 28.083m = 29.083 \text{ million}. $$
After subtracting the average daily balance of vault cash of $4.3 million, the bank needs to maintain a target daily average of $24.783 million ($29.083 million - $4.3 million) during the maintenance period.

b. Is the bank in compliance with the reserve requirements?

Yes. The bank has average reserves of $26.5 million. This amount exceeds the required amount by $1.717 million.

c. What amount of reserves can be carried over to the next maintenance period either as excess or shortfall?

A maximum of 4 percent of the gross required reserves can be carried over to the next maintenance period. Thus, 0.04 x $29.083 million = $1.1633 million can be carried over to the next maintenance period. The bank has deposited $0.5537 million in low interest paying accounts at the Fed that cannot be counted towards next period’s required reserves.

d. If the local bank has an opportunity cost of 6 percent and deposits at the Fed pay 0.5 percent, what is the effect on the income statement from this reserve period?

A total of $0.5537 million (1.717m – 1.1633m) has an opportunity cost of no earnings at the 6 percent rate. Thus, the loss would be $0.5537m(0.060-0.005)(14/365) = $1,168.08.
Chapter 18: Liability and Liquidity Management - Deposits

16. An FI has estimated the following annual costs for its demand deposits: management cost per account = $140, average account size = $1,500, average number of checks processed per account per month = 75, cost of clearing a check = $0.10, fees charged to customer per check = $0.05, and average fee charged per customer per month = $8.

   a. What is the implicit interest cost of demand deposits for the FI?

   \[
   \text{Cost of clearing checks} = 0.10 \times 75 \times 12 = 90.00 \\
   \text{Cost of managing each account} = 140.00 \\
   \text{Per check fee per account} = 0.05 \times 75 \times 12 = -45.00 \\
   \text{Fee received per account} = 8 \times 12 = -96.00 \\
   \text{Total cost per account} = 89.00
   \]

   The average (imputed) interest cost of demand deposits = $89.00/1,500 = 5.93 percent.

   b. If the FI has to keep an average of 8 percent of demand deposits as required reserves with the Fed paying no interest, what is the implicit interest cost of demand deposits for the FI?

   If the bank has to keep 8 percent as reserves, its use of funds is limited to 0.92 x $1,500 per account, or $1,380. The average (imputed) interest cost = $89/$1,380 = 6.45 percent.

   c. What should be the per-check fee charged to customers to reduce the implicit interest costs to 3 percent? Ignore the reserve requirements.

   For an average imputed interest cost of 3 percent, the total cost per account = 1,500 x 0.03 = $45. This means that the total cost per account should be decreased by $44 ($89 - $45) and the per-check fee charged to customers should be increased to $89 ($45 + $44). Thus, the fee per-check should be raised to $89/(75 x 12) = $0.0989 per check.

17. A NOW account requires a minimum balance of $750 for interest to be earned at an annual rate of 4 percent. An account holder has maintained an average balance of $500 for the first six months and $1,000 for the remaining six months. The account holder writes an average
of 60 checks per month and pays $0.02 per check, although it costs the bank $0.05 to clear a check.

a. What average return does the account holder earn on the account?

Gross interest return = Explicit interest return + Implicit interest return

Interest earned by account holder ($500 x 0.00 x 6/12) + ($1,000 x 0.04 x 6/12) = $20.00
Implicit fee earned on checks ($0.05-$0.02) x 60 x 12 = $21.60
Average deposit maintained during the year (6/12 x 500) + (6/12 x 1,000) = $750.00

Average interest earned = $41.60/750 = 5.55 percent

b. What is the average return if the bank lowers the minimum balance to $400?

If the minimum balance requirement is lowered to $400, the account holder earns an extra $500 x 0.04 x 6/12 = $10 in interest. The average interest earned = $51.60/750 = 6.88 percent.

c. What is the average return if the bank pays interest only on the amount in excess of $400? Assume that the minimum required balance is $400.

If the bank only pays interest on balances in excess of $400, the explicit interest earned = ($100 x 0.04 x 6/12) + ($600 x 0.04 x 6/12) = $2 + $12 = $14. The implicit fee earned on checks = $21.60, and the average interest earned = $35.60/$750 = 4.75%

d. How much should the bank increase its check fee to the account holder to ensure that the average interest it pays on this account is 5 percent? Assume that the minimum required balance is $750.

Interest earned (both explicit and implicit) = $750 x 0.05 = $37.50. Fees to be earned through check clearing = $37.50 - $20 = $17.50. Fee subsidy per check = 17.50/(60 x 12) = $0.0243. So, the bank should charge $0.05 - $0.0243 = $0.0257 per check.
Chapter 19: Deposit Insurance – Moral Hazard

5. What is moral hazard? How did the fixed-rate deposit insurance program of the FDIC contribute to the moral hazard problem of the savings association industry?

6. What other changes in the savings association environment during the 1980s encouraged the developing instability of the industry?

Moral hazard occurs in the depository institution industry when the provision of deposit insurance or other liability guarantees encourages the institution to accept asset risks that are greater than the risks that would have been accepted without such liability insurance.

The fixed-rate deposit insurance administered by the FDIC created a moral hazard problem because it did not differentiate between the activities of risky and conservative lending institutions. Consequently, during periods of rising interest rates, savings associations holding fixed-rate assets were finding it increasingly difficult to obtain funds at lower rates. Since the deposits were insured, managers found it easier to engage in risky ventures in order to offset the losses on their fixed-rate loans. In addition, as the number of failures increased in the 1980s, regulators became reluctant to close down savings associations because the fund was being slowly depleted. The combination of excessive risk-taking together with a forbearance policy followed by the regulators led to the savings association industry crisis.

7. How does a risk-based insurance program solve the moral hazard problem of excessive risk taking by FIs? Is an actuarially fair premium for deposit insurance always consistent with a competitive banking system?

A risk-based insurance program should deter FIs from engaging in excessive risk-taking as long as it is priced in an actuarially fair manner. Such pricing currently is being practiced by insurance firms in the property-casualty sector. However, since the failure of commercial banks can have significant social costs, regulators have a special responsibility towards maintaining their solvency, even providing them with some form of subsidies. In a completely free market system, it is possible that Dis located in sparsely populated areas may have to pay extremely high premiums to compensate for a lack of diversification or investment opportunities. These Dis may have to close down unless subsidized by the regulators. Thus, a strictly risk-based insurance system may not be compatible with a truly competitive banking system.
Chapter 19: Deposit Insurance – Implicit Incentives

8. What are three suggested ways a deposit insurance contract could be structured to reduce moral hazard behavior?

Deposit insurance contracts could be structured to reduce moral hazard behavior by (1) increasing stockholder discipline, (2) increasing depositor discipline, and (3) increasing regulator discipline.

What are some ways of imposing stockholder discipline to prevent stockholders from engaging in excessive risk taking?

Two ways of imposing stockholder discipline to prevent excessive risk taking are (a) through a risk-based deposit insurance program and (b) through increased capital requirements and increased disclosure.

Risk-based deposit insurance premiums ensure that DIs engaging in riskier activities will have to pay higher premiums. One reason for the savings institution crisis has been the fixed-rate deposit insurance premiums that did not differentiate between risky and conservative DIs. As a result, stockholders of DIs in financial difficulties had nothing to lose by investing in projects that had high payoffs because depositors were protected by the FDIC insurance program.

Stockholder discipline also is increased if DIs are required to hold more capital as well as required to disclose more financial information. The more capital a DI has, the less likely the failure of a DI in the event of a decline in the market value of assets. This protects not only the depositors but also the FDIC, which provides the insurance. Greater disclosure also allows regulators and outside analysts to make more informed judgments on the viability of the institution, raising the stock prices of better-managed DIs and lowering the stock prices of those that are excessively risky.

9. How is the provision of deposit insurance by the FDIC similar to the FDIC’s writing a put option on the assets of a DI that buys the insurance? What two factors drive the premium of the option?

As long as the DI is profitable, the owners of the DI benefit by maintaining a positive market value of equity. If the DI’s performance falters to the point that net worth becomes negative, the owners can put the assets back to the FDIC who will pay off the insured depositors and sell the assets. The premium on
this put option, or deposit insurance, is positively related to the level of risk of the assets and to the amount of leverage maintained by the DI.

10. What four factors were provided by FDICIA as guidelines to assist the FDIC in the establishment of risk-based deposit insurance premiums? What has happened to the level of deposit insurance premiums in the late 1990s and early 2000s? Why?

The FDIC must base deposit insurance premiums on (1) different categories and concentrations of assets, (2) different categories and concentrations of liabilities, (3) other factors that affect the probability of loss, and (4) the revenue needs of the insurer. In most cases, the ranking of an institution is based on regulators’ judgments regarding asset quality, loan underwriting standards, and other operating risks. As the industry risk profile has improved and the revenue needs of the FDIC insurance funds decreased and the amount of the minimum risk premium fell to zero for most banks.

In the early 2000s, the FDIC identified several weaknesses with the existing system of deposit insurance that it felt needed to be corrected. Among these was that the system did not effectively price risk. At the time, regulations restricted the FDIC from charging premiums to well capitalized and highly rated DIs as long as the insurance fund reserves were above 1.25 percent of insured deposits. As a result over 90 percent of all insured DIs did not pay deposit insurance premiums in the late 1990s and early 2000s. The FDIC argued that it should charge regular premiums for risk regardless of the reserve levels of the fund. Beginning in January 2009, the FDIC began calculating deposit insurance premiums based on a more aggressively risk-based system. Under this scheme, the lowest risk DIs paid a minimum of 5 cents per $100 of deposits for deposit insurance, while the highest risk DIs paid 43 cents per $100 of deposits. Under the FDIC Reform Act, if the reserve ratio drops below 1.15 percent for the FDIC expects it to do so within six months the FDIC must, within 90 days, establish and implement a plan to restore the DIF to 1.15 percent within five years. Such was the case in March 2008 when the FDIC reserve ratio dropped to 1.19 percent. At this point the FDIC was certain that the reserve ratio would drop below 1.15 by the end of the next quarter. Accordingly, the FDIC developed and implemented (on April 1, 2009) a restoration plan for the DIF.

11. What is capital forbearance? How does a policy of forbearance potentially increase the costs of financial distress to the insurance fund as well as the stockholders?

Capital forbearance refers to regulators’ permitting an FI with depleted capital to continue to operate. The primary advantage occurs in the short run through the savings of liquidation costs. In the long run,
the likely cost is that the poorly managed FI will become larger, more risky, but no more solvent. Eventually even larger liquidation costs must be incurred.

12. Under what conditions may the implementation of minimum capital guidelines, either risk-based or non-risk-based, fail to impose stockholder discipline as desired by the regulators?

Regulators must be willing to enforce immediately corrective action provisions against DIs that violate the minimum capital guidelines.

13. Why did the fixed-rate deposit insurance system fail to induce insured and uninsured depositors to impose discipline on risky DIs in the United States in the 1980s?

The fixed-rate deposit insurance system understandably provided no incentives to depositors to discipline the actions of DIs since they were completely insured for deposits of up to $100,000 per account per DI. Uninsured depositors also had few incentives to monitor the activities of DIs because regulators had been reluctant to close down failing DIs, especially larger DIs. This is because of the anticipated widespread social implications. As a result, both insured and uninsured depositors were usually protected against DI losses, reducing the incentives to monitor the actions of DIs.

a. How is it possible to structure deposits in a DI to reduce the effects of the insured ceiling?

Deposits are insured by the FDIC up to $250,000 per person account per DI. Therefore, individual depositors could expand coverage beyond $250,000 by placing deposits as joint accounts and by having accounts in many DIs at the same time.

b. What are brokered deposits? Why are brokered deposits considered more risky than nonbrokered deposits by DI regulators?

Individuals and companies who wish to place more than $250,000 of deposits in DIs often will hire brokers to place these deposits in blocks of $250,000 in DIs that pay the highest interest rates. This activity is considered risky by regulators for two reasons. First, DIs willing to pay the highest rates often have the highest need for deposits from a liquidity standpoint. Second, when the deposits mature, the risk of withdrawal may force the DI to pay even higher rates to keep the
deposits. As a result, this higher cost of funds may force the DI to engage in even riskier lending activities.

c. How did FIRREA and FDICIA change the treatment of brokered deposits from an insurance perspective?

FIRREA specified that institutions that did not meet capital standards could not accept brokered deposits and could not solicit deposits by paying interest rates that were significantly higher than the prevailing market rates. FDICA further strengthened these prohibitions by including any DIs that did not have risk-based capital of at least ten percent.

d. What trade-offs were weighed in the decision to leave the deposit insurance ceiling at $100,000 in 2005 and then increase the ceiling to $250,000?

Lowering the deposit insurance ceiling potentially would give depositors the incentive to better monitor the risk of DIs. However, such monitoring may also allow these depositors to run from DIs that became too risky. Such action would perhaps cause more DIs to fail that would put increased solvency pressure on the insurance fund.

During the financial crisis of 2008-2009, in an attempt to provide stability to the U.S. banking system, the Troubled Asset Relief Program (or TARP) that gave the U.S. Treasury funds to buy “toxic” mortgages and other securities from financial institutions also called for the FDIC to increase the deposit insurance limit to $250,000 from $100,000 per person per institution. At this time, the FDIC was more concerned about the possibility of contagious runs as a few major DIs (e.g., Washington Mutual) failed or nearly failed. The FDIC wanted to instill confidence in the banking system and made the change to avoid massive depositor runs from many of the troubled (and even safer) DIs, more DI failures, and an even larger collapse of the financial system.
Chapter 19: Deposit Insurance – Bank Failure

18. The following is a balance sheet of a commercial bank (in millions of dollars).

<table>
<thead>
<tr>
<th></th>
<th>Assets</th>
<th>Liabilities and Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>$5</td>
<td>Insured deposits $30</td>
</tr>
<tr>
<td>Loans</td>
<td>40</td>
<td>Uninsured deposits 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Equity 5</td>
</tr>
<tr>
<td>Total assets</td>
<td>$45</td>
<td>Total liabilities and equity $45</td>
</tr>
</tbody>
</table>

The bank experiences a run on its deposits after it declares it will write off $10 million of its loans as a result of nonpayment. The bank has the option of meeting the withdrawals by first drawing down its cash and then by selling off its loans. A fire sale of loans in one day can be accomplished at a 10 percent discount. They can be sold at a 5 percent discount if sold in two days. The full market value will be obtained if they are sold after two days.

a. What is the amount of loss to the insured depositors if a run on the bank occurs on the first day? On the second day?

Insured depositors will not lose any money because even if the bank does not make the payment, they will be paid by the FDIC. Further, the value of the loans on the first day is $0.90 \times $30 = $27m and their value on the second day is $0.95 \times $30 = $28.5m. With its cash reserves, it has a more than adequate amount to pay the insured depositors as long as the uninsured depositors are not given the opportunity to cash in their deposits first.

b. What amount do the uninsured depositors lose if the FDIC uses the insured depositor transfer method to close the bank immediately? The assets will be sold after the two-day period.

The value of the loans on the second day is $0.95 \times $30 = $28.5m. With its cash reserves of $5 million, it has a total of $33.5 million to pay the depositors. The first $30 million goes to the insured depositors. So the uninsured depositors will receive the remaining $3.5 million, and thus they will lose $6.5 million out of their $10 million. The equity holders will lose all of their capital.
19. A bank with insured deposits of $55 million and uninsured deposits of $45 million has assets valued at only $75 million. What is the cost of failure resolution to insured depositors, uninsured depositors, and the FDIC if an insured depositor transfer method is used?

Neither the insured depositors nor the FDIC lose under the insured depositor transfer method. Uninsured depositors receive $20 million (= $75m - $55m) equal to the cash (received from the sale of the bank’s assets) remaining after insured depositors have been paid in full. This results in a loss of $25 million (= $45m - $20m) for the uninsured depositors.

20. A commercial bank has $150 million in assets at book value. The insured and uninsured deposits are valued at $75 million and $50 million, respectively, and the book value of equity is $25 million. As a result of loan defaults, the market value of the assets has decreased to $120 million. What is the cost of failure resolution to insured depositors, uninsured depositors, shareholders, and the FDIC if an insured depositor transfer method is used?

Under the insured depositor transfer method, all losses will be borne by shareholders, followed by uninsured depositors, before the FDIC takes any loss. Thus, in this example, neither the insured depositors nor the FDIC lose under the insured depositor transfer method. Uninsured depositors receive $45 million (= $120m - $75m) equal to the cash (received from the sale of the bank’s assets) remaining after insured depositors have been paid in full. This results in a loss of $5 million (= $50m - $45m) for the uninsured depositors. Shareholders will lose $25 million.
Chapter 20: Capital Adequacy Standards - Capitalization

17. National Bank has the following balance sheet (in millions) and has no off-balance-sheet activities.

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>$20</td>
</tr>
<tr>
<td>Treasury bills</td>
<td>40</td>
</tr>
<tr>
<td>Residential mortgages</td>
<td>600</td>
</tr>
<tr>
<td>Business loans (BB+ rated)</td>
<td>430</td>
</tr>
<tr>
<td>Total assets</td>
<td>$1,090</td>
</tr>
<tr>
<td>Deposits</td>
<td>$980</td>
</tr>
<tr>
<td>Subordinated debentures</td>
<td>40</td>
</tr>
<tr>
<td>Common stock</td>
<td>40</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>30</td>
</tr>
<tr>
<td>Total liabilities and equity</td>
<td>$1,090</td>
</tr>
</tbody>
</table>

a. What is the leverage ratio?

The leverage ratio is \( \frac{(40 + 30)}{1,090} = 0.06422 \) or 6.422 percent.

b. What is the Tier I capital ratio?

Risk-adjusted assets = \( 20 \times 0.0 + 40 \times 0.0 + 600 \times 0.5 + 430 \times 1.0 = 730 \).

Tier I capital ratio = \( \frac{40 + 30}{730} = 0.09589 \) or 9.589 percent.

c. What is the total risk-based capital ratio?

The total risk-based capital ratio = \( \frac{40 + 40 + 30}{730} = 0.15068 \) or 15.068 percent.

d. In what capital risk category would the bank be placed?

The bank would be placed in the well-capitalized category.
18. Onshore Bank has $20 million in assets, with risk-adjusted assets of $10 million. Tier I capital is $500,000 and Tier II capital is $400,000. How will each of the following transactions affect the value of the Tier I and total capital ratios? What will the new value of each ratio be?

The current value of the Tier I ratio is 5 percent and the total ratio is 9 percent.

a. The bank repurchases $100,000 of common stock with cash.

Tier I capital decreases to $400,000 and total capital decreases to $400,000+$400,000 = $800,000. Cash has a 0 risk weight so risk-weighted assets do not change. Thus, the Tier I ratio decreases to 4 percent and the total capital ratio decreases to 8 percent.

b. The bank issues $2 million of CDs and uses the proceeds to issue mortgage loans.

The risk weight for mortgages is 50 percent. Thus, risk-weighted assets increase to $10 million + $2 million (.5) = $11 million. The Tier I ratio decreases to $500,000/$11 million = 4.54 percent and the total capital ratio decreases to 8.18 percent.

c. The bank receives $500,000 in deposits and invests them in T-bills.

T-bills have a 0 risk weight so risk-weighted assets remain unchanged. Thus, both ratios remain unchanged.

d. The bank issues $800,000 in common stock and lends it to help finance a new shopping mall.

The developer has an A+ credit rating.

Tier I equity increases to $1.3 million and total capital increases to $1.7 million. Since the developer has an A- credit rating, the loan’s risk weight is 50 percent. Thus, risk-weighted assets increase to $10 million + $800,000 (.5) = $10.4 million. The Tier I ratio increases to $1.3m/$10.4m = 12.50 percent and the total capital ratio increases to 16.35 percent.
e. The bank issues $1 million in nonqualifying perpetual preferred stock and purchases general obligation municipal bonds. Tier I capital is unchanged. Total capital increases to $1.9 million. General obligation municipal bonds fall into the 20 percent risk category. So, risk-weighted assets increase to $10 million + $1 million (.2) = $10.2 million. Thus, the Tier I ratio decreases to $500,000/$10.2 million = 4.90 percent and the total capital ratio decreases to 18.63 percent.

f. Homeowners pay back $4 million of mortgages and the bank uses the proceeds to build new ATMs.

The mortgage loans were Category 3 (50%) risk weighted. The ATMs are Category 4 (100%) risk weighted. Thus, risk-weighted assets increase to $10 million - $4 million (.5) + $2 million (1.0) = $12 million. The Tier I capital ratio decreases to $500,000/$12 million = 4.17 percent and the total capital ratio decreases to 7.50 percent.
Chapter 20: Capital-Adequacy Standards – Off Balance Sheet Items

19. Explain the process of calculating risk-adjusted off-balance-sheet contingent guaranty contracts?

The first step is to convert the off-balance-sheet items to credit equivalent amounts of an on-balance-sheet item by multiplying the notional amounts by an appropriate conversion factor as given in Table 20-10. The converted amounts are then multiplied by the appropriate risk weights as if they were on-balance-sheet items.

   a. What is the basis for differentiating the credit equivalent amounts of contingent guaranty contracts?

The factors used in the conversion are arbitrary selections from the list of choices approved by regulators. While a subjective relationship undoubtedly exists between the factors and the respective credit risks to the FI, no theoretical valuation models were utilized to determine the specific weights that are used.

   b. On what basis are the risk weights for the credit equivalent amounts differentiated?

The appropriate risk weights depend on the counterparty risk to off-balance-sheet activity.

20. Explain how off-balance-sheet market contracts, or derivative instruments, differ from contingent guaranty contracts.

Off-balance-sheet contingent guaranty contracts in effect are forms of insurance that FIs sell to assist customers in the financial management of the customers' businesses. FI management typically uses market contracts, or derivative instruments, to assist in the management of the FI’s asset and liability risks. For example, a loan commitment or a standby letter of credit may be provided to help a customer with another source of financing, while an over-the-counter interest rate swap likely would be used by the FI to help manage interest rate risk.

   a. What is counterparty credit risk?
Counterparty credit risk is the risk that the other party in a contract may default on their payment obligations.

b. Why do exchange-traded derivative security contracts have no capital requirements?

Counterparty obligations of exchange-traded contracts are guaranteed by the exchange on which they are traded. Thus, there is no counterparty risk to the DI.

c. What is the difference between the potential exposure and the current exposure of over-the-counter derivative contracts?

The potential exposure is the portion of the credit equivalent amount that would be at risk if the counterparty to the contract defaulted in the future. The current exposure is the cost of replacing the contract if the counterparty defaulted today.

d. Why are the credit conversion factors for the potential exposure of foreign exchange contracts greater than they are for interest rate contracts?

The credit conversion factors for the potential exposure of foreign exchange contracts are greater than they are for interest rate contracts because research indicates that foreign exchange rates are more volatile than interest rates.

e. Why do regulators not allow DIs to benefit from positive current exposure values?

Regulators fear that allowing DIs to gain from a counterparty default would create risk-taking incentives that would not be in the best interests of the DI or the financial services industry.
Chapter 20: Capital-Adequacy Standards – Risk Adjusted Capitalization

25. Third Bank has the following balance sheet (in millions), with the risk weights in parentheses.

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash (0%)</td>
<td>Deposits</td>
</tr>
<tr>
<td>OECD interbank deposits (20%)</td>
<td>Subordinated debt (5 years)</td>
</tr>
<tr>
<td>Mortgage loans (50%)</td>
<td>Cumulative preferred stock</td>
</tr>
<tr>
<td>Consumer loans (100%)</td>
<td>Equity</td>
</tr>
<tr>
<td>Total Assets</td>
<td>Total liabilities and equity</td>
</tr>
<tr>
<td>$20</td>
<td></td>
</tr>
<tr>
<td>$25</td>
<td></td>
</tr>
<tr>
<td>$70</td>
<td></td>
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<tr>
<td>$70</td>
<td></td>
</tr>
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<td>$185</td>
<td>$185</td>
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</tbody>
</table>

The cumulative preferred stock is qualifying and perpetual. In addition, the bank has $30 million in performance-related standby letters of credit (SLCs) to a BB+ rated corporation, $40 million in two-year forward FX contracts that are currently in the money by $1 million, and $300 million in six-year interest rate swaps that are currently out of the money by $2 million. Credit conversion factors follow:

- Performance-related standby LCs: 50%
- 1- to 5-year foreign exchange contracts: 5%
- 1- to 5-year interest rate swaps: 0.5%
- 5- to 10-year interest rate swaps: 1.5%

a. What are the risk-adjusted on-balance-sheet assets of the bank as defined under the Basel Accord?

Risk-adjusted assets:

- Cash: \( 0 \times 20 = 0 \) million
- OECD interbank deposits: \( 0.20 \times 25 = 5 \) million
b. What is the total capital required for both off- and on-balance-sheet assets?

Standby LCs:

\[ \text{Potential exposure} \times \text{Current exposure} = \$30 \times 0.50 \times 1.0 = \$15 \]

Foreign exchange contracts:

<table>
<thead>
<tr>
<th>Potential exposure</th>
<th>Current exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \times 0.05 )</td>
<td>( \times \text{in the money} )</td>
</tr>
<tr>
<td>( $40 )</td>
<td>( $0 )</td>
</tr>
</tbody>
</table>

Interest rate swaps:

<table>
<thead>
<tr>
<th>Potential exposure</th>
<th>Current exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \times 0.015 )</td>
<td>( \times \text{Out-of-the-money} )</td>
</tr>
<tr>
<td>( $300 )</td>
<td>( $2 )</td>
</tr>
</tbody>
</table>

\[ \text{Total risk-adjusted on- and off-balance-sheet assets} = \$133.50 \times 0.08 = \$10.68 \]

c. Does the bank have enough capital to meet the Basel requirements? If not, what minimum Tier 1 or total capital does it need to meet the requirement?

No, the bank does not have sufficient total capital to meet the Basel requirements. It needs total capital of \$10.68 million, of which Tier 1 must be at least \$133.50 million \times 0.04 = \$5.34 million. Further, since perpetual preferred stock is limited to 25 percent (\$1.335 million) of Tier 1, the bank needs at least \$4.005 million of equity capital. Thus, an additional \$2.005 million of equity is necessary to satisfy the Tier 1 requirements.

If Tier I actually equals \$5.34 million, the required Tier II capital also will be \$5.34 million. Of this amount, the remaining perpetual preferred stock of \$3.665 million is
counted, which leaves $1.675 million of subordinated debt that can be used to satisfy the Tier II requirement. This amount is available and satisfies the limit of 50% of Tier I rule. (Refer to Table 20-5 for explanations of Tier I and Tier II requirements.)

A new balance sheet after the issuance of the new required equity is shown below. You will note that the total capital now seems to exceed the minimum of $10.68 million. However, only a portion of the subordinated debt can be counted and this portion will decrease as the maturity approaches.

New balance sheet:

<table>
<thead>
<tr>
<th>Cash</th>
<th>$22.005</th>
<th>Deposits</th>
<th>$175</th>
</tr>
</thead>
<tbody>
<tr>
<td>OECD interbank deposits</td>
<td>25</td>
<td>Subordinated debt (over 5 years)</td>
<td>3</td>
</tr>
<tr>
<td>Mortgage loans</td>
<td>70</td>
<td>Cumulative preferred stock</td>
<td>5</td>
</tr>
<tr>
<td>Consumer loans</td>
<td>70</td>
<td>Equity</td>
<td>4.005</td>
</tr>
<tr>
<td>Total</td>
<td>$187.005</td>
<td>Total Liabilities and equity</td>
<td>$187.005</td>
</tr>
</tbody>
</table>

26. Third Fifth Bank has the following balance sheet (in millions), with the risk weights in parentheses.

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash (0%)</td>
<td>$20</td>
</tr>
<tr>
<td>Mortgage loans (50%)</td>
<td>50</td>
</tr>
<tr>
<td>Consumer loans (100%)</td>
<td>70</td>
</tr>
<tr>
<td>Total assets</td>
<td>$140</td>
</tr>
</tbody>
</table>

In addition, the bank has $20 million in commercial standby letters of credit to a BB rated corporation and $40 million in 10-year FX forward contracts that are in the money by $1 million.

a. What are the risk-adjusted on-balance-sheet assets of the bank as defined under the Basel II?
b. What is the total capital required for both off- and on-balance-sheet assets?

Total capital required:
On-balance-sheet: $95 x 0.08 = $7.6
Off-balance-sheet $20 x 1.0 x 1.0 x 0.08 = $1.6
Derivatives:
Potential exposure $40 x 0.075 = $3.0
Current exposure = $0.0
Total capital for derivatives = $3.0 x 1.0 = 3.0 x 0.08 = $0.24
Total capital required = $9.44

No, the bank does not have sufficient capital. The amount of subordinated debt that can count towards capital cannot exceed 50% of Tier I capital. Since Tier I capital is $5 million, only $2.5 million of the subordinated debt qualifies as Tier II capital. Thus, total qualifying capital is $5 of equity plus $2.5 of subordinated debt, for a total of $7.5 million. This amount is $1.94 million short of the necessary amount of capital.

Note that in this example the amount of loan loss reserve is not indicated. Since up to 1.25% of risk-adjusted assets could qualify as Tier II capital, an additional amount of capital may be available to the bank. This would reduce the amount of capital shortfall as determined above.