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

1. Classify the following items as (1) on-balance-sheet assets, (2) on-balance-sheet liabilities, (3) off-balance-sheet assets, (4) off-balance-sheet liabilities, or (5) capital account. Classification

a. Loan commitments. 3

b. Loan loss reserves. 5

c. Letter of credit. 2

d. Bankers acceptance. 2

e. Rediscounted bankers acceptance. 2

f. Loan sales without recourse. None of the above.

g. Loan sales with recourse. 2

h. Forward contracts to purchase. 3

I. Forward contracts to sell. 4

j. Swaps. 4 (for liability swaps)

k. Loan participations. 1

l. Securities borrowed. 3

m. Securities lent. 4

n. Loss adjustment expense account (PC insurers). 2

o. Net policy reserves. 2

1. How does one distinguish between an off-balance-sheet asset and an off-balance-sheet liability?

Off-balance-sheet activities or items are contingent claim contracts. An item is classified as an off-balance-sheet asset when the occurrence of the contingent event results in the creation of an on-balance-sheet asset. An example is a loan commitment. If the borrower decides to exercise the right to draw down on the loan, the FI will incur a new asset on its portfolio. Similarly, an item is an off-balance-sheet liability when the contingent event creates an on-balance-sheet liability. An example is a standby letter of credit (SLC). In the event that the original payer of the SLC defaults, then the FI is liable to pay the amount to the payee, incurring a liability on the right-hand-side of its balance sheet.

3. Contingent Bank has the following balance sheet in market value terms (in millions of dollars):

Assets Liabilities and Equity

Cash $20 Deposits $220

Mortgages 220 Equity 20

Total assets $240 Total liabilities and equity $240

In addition, the bank has contingent assets with $100 million market value and contingent liabilities with $80 million market value. What is the true stockholder net worth? What does the term *contingent* mean?

Net worth = ($240m - $220m) + ($100m - $80m) = $40 million. The term contingent means an event that may or may not happen. In financial economics, the term is used in conjunction with the result given that some event does occur.

4. Why are contingent assets and liabilities like options? What is meant by the delta of an option? What is meant by the term *notional value*?

Contingent assets and liabilities may or may not become on-balance-sheet assets and liabilities in a manner similar to the exercise or non-exercise of an option. In each case, the realization of the event is contingent or dependent on the occurrence of some other event. The delta of an option is the sensitivity of an option’s value for a unit change in the price of the underlying security. The notional value represents the amount of value that will be placed in play if the contingent event occurs. The notional value of a contingent asset or liability is the amount of asset or liability that will appear on the balance sheet if the contingent event occurs.

5. An FI has purchased options on bonds with a notional value of $500 million and has sold options on bonds with a notional value of $400 million. The purchased options have a delta of 0.25 and the sold options have a delta of 0.30. What is (a) the contingent asset value of this position, (b) the contingent liability value of this position, and (c) the contingent market value of net worth?

a. The contingent asset value is $500 million x 0.25 = $125 million.

b. The contingent liability value is $400 million x 0.30 = $120 million.

c. The contingent market value of net worth is $125 million - $120 million = $5 million.

6. What factors explain the growth of off-balance-sheet activities in the 1980s through the 2000s among U.S. FIs?

The narrowing of spreads on on-balance-sheet lending in a highly competitive market and large loan losses by commercial banks gave impetus to seek other sources of income in the 1980s. Off-balance-sheet activities represented one avenue. In addition, off-balance-sheet assets and liabilities were not subject to capital requirements or reserve requirements, increasing the effective returns on these activities. In the 1990s and early 2000s, increased revenue from trading activities was a major impetus to the increases in OBS activities. For the first time ever, OBS activities fell in late 2008 with the fallout from the financial crisis. However, growth of OBS securities was quickly seen again in early 2009.

7. What role does Schedule L play in reporting off-balance-sheet activities? Refer to Table 16-4. What was the annual growth rate over the 21-year period 1992-2012 in the notional value of off-balance-sheet items compared with on-balance-sheet items? Which contingencies have exhibited the most rapid growth?

Schedule L is a method for the Federal Reserve to track the types and amounts of off-balance-sheet (OBS) activities of commercial banks and savings institutions. Most of the OBS activities mentioned in this chapter are reported in Schedule L of the quarterly Call Reports, although items associated with settlement risk and affiliate risk are not reported.

The following information from Table 16-4 reflects the most significant OBS items in terms of notional value:

Annual Growth

OBS Item Rate (%)

Commitments to lend 6.98%

Future and forward contracts on interest rates 14.00

Written option contracts on interest rates 17.01

Purchased option contracts on interest rates 17.19

Commitments to buy foreign exchange 8.08

Notional value of all outstanding swaps 21.27

Total OBS 16.08

Total assets (on-balance-sheet items) 6.35%

Clearly the off-balance-sheet items have grown at a much faster rate than the on-balance-sheet items for U.S. commercial banks, with swaps growing the most rapidly of all OBS activities. Further, the dollar value of the notional OBS items was a multiple of 18.57 times as large as the dollar value of the on-balance-sheet items in the first quarter of 2012.

8. What are the characteristics of a loan commitment that an FI may make to a customer? In what manner and to whom is the commitment an option? What are the various possible pieces of the option premium? When does the option or commitment become an on-balance-sheet item for the FI and the borrower?

A loan commitment is an agreement to lend a fixed maximum amount of money to a firm within some given amount of time. The interest rate or rate spread normally is determined at the time of the agreement, as is the length of time that the commitment is open. Because the borrower usually triggers the timing of the drawdown, which may be any portion of the total commitment, the commitment is an option to the borrower. If the loan is not needed, the option or drawdown will not be exercised. The premium for the commitment may include a fee of some percent times the total commitment and a fee of some percent times the amount of the unused commitment. Of course, the borrower must pay interest while any portion of the commitment is in use. The option becomes an on-balance-sheet item for both parties at the point in time that a drawdown occurs.

9. A FI makes a loan commitment of $2.5 million with an up-front fee of 50 basis points and a back-end fee of 25 basis points on the unused portion of the loan. The takedown on the loan is 50 percent and takedown occurs at the beginning of the year.

a. What total fees does the FI earn when the loan commitment is negotiated?

Up-front fee = $2,500,000 x 0.0050 = $12,500

b. What are the total fees earned by the FI at the end of the year, that is, in future value terms? Assume the cost of capital for the FI is 6 percent.

Note that adjustment has not been made for the fact that the up-front fee is usually collected at the beginning of the period. To adjust, a common treatment is to find the future value for this fee by multiplying by bank’s cost of capital. Thus, $2,500,000 x 0.0050 x (1 + 0.06) = $13,250, and the total fees are:

Up-front fee = $2,500,000 x 0.0050 x 1.06 = $13,250

Back-end fee = $2,500,000 x 0.0025 x 0.50 = 3,125

Total = $16,375

10. Use the following information on a one-year loan commitment to calculate the return on the loan commitment.

*BR =* FI’s base interest on the loans = 8%

*Φ =* Risk premium on loan commitment = 2.5%

*f*1 *=* Up-front fee on the whole commitment = 25 basis points

*f*2 = Back-end fee on the unused commitment = 50 basis points

b = Compensating balance on loans = 10%

*RR* = Reserve requirements = 8%

*td* = Expected (average) takedown rate on the loan commitment = 70%

The general formula for the promised return (1 + *k*) of the loan commitment is:

Using the formula: 

1 + *k* = 1 + [(0.0025) + (0.0050)(1 - 0.70) + (0.08 + 0.025)(0.70)]/{0.70 - [0.10(0.70)(1 - 0.08) ]}

1 + *k* = 1.12193, or *k* = 12.193 percent.

11. A FI has issued a one-year loan commitment of $2 million for an up-front fee of 25 basis points. The back-end fee on the unused portion of the commitment is 10 basis points. The FI’s base rate on loans is 7.5 percent and loans to this customer carry a risk premium of 2.5 percent. The FI requires a compensating balance on loans of 5 percent in the form of demand deposits. Reserve requirements on demand deposits are 8 percent. The customer is expected to draw down 80 percent of the commitment at the beginning of the year.

a. What is the expected return on the loan without taking future values into consideration?

Using the formula: 

1 + *k* = 1 + [(0.0025) + (0.0010)(1 - 0.80) + (0.075 + 0.025)(0.80)]/{0.80 - [0.05(0.80)(1 - 0.08)]}

1 + *k* = 1.10836, or *k* = 10.836 percent.

Alternatively, using dollar values:

Up-front fees = 0.0025 x $2,000,000 = $ 5,000

Interest income = 0.10 x $2,000,000(.80) = 160,000

Back-end fee = 0.0010 x $$2,000,000(1 - .80) = 400

Total = $165,400

Funds committed = $2,000,000(0.80) - $80,000 (compensating balances = $2,000,000 x 0.80 x 0.05) + $6,400 (reserve requirements on demand deposits = $80,000 x 0.08) = $1,526,400.

Expected rate of return = $165,400/$1,526,400 = 10.836%

b. What is the expected return using future values? That is, the net fee and interest income are evaluated at the end of the year when the loan is due?

Using the formula:

1+*k* = 1 + [(0.0025(1 + 0.06) + 0.0010(1 - 0.80) + (0.075 + 0.025)(0.80)]/{0.80 - [0.05(0.80)(1 - 0.08)]} => 1+*k* = 1.108556, or *k* = 10.8556 percent.

Using dollar values, the only difference is that the up-front fee is estimated at year-end, i.e., $5,000 x 1.06 = $5,300. Thus, expected return = $165,700/$1,526,400 = 10.8556%.

c. How is the expected return in part (b) affected if the reserve requirements on demand deposits are zero?

Using the formula:

1 + *k* = 1 + [(0.0025(1 + 0.06) + 0.0010(1 - 0.80) + (0.075 + 0.025)(0.80)]/ {0.80 - [0.05(0.80)(1 – 0)]} => 1 + *k* = 1.1090, or *k* = 10.90 percent.

Using dollar values, the amount of funds committed is reduced by the amount set for reserves, i.e., $6,400. Thus, expected return = $165,700/$1,520,000 = 10.90%.

d. How is the expected return in part (b) affected if compensating balances are paid a nominal interest rate of 2.5 percent?

Using the formula:

1+*k* = 1+[(0.0025(1 + 0.06) + 0.0010(1 - 0.80) + (0.075 + 0.025)(0.80) - 0.05(0.025)(0.80)]/[0.80 - 0.05(0.80)(1 - 0.08)] => 1 + *k* = 1.107246, or *k* = 10.7246 percent.

Using dollar values, we need to subtract additional payments of interest on reserve requirements from the total fees and interest earned, i.e., 0.025 x $80,000 = $2,000.

Expected return = $163,700/1,526,400 = 10.7246%

e. What is the expected return using future values, but with the compensating balance placed in certificates of deposit that have an interest rate of 5.5 percent and no reserve requirements, rather than in demand deposits?

Using the formula:

1 + *k* = 1 + [(0.0025(1 + 0.06) + 0.0010(1 - 0.80) + (0.075 + 0.025)(0.80) – 0.05)(0.055)(0.80)]/ {0.80 - [0.05(0.80)(1 – 0)]} => 1 + *k* = 1.10612, or *k* = 10.612 percent.

Using dollar values, in this case the compensating balance is placed in certificates of deposits paying 5.5 percent and with no compensating balance requirement Thus, revenue in part (b) above is reduced by $80,000 x 0.055 = $4,400, and the expected return is $161,300/$1,520,000 = 10.612 percent.

12. Suburb Bank has issued a one-year loan commitment of $10 million for an up-front fee of 50 basis points. The back-end fee on the unused portion of the commitment is 20 basis points. The bank’s base rate on loans is 7 percent, and loans to this customer carry a risk premium of 2 percent. The bank requires a compensating balance on loans of 10 percent to be placed in demand deposits and must maintain reserve requirements on demand deposits of 10 percent. The customer is expected to draw down 60 percent of the commitment at the beginning of the year.

a. What is the expected return on this loan?

Using the formula: 

1 + *k* = 1 + [(0.0050) + (0.0020)(1 - 0.60) + (0.07 + 0.02)(0.60)]/{0.60 - [0.10(0.60)(1 - 0.10)]}

1 + *k* = 1.1095, or *k* = 10.95 percent.

Alternatively, using dollar values:

Up-front fee = 0.0050 x $10,000,000 = $50,000

Interest income = 0.0900 x $10,000,000(0.6) = 540,000

Back-end fee = 0.0020 x $10,000,000(1 - 0.6) = $8,000

Total revenue $598,000

Funds committed = $10,000,000(0.6) - $600,000 (compensating balance = $10,000,000(0.60)(0.1))

+ $60,000 (reserve requirements on demand deposits = $10,000,000(0.60)(0.1)(0.1)) = $5,460,000.

Expected rate of return = $598,000/$5,460,000 = 10.95 percent.

b. What is the expected annual return on the loan if the draw-down on the commitment does not occur until at the end of six months?

In this case the fees remain the same, but the interest revenue will be only half as large since the loan is taken down for only six months.

Using the formula:

1 + *k* = 1 + [(0.0050) + (0.0020)(1 - 0.60) + (0.07 + 0.02)(6/12)(0.60)]/{0.60 - [0.10(0.60)(1 - 0.10)]} = > 1 + *k* = 1.120147, or *k* = 12.0147 percent.

Using dollar values, the interest revenue will be only half as large and the average balance outstanding will be only half as large. Thus, revenue will be $598,000 - $270,000 = $328,000, and the funds committed will be $5,460,000/2 = $2,730,000. The expected rate of return on an annual basis is 12.0147 percent. Note, the return is greater than the return calculated in part (a) because the fees are dollar sensitive, not time sensitive.

13. How is an FI exposed to interest rate risk when it makes loan commitments? In what way can an FI control for this risk? How does basis risk affect the implementation of the control for interest rate risk?

When an FI makes a fixed-rate loan commitment, it faces the likelihood that interest rates may increase during the intervening period. This reduces its net interest income if the borrower decides to take down the loan. The FI can partially offset this loan by making variable rate loan commitments. However, this still does not protect it against basis risk, that is, if lending rates and the cost of funds of the FI do not increase proportionately.

14. How is an FI exposed to credit risk when it makes loan commitments? How is credit risk related to interest rate risk? What control measure is available to an FI for the purpose of protecting against credit risk? What is the realistic opportunity to implement this control feature?

An FI is exposed to credit risk because the credit quality of a borrower could decline during the intervening period of the loan commitment. When an FI makes a loan commitment, it is obligated to deliver the loan. Although most loan commitments today contain a clause releasing an FI from its obligations in the event of a significant decline in credit quality, the FI may not be inclined to use it for fear of reputation concerns. Interest rate risk is related to credit risk because default risks are much higher during periods of increasing interest rates. When interest rates rise, firms have to generate higher rates of return. Thus, FIs making loan commitments are subject to both risks in periods of rising interest rates.

15. How is an FI exposed to takedown risk and aggregate funding risk? How are these two contingent risks related?

An FI is exposed to takedown risk because not all loan commitments are fully taken down. As a result, an FI has to forecast its funding requirements in order not to keep funds at levels that are too high or too low. Maintaining low levels of funds may result in paying more to obtain funds on short notice. Maintaining high levels of funds may result in lower earnings.

Additionally, FIs are exposed to aggregate funding risk, i.e., all customers may choose to take down their loan commitments during a similar period, such as when interest rates are rising or credit availability is low. This could cause a severe liquidity problem for the FI.

These two risks are related because takedowns usually occur when interest rates are rising or when credit availability is low. If all customers decide to increase their takedowns in these circumstances, it could put a severe strain on the FI. Similarly, when interest rates are falling or when credit availability is high, customers are likely to find cheaper financing elsewhere. Thus, FIs should take into account the interdependence of these two events when forecasting future funding need.

16. Do the contingent risks of interest rate, takedown, credit, and aggregate funding tend to increase the insolvency risk of an FI? Why or why not?

These risk elements all can have adverse effects on the solvency of an FI. While they need not occur simultaneously, there is a fairly high degree of correlation between them. For example, if rates rise, funding will become shorter, takedowns will likely increase, credit quality of borrowers will become lower, and the value of the typical FI will shrink.

17. What is a letter of credit? How is a letter of credit like an insurance contract?

Like most insurance contracts, a letter of credit is a guarantee. It essentially gives the holder the right to receive payment from the FI in the event that the original purchaser of the product defaults on the payment. Like the seller of any guarantee, the FI is obligated to pay the guarantee holder at the holder’s request.

18. A German bank issues a three-month letter of credit on behalf of its German customer who is planning to import $100,000 worth of goods from the United States. The bank charges an up-front fee of 100 basis points.

a. What up-front fee does the bank earn? How is this fee recorded on the bank’s income

statement?

Up-front fee earned = $100,000 x 0.0100 = $1,000. This fee will be recorded as noninterest income for the bank.

b. If the U.S. exporter decides to discount this letter of credit after it has been accepted by the German bank, how much will the exporter receive, assuming that the interest rate currently is 5 percent and that 90 days remain before maturity? (*Hint*: To discount a security, use the time value of money formula, PV = FV [(1 – (interest rate x (days to maturity/365))].)

PV = (1 - (0.05 x 90/365) x $100,000 = $98,767.12

c. What risk does the German bank incur by issuing this letter of credit?

The German bank faces the risk that the importer may default on its payment and it will be obligated to make the payment at the end of 90 days. In such a case, it will incur an on-balance-sheet liability of $100,000.

19. How do standby letters of credit differ from commercial letters of credit? With what other types of FI products do SLCs compete? What types of FIs can issue SLCs?

Standby letters of credit usually are written for contingent situations that are less predictable and that have more severe consequences than the LCs written for standard commercial trade relationships. Often SLCs are used as performance guarantees for projects over extended periods of time, or they are used in the issuance of financial securities such as municipal bonds or commercial paper. Banks and property-casualty insurance companies are the primary issuers of SLCs.

20. A corporation is planning to issue $1 million of 270-day commercial paper for an effective yield of 5 percent. The corporation expects to save 30 basis points on the interest rate by using either an SLC or a loan commitment as collateral for the issue.

a. What are the net savings to the corporation if a bank agrees to provide a 270-day SLC for an up-front fee of 20 basis points (of the face value of the loan commitment) to back the commercial paper issue?

Cost of using SLC = -(0.0020) x $1,000,000 = -$2,000.00

Savings by using SLC as collateral = 0.0030 x (270/365) x $1,000,000) = 2,219.18

Net savings = $ 219.18

b. What are the net savings to the corporation if a bank agrees to provide a 270-day loan commitment to back the issue? The bank will charge 10 basis points for an up-front fee and 10 basis points for a back-end fee for any unused portion of the loan. Assume the loan is not needed and that the fees are on the face value of the loan commitment.

Up-front fee of loan commitment = -(0.0010) x $1,000,000 = -$1,000.00

Back-end fee (assuming no usage) = -(0.0010) x $1,000,000 = -1,000.00

Cost of loan commitment = -$2,000.00 Savings by using loan commitments as collateral =

0.0030 x (270/365 x $1,000,000) = $2,219.18

Net savings = $ 219.18

c. Should the corporation be indifferent to the two alternative collateral methods at the time the commercial paper is issued?

Not necessarily. If some of the loan commitment is drawn down, the back-end fee will be less and the savings will be greater.

21. Explain how the use of derivative contracts such as forwards, futures, swaps, and options creates contingent credit risk for an FI. Why do OTC contracts carry more contingent credit risk than do exchange-traded contracts? How is the default risk of OTC contracts related to the time to maturity and the price and rate volatilities of the underlying assets?

Credit risk occurs because of the potential for the counterparty to default on payment obligations, a situation that would require the FI to replace the contract at current market prices and rates. OTC contracts typically are non-standardized or unique contracts that do not have external guarantees from an organized exchange. Defaults on these contracts usually will occur when the FI stands to gain and the counterparty stands to lose, i.e., when the contract is hedging the risk exactly as the FI hoped. Thus, default risk is higher when the volatility of the underlying asset is higher.

22. What is meant by when-issued trading? Explain how forward purchases of when-issued government T-Bills can expose FIs to contingent interest rate risk.

The purchase or sale of a security before it is issued is called when-issued trading. For example, when an FI purchases T-bills on behalf of a customer prior to the actual weekly auctioning of securities, it incurs the risk of underpricing the security. On the day the T-bills are allotted, it is possible that because of high demand, the prices may be much higher than what the FI has forecasted. It then may be forced to purchase the securities at higher prices, which means lower interest rates.

23. Distinguish between loan sales with and without recourse. Why would FIs want to sell loans with recourse? Explain how loan sales can leave FIs exposed to contingent interest rate risks.

When FIs sell loans without recourse, the buyers of the loans accept the risk of non-repayment by the borrower. In other words, the loans are completely off the books of the FI. In the case of loans sold with recourse, FIs are still legally responsible for the payment of the loans to the seller in the event the borrower defaults. FIs are willing to sell such loans because they obtain better prices and also because it allows them to remove the assets from their balance sheets. FIs are more likely to sell such loans with recourse if the borrower of the loan is of good credit standing. When interest rates increase, there is a higher likelihood of loan defaults and a higher probability that the FI will have to buy back some of the loans. This may be the case even for sales of loans without recourse because FIs are reluctant not to take back loans for reputation concerns.

24. The manager of Shakey Bank sends a $2 million funds transfer payment message via CHIPS to the Trust Bank at 10 AM. Trust Bank sends a $2 million funds transfer message via CHIPS to Hope Bank later that same day. What type of risk is inherent in this transaction? How will the risk become reality?

This is an example of settlement risk. If the funds sent by Shakey Bank do not reach Trust Bank in time, then Trust Bank may not have sufficient funds to cover its promised payment to Hope Bank.

25. Explain how settlement risk is incurred in the interbank payment mechanism and how it is another form of off-balance-sheet risk.

Settlement risk occurs when FIs transfer and receive funds from other FIs through the FedWire system or CHIPS (Clearing House Interbank Payment System). Since all settlements are netted out at the end of the day, FIs can engage in overdrafts during the day. This means that if an FI defaults during the middle of the day, several FIs may be caught short-ended because they may not receive their scheduled payments. This may also cause their payments made to other FIs to be denied. The risks of such intra-day overdrafts can be solved by real-time transfers.

26. What is the difference between a one-bank holding company and a multibank holding company? How does the principle of corporate separateness ensure that a bank is safe from the failure of its affiliates?

A one-bank holding company (OBHC) is a holding company that has among its several subsidiaries only one bank. In contrast, a multibank holding company (MBHC) owns several banks. The principle of corporate separateness ensures that the affiliates are all structured as separate entities so that the failure of one will not have a negative impact on either the holding company or the other affiliates. This is accomplished by ensuring that each affiliate is run as a separate entity with its own financial resources and capital.

27. Discuss how the failure of an affiliate can affect the holding company or its affiliates even if the affiliates are structured separately.

First, creditors of the failed affiliate may claim that it is not a truly separate firm under the “estoppel argument” because they could not distinguish between affiliates of the holding company with similar names. Second, regulators themselves have tried to challenge the principle of corporate separateness by asking the holding company or the other banks of the multibank holding company to bail out the failed unit. Although not yet approved by the courts, a future favorable ruling could undermine the separateness of the affiliates.

28. Defend the statement that although off-balance-sheet activities expose FIs to several forms of risks, they also can alleviate the risks of FIs.

Although an FI is exposed to interest rate, foreign exchange, credit, liquidity, and other risks, it also can use these risks to help alleviate its overall risk, if used judiciously. For example, the use of options and futures can reduce the volatility of earnings if hedged with the appropriate amount. Such hedging can be incorporated in an FI’s overall portfolio so that both trading and hedging activities can be pursued independently while still reducing the total exposure of the FI. It is also possible to offset the exposures of on- and off-balance-sheet activities. For example, it is possible that decreases in interest rates could lead to increased exposures for some assets (reinvestment risks), but they could be offset by off-balance-sheet liabilities. Thus, regulation of off-balance-sheet activities should recognize the positive effects of these instruments in helping ameliorate the total exposure of the FI.

**Integrated Mini Case: Calculating Income on Off-Balance-Sheet Activities**

Dudley National has issued the following off-balance-sheet items:

• A one-year loan commitment of $1 million with an up-front fee of 40 basis points. The back-end fee on the unused portion of the commitment is 55 basis points. The bank’s base rate on loans is 8 percent, and loans to this customer carry a risk premium of 2 percent. The bank requires a compensating balance on this loan of 10 percent to be placed in demand deposits and must maintain reserve requirements on demand deposits of 8 percent. The customer is expected to draw down 75 percent of the commitment at the beginning of the year.

• A one-year loan commitment of $500,000 with an up-front fee of 25 basis points. The back-end fee on the unused portion of the commitment is 30 basis points. Loans to this customer carry a risk premium of 2.5 percent. The bank will not require a compensating balance on this loan. The customer is expected to draw down 90 percent of the commitment at the beginning of the year.

• A three-month commercial letter of credit on behalf of one of its AA-rated customers who is planning to import $400,000 worth of goods from the Germany. The bank charges an up-front fee of 75 basis points on commercial letters of credit to AA-rated customers.

• A standby letter of credit to one its A-rated customers who is planning to issue $5 million of 270-day commercial paper for an effective yield of 5 percent. The corporation expects to save 50 basis points on the interest rate by using the SLC. The bank charges an up-front fee of 40 basis points on SLCs to A-rated customers to back the commercial paper issue?

a. What up-front fees does the bank earn on each of these?

Up-front fee on $1m loan commitment = 0.0040 x $1,000,000 = $4,000

Up-front fees on $500,000 loan commitment = 0.0025 x $500,000 = 1,250

Up-front fee on commercial letter of credit = 0.0075 x $400,000 = 3,000

Up-front fee on standby letter of credit = 0.0040 x $5,000,000 = 20,000

Total up-front fees $28,250

b. What other income does the bank earn on these off-balance-sheet activities?

$1m loan commitment

Interest income = (0.08 + 0.02) x $1,000,000(0.75) = $75,000

Back-end fee = 0.0055 x $1,000,000(1 - 0.75) = 1,375

$500,000 loan commitment

Interest income = (0.08 + 0.025) x $500,000(0.9) = $47,250

Back-end fee = 0.0030 x $500,000(1 - 0.9) = 150

No other income is earned on the letters of credit.

c. Calculate the returns on each of the off-balance-sheet activities assuming that the takedowns on the loan commitments are at the expected percentage and the customers holding the letters of credit do not default on their obligations.

$1m loan commitment

Up-front fee = $4,000

Interest income = 75,000

Back-end fee = 1,375

Total revenue $80,375

Funds committed = $1,000,000(0.75) - $75,000 (compensating balances = $1,000,000 x 0.75 x 0.10) + $6,000 (reserve requirements on demand deposits = $75,000 x 0.08) = $681,000.

Expected rate of return = $80,375/$681,000 = 11.80%

$500,000 loan commitment

Up-front fee = $1,250

Interest income = 47,250

Back-end fee = 150

Total revenue $48,650

Funds committed = $500,000(0.90) = $450,000.

Expected rate of return = $48,650/$450,000 = 10.81%

No investment is made by the bank for the guarantees offered through the letters of credit. Thus, bank invests no funds, yet makes $3,000 on the commercial letter of credit and $20,000 on the standby letter of credit.