Community County State Bank

Asset/Liability Management: Focus on Earnings

Community County State Bank (CCSB) is a medium-sized community bank with several branch offices located in a southeastern city. The management team at CCSB has remained stable for several years with Mary Banker, the President, serving for over 10 years. Although the bank has performed well relative to its peers, given the current banking environment Ms. Banker feels it is imperative that CCSB reexamine its strategy. As part of the overall process, all management systems and procedures are to be examined.

The CFO, Buck Freely, wants to take advantage of this opportunity to better explain interest rate risk and related risk management procedures to top management and the board of directors. The bank has primarily relied on GAP analysis in the past, but Mr. Freely is unsure that the method is completely understood. While lobbying for using earnings sensitivity analysis Mr. Freely heard comments such as "GAP is simple and straightforward with no guesstimates required" and "why should we use a different method when GAP already shows the potential earnings impact due to interest rate movements."

Mr. Freely feels that a better explanation of GAP and earnings sensitivity is needed. Fortuitously, his assistant, Kelly Charger, is currently a student at a well-regarded regional banking school. Since a portion of the school's curriculum focuses on Asset-Liability Management, Mr. Freely hopes that Kelly can use newly gained knowledge to better explain interest rate risk measures to top management and the board.

Kelly began the task by gathering the bank's most recent financial data. To keep the analysis as simple as possible (as instructed by Mr. Freely), the financial data has been consolidated into broad categories. Kelly also retrieved some ALM presentation slides from banking school.

Exhibit 1 shows the balance sheet. Real estate loans comprise over 50% of the bank's loan portfolio. The remainder of the loan portfolio is distributed across business/commercial and individual loan categories. The investment security portfolio is about 1/10 the size of the loan portfolio. U.S. Treasury and Federal Agency securities make up the bulk of the portfolio. Core deposits supply over 80% of the bank's funding. Negotiable CDs provide the majority of the remaining liabilities. The bank's equity position represents over 9% of assets.

Exhibit 2 contains the bank's income statement. The bank's net income compares favorably to its peers. Its most recent ROA and ROE are approximately 1.32% and 14.6%, respectively. Recent rate changes have impacted the bank's financial performance. CCSB does not use off-balance sheet derivatives, but it still faces options risk. Kelly has specifically identified impacts associated with the possibility of loan prepayments and early deposit withdrawals.

Exhibit 3 contains pricing characteristics of assets and liabilities. The majority of loans and securities carry fixed interest rates, while most liabilities have short or no stated maturities. However, since a large portion of liabilities are core deposits, the bank has some ability to control how frequently and by how much the rates change. Demand deposits have not grown quickly over the past few years, but neither has the bank's asset base. Still, the bank's use of interest bearing liabilities has increased over time.

Exhibit 4 contains an abbreviated maturity schedule for major asset and liability classes. The maturity estimates include loans balances that mature during the period plus scheduled principal payments on continuing loans.

Exhibit 5 contains estimated changes in rates and sensitivities for various asset and liability classes. The sensitivity changes are incremental changes relative to the GAP estimated values. The forecasted sensitivity adjustments are based on expected changes in early payments/withdrawals and customer preferences. The values are intended to be used to compare the difference in GAP and earnings sensitivity analysis.

Exhibit 6 contains a partial set of ALM slides from banking school.

To prepare for the presentation, Kelly must complete the following tasks.

1. Calculate the bank's GAP position for a one-year time bucket. Indicate the implications of your GAP estimate for net interest income if interest rates change. Be prepared to explain the basics of GAP analysis and how you arrived at your values. What major assumptions are inherent in the procedure? Does your analysis require "guesstimates"? Are there additional data items that would make your analysis more complete?

2. Be prepared to discuss how earnings sensitivity analysis "extends" GAP analysis. What are its advantages and limitations?

3. Discuss the assumptions that underlie the values in Exhibit 5. Are the values "reasonable?

4. Execute an earnings sensitivity analysis (ESA) that incorporates the values in Exhibit 5. Explain why the ESA earnings estimates differ from your GAP earnings estimates. Which method is better?

5. Are there other potential "embedded options" that are not specifically addressed? How would they impact the analysis?

6. How would you use similar information to assess the impact of changing interest rates on the value of the bank's equity?

Exhibit 1: Balance Sheet (figures in $1,000s)
Community County State Bank

Assets	12/31/10
Cash Items	18,528
Fed Funds Sold	0
Securities	31,755
Loans	
Business	65,239
Com RE	109,142
Residential RE	73,287
Consumer	56,198
Premises	8,251
Other Assets	17,298
Total Assets	**379,698**
Liabilities & Equity	
Deposits	
Checking	59,214
Savings	135,896
Time Dep < 100k	94,698
Time Dep > 100k	34,058
Fed Funds Purch	7,156
Other Liab	14,387
Total Liabilities	**345,409**
Equity	34,289
Total Liab & Equity	**379,698**

Exhibit 2: Income Statement (figures in $1,000s)
Community County State Bank

	Period Ending	12/31/10
Interest income on:		
Business loans	4,043	
Com RE loans	7,263	
Residential RE loans	4,104	
Consumer loans	4,117	
Total Loans		**19,527**
Securities	1,270	
Fed Funds Sold	0	
Total Securities		**1,270**
Total Interest Income		**20,797**
Interest expense on:		
Checking	592	
Savings	2,718	
Time Dep < 100k	3,362	
Time Dep > 100k	1,311	
Fed Funds Purch	240	
Other Liab	575	
Total Interest Expense		**8,798**
Net Interest Income		**11,999**
Provision for loan losses		**682**
Non Interest Income		**2,852**
Non Interest Expense		**6,572**
Realized Gain/Loss Sec		**0**
Income Before Taxes		**7,597**
Taxes		**2,583**
Net Income		**5,014**

Exhibit 3: Pricing Characteristics of Key Assets and Liabilities: 12/31/2010

Securities: Primarily consist of U.S. Treasury and Federal Agency Securities. The portfolio average maturity is 2.5 years and the average yield is 4%.

Business Loans: 55% of business loans carry variable rates. The average portfolio maturity is 3-years. The fixed rate loans require equal payments of the original principal each year of the loan's life. An additional 12% of the loan balances with maturities over one year are expected to be repaid early this year. The average portfolio yield is 6.2% (Var=5.95%; Fix=6.5%).

Commercial Real Estate Loans: 35% of the loans carry variable rates. The portfolio of loans has an average amortization period of 10-years with an average 5-year maturity. An additional 8% of the loan balances with maturities over one year are expected to be repaid early this year. The average portfolio yield is 6.66% (Var=6.2%; Fix=6.9%).

Residential Real Estate Loans: 10% of the loans carry variable rates. The portfolio of loans has an average amortization period of 22.5-years. The effective maturity of the loans is around 10-years. An additional 7% of the loan balances with maturities over one year are expected to be repaid early this year. The average portfolio yield is 5.60% (Var=4.70%; Fix=5.7%).

Consumer Loans: 15% of the loans carry variable rates. The loans have average amortization and maturity periods of 4 years. An additional 13% of the loan balances with maturities over one year are expected to be repaid early this year. The average portfolio yield is 7.33% (Var=6.9%; Fix=7.4%).

Checking: Includes regular and interest-bearing accounts. Average portfolio cost rate is 1%.

Savings: Includes regular and "premium" savings accounts. Average portfolio cost rate is 2%.

Time Deposits Under $100,000: These deposits pay fixed rates. The average maturity is between 1- and 2-years. An additional 5% of the deposit balances with maturities over one year are expected to be withdrawn early this year. Average portfolio cost rate is 3.55%.

Time Deposits Over $100,000: These deposits pay fixed rates. The average maturity is less than 1 year. Average portfolio cost rate is 3.85%.

Federal Funds Sold/Purchased: Represent overnight funds. Avg rate: Purch=3.35%; Sell=3.15%.

Other Liabilities: Represent relatively short-term funding with an average maturity of well under 1 year. Average cost rate is 4%.

Assumptions:

Average maturities of variable and fixed rate products are roughly equal.

Average portfolio yields/costs are approximately equal to current market rates.

Exhibit 4: Maturity Schedule - Community County State Bank

	1-3 months	4-6 months	6-12 months	1<=2 years	>2 years
Securities	6%	7%	11%	25%	51%
Loans					
Business	5%	6%	10%	19%	60%
Com RE	7%	5%	9%	21%	58%
Residential RE	1%	1%	3%	6%	89%
Consumer	4%	5%	11%	18%	62%
Deposits					
Time Dep < 100k	11%	13%	24%	42%	10%
Time Dep > 100k	30%	25%	45%		
Other Liab	25%	25%	50%		

Exhibit 5: Sensitivity Assumptions - Community County State Bank

	Treasury Rate Change and Asset/Liability Rate Assumptions						
Treasury Securities	***-3%***	***-2%***	***-1%***	***0%***	***1%***	***2%***	***3%***
Fed Funds Sold	0.15%	1.15%	2.15%	3.15%	4.15%	5.15%	6.15%
Securities	1.30%	2.10%	3.00%	4.00%	5.00%	6.00%	7.00%
Loans							
Business	3.50%	4.40%	5.30%	6.20%	7.20%	8.30%	9.40%
Com RE	4.46%	4.96%	5.76%	6.66%	7.56%	8.46%	9.36%
Residential RE	4.20%	4.55%	5.00%	5.60%	6.40%	7.20%	8.00%
Consumer	4.88%	5.58%	6.43%	7.33%	8.23%	9.18%	10.18%
All Other Assets	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Deposits							
Checking	0.10%	0.30%	0.60%	1.00%	1.20%	1.50%	1.90%
Savings	0.50%	0.80%	1.30%	2.00%	2.30%	2.70%	3.20%
Time Dep < 100k	1.55%	2.05%	2.75%	3.55%	4.45%	5.35%	6.45%
Time Dep > 100k	1.85%	2.35%	3.05%	3.85%	4.75%	5.65%	6.75%
Fed Funds Purch	0.35%	1.35%	2.35%	3.35%	4.35%	5.35%	6.35%
Other Liab	2.45%	2.75%	3.25%	4.00%	4.80%	5.65%	6.55%
	Incremental Change in Base Sensitivity Across Rate Changes for < 1 year						
Securities	15.0%	7.0%	3.0%	0.0%	0.0%	0.0%	0.0%
Loans							
Business	10.0%	4.0%	2.0%	0.0%	-2.0%	-5.0%	-8.0%
Com RE	6.0%	3.0%	1.0%	0.0%	-2.0%	-4.0%	-6.0%
Residential RE	13.0%	7.0%	3.0%	0.0%	-1.0%	-2.0%	-4.0%
Consumer	7.0%	3.0%	1.0%	0.0%	-1.0%	-3.0%	-6.0%
All Other Assets	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Deposits							
Time Dep < 100k	-3.0%	-2.0%	-1.0%	0.0%	2.0%	5.0%	10.0%

Exhibit 6: Asset Liability Management

- Manage a bank's sensitivity to changes in market interest rates (interest rate risk)
- Plan, organize, and control asset and liability volume, mix, maturity, and rates
- Achieve an acceptable risk of change in net interest margin or economic value of equity

1

Interest Rate Risk

- The potential significant changes in a bank's profitability and market value of equity due to unexpected changes in interest rates
- Reinvestment rate risk
  - Interest rate changes affect the bank's cost of funds and return on invested assets (differing magnitudes possible)
- Price Risk
  - Interest rate changes impact the market values of the bank's assets and liabilities (and therefore, its value of equity)

2

Interest Rate Risk

- Repricing risk: assets and liabilities reprice at different times
- Basis risk: rates change by different amounts for various assets and liabilities
- Yield curve risk: rates change by different amounts across maturities
- Option risk: changes in rates result in option exercise (for example, prepayments or early withdrawals)

3

ALM: Earnings Focus

- Net Interest Income (NII)
  = Interest Income minus Interest Expense
- Net Interest Margin (NIM)
  = Net Interest Income divided by Earning Assets
- NII and NIM can and will fluctuate due to changes in the general level of rates
- GAP and Earnings Sensitivity Analysis are measures of the amount of Interest Rate Risk (IRR) in relation to earnings

4

ALM: Earnings Focus

- GAP – a static measure of risk that is commonly associated with net interest income (margin)
- If interest rates change, the bank will have to reinvest the cash flows from assets and refinance rolled-over liabilities at different interest rates
- Which is impacted the most?

5

Measuring Interest Rate Risk with GAP

GAP = RSA – RSL

- RSA: Rate Sensitive Assets
  - Assets that will reprice in a given time period
- RSL: Rate Sensitive Liabilities
  - Liabilities that will reprice in a given time period

– Focuses on managing net interest income in short-run
– Implicitly assumes that all rates change at the same time, in the same direction and by the same amount

6

Rate Sensitivity

- An asset or liability is rate sensitive if during the time interval it:
  - Matures
  - Is an interim or partial principal payment
  - Will likely be repriced:
    - The interest rate applied to principal changes contractually during the interval
    - The outstanding principal can be repriced when an index changes and the index is expected to change during the interval
  - Is principal associated with the exercise of an embedded option

7

Rate Sensitivity Classification

- Easy Cases
  - Fixed maturities and high costs for prepayment or withdrawal
  - Variable rate instruments
  - Credit risk free instruments
- Hard cases
  - High prepayment prospects
  - High credit risk assets
  - No specified maturity
- Basic Rule: Classify as to likelihood of repricing, not capacity to reprice

8

Steps in GAP Analysis

- Select a series of “time buckets” or intervals for determining when assets and liabilities will reprice
- Group assets and liabilities into these “buckets ”
- Calculate the GAP for each “bucket ”
- Implication for net interest income:
  - **Change in NII = GAP X rate change %**

9

GAP

- If GAP is negative:
  - Rate increases result in lower NII
  - Rate decreases result in higher NII
- If GAP is Positive:
  - Rate increases result in higher NII
  - Rate decreases result in lower NII
- GAP=0 “immunizes” bank’s net interest income to effects of interest rate changes

10

Static GAP Analysis

- Advantages
  - Easy to understand
  - Works well with small changes in interest rates
- Disadvantages
  - Ex-post measurement errors
  - Ignores the time value of money
  - Ignores the cumulative impact of interest rate changes
  - Assumes repricing assets and liabilities are equally sensitive to rate changes (Beta GAP)
  - Ignores embedded options

11

Determinants of NII and NIM

- Level of interest rates
- Composition of assets and liabilities
- Volume of earning assets (EA) and interest-bearing liabilities (IBL)
- Relative rates on EA and IBL
- How do these change with economy?

12

Earnings Sensitivity Analysis

- Incorporates the impact when asset yields and liability interest costs change by different amounts
- Allows consideration of embedded options that can potentially alter the bank's cash flows
- Adjusts for changes in composition in different rate environments

13

Embedded Options

- Many bank assets and liabilities contain explicit and/or implicit options:
  - Option to repay a loan early
  - Call option on bonds
  - Option to withdraw funds prior to maturity
  - Cap (maximum) rate on a floating-rate loan

14

Steps in ESA

- Determine interest rates changes of concern
- Identify composition changes in assets and liabilities in different rate environments
- Forecast exercise of embedded options
- Base repricing assumptions for assets and liabilities on forecasted rate environments
- Estimate net interest income and net income
- Repeat and compare forecasts of net interest income and net income across different interest rate environments

15

Economic Value of Equity Sensitivity Analysis

- Involves basically the same steps as earnings sensitivity analysis
- However, in EVE analysis the focus is on:
  - The relative durations of assets and liabilities
  - How much the durations change in different interest rate environments
  - What happens to the economic value of equity across different rate environments

16

Actively Managing Sensitivity to Rates

- It is difficult to actively vary asset/liability sensitivity on the balance sheet (and consistently win)
  - Interest rate forecasts are frequently wrong
  - Even if rates change as predicted, banks have limited flexibility in varying asset and liability sensitivity and must often sacrifice yield to do so

17

Derivatives

- Any security or contract that derives its value from another underlying asset
- Derivatives Used to Manage Interest Rate Risk
  - Financial Futures Contracts
  - Forward Rate Agreements
  - Interest Rate Swaps
  - Options on Interest Rates
    - Interest Rate Caps
    - Interest Rate Floors

18