Essex EC248-2-SP
Lecture 7

Commercial Banking and Risk Management

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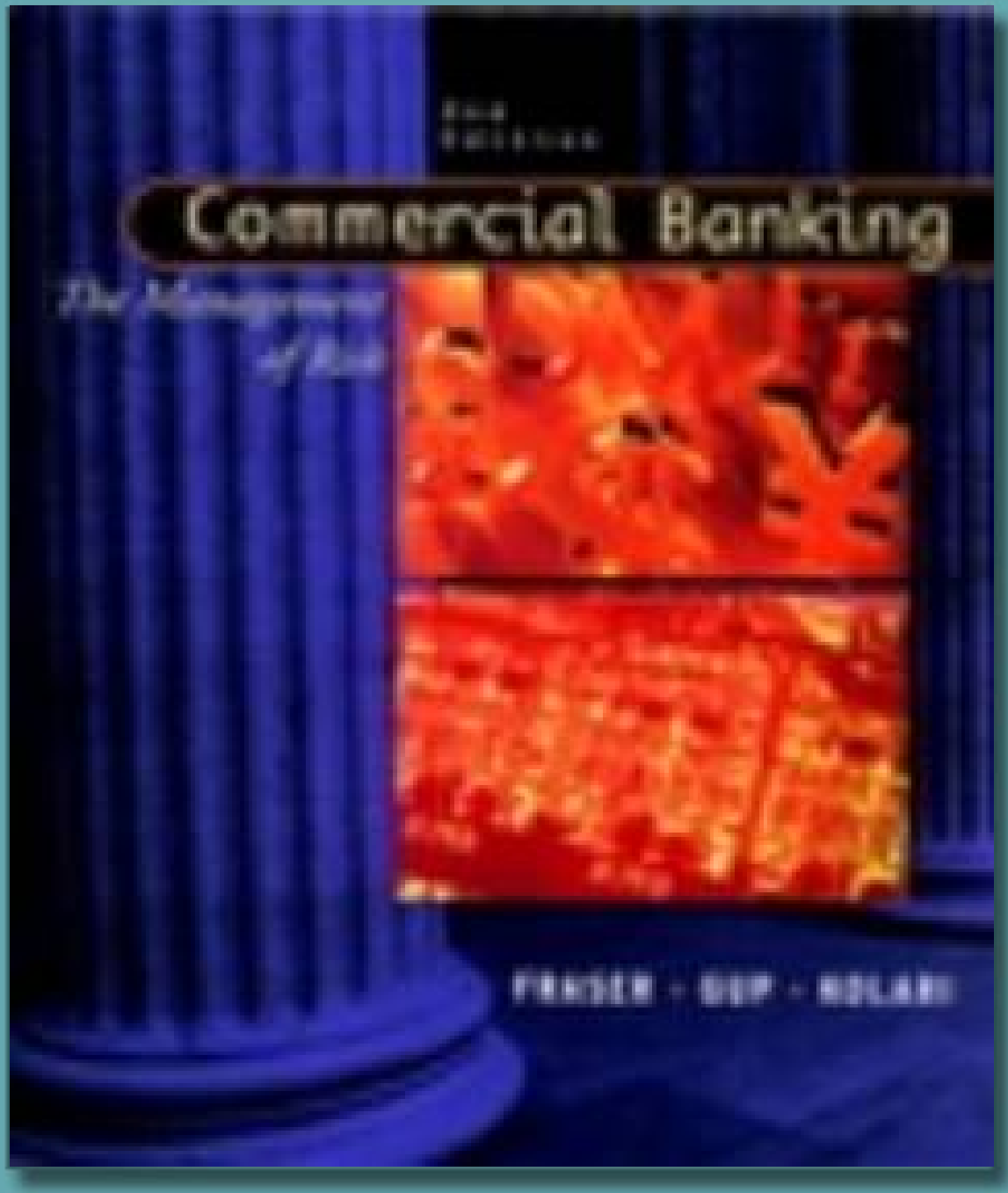

WILEY HIGHER EDUCATION

Plan of Talk

- **Introduction**

1. Commercial Banking as a Business
2. Bank Performance and Risk Management
3. Asset/Liability Management
4. Liquidity Management

- **Wrap-up**

Aims and Learning Outcomes

- **Aim:**
  - Understand how commercial banks manage risks
- **Learning outcomes**
  - Discuss a bank's objective and constraints
  - Define and use major indicators of bank performance
  - Compare alternative approaches to asset/liability management
  - Describe how banks estimate and face their liquidity needs

(Commercial) Banking as a Business

- **Banks** are *private* firms with a *public* purpose
  - **objective**
    - maximize shareholder wealth = market value of bank stock and dividends paid
    - depends on *3 factors*
      - *amount* of cash flow
      - *timing* of cash flow
      - *risk* of cash flow
  - **constraints**: *3 types*
    - *market* (competition and growth): most failures during economic distress
    - *social* (functions): e.g. promote economic development and quality of life
    - *legal and regulatory*: e.g. the risk/return position in portfolio management
- Banking is the management of risk: by taking risks, banks earn a profit

- credit risk	- foreign exchange risk
- interest rate risk	- compliance risk
- liquidity risk	- strategic risk
- price risk	- reputation risk

Banks: Principal *Uses* of Funds

- Assets
  - **Loans**: most risky and biggest component, **62%** of TA **(US, 1998 data)**
    - commercial and industrial (C&I) loans: 29% of loans
    - real estate loans: 40%
    - consumer loans: 16%
    - other (e.g. interbank) loans: 15%
  - **Investments**, **23%**: loans + investments = *earning* assets (or bank *credit*): **85%**
    - short-term, liquid securities
    - long-term securities: ST + LT securities = 63% of investments
    - other, 37%
  - **Cash**: **9%** => earnings assets + cash = *financial* assets: 94%
  - **Other** assets: **6%**
    - buildings
    - equipment

Banks: Principal *Sources* of Funds

- **Liabilities**: **92%** of TL
  - **Deposits**, **68%**
    - transactions deposits, 20% of deposits: e.g. checking and money market accounts
    - nontransactions deposits, 80% of deposits, **54%** of TL: e.g. time (CDs) or savings deposits
  - **Nondeposit sources** of funds, **32%**: e.g. money market funds or bankers' acceptances
- **(Bank) Capital**: **8%** => capital adequacy, capital/assets, BIS
  - **common and preferred stock** (number of shares outstanding x par value)
    - banks: equity relatively small compared to debt sources of funds
    - banks: highly leveraged (high debt/equity) compared to nonfinancial firms
  - **surplus** = paid-in capital in excess of par value at the initial sale of stock
  - **undivided profits** = retained earnings = cumulative net profits before dividends
  - **long-term debt**: subordinated (second in priority to deposits) notes and debentures
  - **reserves for loan** (and lease) **losses**: provisions for loan losses in income statement

Bank Performance

- **Internal**: management has *immediate* control
  - Bank planning (policy formulation): goals, budgets, strategic planning
  - Technology: computers, communications, payments
  - Personnel development: job satisfaction (training and compensation)
- **External**: management does *not* control it *directly*
  - Market share
    - Earnings effects
    - Role of technology
  - Regulatory compliance
    - Capital
    - Lending
    - Securities
    - Other
  - Public confidence
    - Deposit insurance
    - Public image

Bank Financial Statements

- **Balance Sheet** (Report of Condition), **B/S**

  Assets: cash assets (liquidity), securities (investment), loans (lending)

  Liabilities: deposit funds and nondeposit funds

  Capital: equity capital, subordinated notes and debentures, loan loss reserves

- **Income Statement** (Report of Income or of Profit and Loss), **I/S**

  Revenues (Income)

  Interest income

  Noninterest income

  Expenses

  Interest expenses

  Noninterest expenses (including provision for loan losses)

  Net income (profit)

B/S of "State Bank" ($ Thousands), T.3.1: *Assets*

ASSETS	**DEC. 31, 2004**	**DEC. 31, 2003**
Cash assets	*$ 9,039*	*$ 10,522*
Interest bearing bank balances	0	1,000
Federal funds sold	10,500	1,500
U.S. Treasury and agency *securities*	54,082	44,848
Municipal *securities*	32,789	34,616
All other *securities*	0	0
***Net* loans and leases**	**90,101**	**81,857**
Real estate loans	50,393	38.975
Commercial loans	9,615	11,381
Individual loans	8,824	10,640
Agricultural loans	20,680	19,654
Other loans and leases - domestic	3,684	4,025
***Gross* loans and leases**	**93,196**	**84,675**
Less: *Unearned income reserves*	*89*	*282*
Reserve for loan and lease losses	*3,006*	*2,356*
Premises, fixed assets, and capitalized leases	*2,229*	*2,398*
Other real estate	2,282	3,012
Other assets	4,951	4,014
Total assets	**$205,973**	**$183,767**

B/S of "State Bank" ($ Thousands), T.3.1 (cont.): *Liabilities & Capital*

LIABILITIES & CAPITAL	**DEC. 31, 2004**	**DEC. 31, 2003**
Demand deposits	$ 23,063	$ 22,528
All NOW and ATS accounts	6,021	5,322
MMDA accounts	41,402	49,797
Other *savings* deposits	3,097	2,992
Time deposits < $ 100K	31,707	28,954
Time deposits > $ 100K	83,009	57,665
Total deposits	188,299	167,258
Fed funds purchase and resale	0	0
Other borrowings	0	0
Bankers' acceptance and other liabilities	3,546	3,101
Total liabilities	**191,845**	**170,359**
Subordinated notes and debentures	0	0
All common and preferred equity	**14,128**	**13,408**
Total liabilities & capital	**$205,973**	**$183,767**

I/S of "State Bank" ($ Thousands), T.3.2: *Interest* Income and *Interest* Expenses

REVENUES & EXPENSES	**DEC. 31, 2004**	**DEC. 31, 2003**
Interest and fees on *loans*	$ 8,931	$ 9,192
Income from *lease financing*	0	0
Fully taxable	8,880	49,797
Tax exempt	51	50
Estimated tax benefit	38	21
Income on *loans and leases*	**8,969**	**9,213**
US Treasury and agency securities income	3,735	3,025
Municipal securities (tax exempt) income	3,097	3,571
Estimated tax benefit	1,882	2,103
Other securities income	13	0
***Investment* interest income**	**8,727**	**8,699**
Interest Fed funds sold	192	83
Interest due from banks	27	5
Total *interest* income	**17,915**	**18,001**
Interest on CDs over $100K	3,248	2,924
Interest on other deposits	6,757	7,167
Subordinated notes and debentures	16	59
All common and preferred equity	0	50
Interest on mortgages and leases	0	0
Interest on subordinated notes and debentures	0	0
Total *interest* expense	**10,021**	**10,200**

I/S of "State Bank" ($ Thousands), T.3.2 (cont.): *Net Interest* Income, *Non-Interest* and Net Income

REVENUES & EXPENSES	**DEC. 31, 2004**	**DEC. 31, 2003**
Net interest income	**$ 7,894**	**$ 7,801**
Noninterest income	571	577
***Adjusted* operating income**	**8,465**	**8,378**
Overhead expense	3,624	3,876
Provision for loan (and lease) losses	1,294	3,208
***Pretax* operating income**	**3,547**	**1,294**
Securities gains (losses)	1,240	3,331
Pretax net operating income	*4,787*	*4,625*
Applicable income *tax*	**2,267**	**2,113**
Net *operating* income	**2,520**	**2,492**
Net extraordinary items	0	0
Net income (profit)	**2,520**	**2,492**

(Main) *Profit* Ratios: Trends in Profitability

- *Rate of return on equity* = net income after taxes / total *equity*

  ROE = NI / TE

  if low (relative to other banks = “peer group”), difficult access may be expected to new capital, itself needed for expansion of activities

- *Rate of return on assets* = net income after taxes / total *assets*

  ROA = NI / TA

  measures the ability of management to utilise the real and financial resources of the bank to generate returns

Risk Ratios I: *Capitalisation*

- *Leverage ratio*

  = total equity / total assets

  may affect the growth of the bank

- *Total capital ratio*

  = (total equity + *long-term debt* + *reserve for loan losses*) / total assets

- *book* and *market* values differ and thus yield different results

Risk Ratios II: *Asset Quality*

- *Provision for loan loss ratio*
  = provision for loan losses (PLL) / total loans and leases
- *Loan ratio*
  = net loans / total assets
- *Loss ratio*
  = net charge-offs on loans (gross charge-offs minus recoveries) / total loans and leases
- *Reserve ratio*
  = reserve for loan losses (reserve for loan losses last year minus gross charge-offs plus PLL and recoveries) / total loans and leases
- *Nonperforming ratio*
  = nonperforming assets (nonaccrual loans and restructured loans) / total loans and leases

Risk Ratios III: *Efficiency* and *Liquidity*

- *Operating efficiency*: cost control
  = wages / total expenses
- *Liquidity*

  Temporary investments ratio

  = (Fed funds sold + short-term securities + cash + trading account securities) / total assets

  a higher ratio indicates more liquidity

  Volatile liability dependency ratio

  = (total volatile liabilities - temporary investments) / net loans and leases

  gives an indication of the extent to which “hot” money is being used to fund the riskiest assets of the bank

Asset/Liability Management: Definition

- the process of
  - making decisions about the compositions of assets and liabilities
  - and conducting risk assessment
- bank asset/liability committee: in general, **short-run** management

  Example (simplified B/S, 1 month period)*:*

  $100 million 5-year *fixed*-rate loans at 8% = $8 million interest

  $90 million 30-day time deposits at 4% (*variable*) = $3.6 million interest

  $10 million equity

  Net interest income (NII), in $ = $8 - $3.6 = $4.4 million

  Net interest *margin* (NIM), *in % to earning assets* = ($8 - $3.6)/$100 = 4.4%

  If *market* interest rates rise by 2%, deposit costs will rise in the next month but not fixed loan interest. Now, NIM = ($8 - $5.4)/$100 = 2.6%

  Thus, NIM depends on interest rates, the dollar amount of funds, and the *earning mix* (rate x dollar amount)

Asset/Liability Management: History

- Traditionally, banks have concentrated on *asset management*
  - under *Regulation Q*, *fixed* deposit costs on mainly "core" deposits, i.e. *not* interest-sensitive
  - before October 1979, Fed monetary policy kept interest rates stable
- As loan demand increased in the 1960s, during bouts of inflation associated with the Vietnam War, banks started to use *liability management*
  - under ***liability management,*** banks *purchase funds from the financial markets* when needed
  - unlike core deposits purchased funds are highly interest-elastic
  - purchased funds have *availability risk*: these funds can dry up quickly if the market perceives problems of bank safety (e.g., *Continental Illinois* in 1984)
- Alternatives to *managing interest rate risk*
  - *on*-balance sheet adjustments in fixed vs variable pricing and maturities
  - *off*-balance sheet use of derivatives, such as interest rate swaps, financial futures, and loan guarantees

Short Run: Dollar Gap Analysis

- Gap$ = RSA$ - RSL$

  dollars of rate sensitive assets minus dollars of rate sensitive liabilities (normally, less than one-year maturity)
- to compare two or more banks, or track a bank over time, use

  relative gap ratio = Gap$ / Total Assets

  or

  interest rate sensitivity ratio = RSA$ / RSL.
- positive dollar gap (RSA$ > RSL$)

  => if interest rates rise (fall), bank NIM or profit will rise (fall)
- negative dollar gap (RSA$ < RSL$)

  => if interest rates rise (fall), bank NIM or profit will fall (rise)
- zero dollar gap (RSA$ = RSL$)

  => bank profits will be protected from changes in interest rates

Long Run: Duration Gap Analysis

- While GAP$ can adjust NIM for changes in interest rates, it does not consider effects of such changes on asset, liability, and equity values

  => Duration gap analysis:

  In general, $\Delta V = -D \times V \times [\Delta i/(1 + i)]$

  For assets: $\Delta A = -D \times A \times [\Delta i/(1 + i)]$

  For liabilities: $\Delta L = -D \times L \times [\Delta i/(1 + i)]$

  Change in equity (or net worth) value is: $\Delta E = \Delta A - \Delta L$

  DGAP (duration gap) = $D_A - W \times D_L$,

  where D_A is the average duration of assets, D_L is the average duration of liabilities, and W is the ratio of total liabilities to total assets.

  DGAP can be positive, negative, or zero

  The change in net worth (or equity) value (ΔE) here is different from the market value of a bank's stock (which is based on future expectations of dividends). This new value is based on changes in the market values of assets and liabilities on the bank's balance sheet.

Duration Gap Analysis: Example

Assets	$	Duration (yrs)	Liabilities	$	Duration (yrs)
Cash	100	0	CD, 1 year	600	1.0
Business loans	400	1.25	CD, 5 year	300	5.0
			Total liabilities	$900	2.33
Mortgage loans	500	7.0	Equity	100	
	$1,000	4.0		$1,000	

DGAP = 4.0 - 0.9 x 2.33 = 1.90 years

Suppose interest rates increase from 11% to 12%. Now,

% ΔE = (-1.90)(1/1.11) = -1.7%.

$ ΔE = -1.7% x total assets = 1.7% x $1000 = -$17.

Estimating Liquidity Needs: Sources and Uses

- General definition of liquidity:
  - amount of liquidity needed
  - relative to ability to meet anticipated liquidity demands
- Sources and Uses of Funds Method:
  - calculate future changes over time in loans and deposits
  - from past experience and expectations about future needs

Month	Estim-ated Loans	Estim-ated Deposits	Change Loans	Change Deposits	Estimated Liquidity Needs
Dec	1000	1200	-----	-----	-----
Jan	1200	1000	200	(200)	400
Feb	1600	1200	400	200	200
March	1500	1600	(100)	400	(500)

Estimating Liquidity Needs: Structure of Deposits

	Amount Held (in millions)	Probability of Withdrawal in Next 3 Months	Expected Withdrawals
Short-term (unstable):			
Demand deposits	$ 2	.90	$ 1.8
Other transactions accounts	$10	.60	$ 6.0
Medium-term:			
Small time and savings deposits	$50	.30	$15.0
Long-term (stable):			
Large time deposits	$10	.20	$ 2.0
Expected deposit withdrawals			$24.8

Liquidity Management

- *Asset* liquidity adjustment
  - Liquid assets are an alternative source of funds
  - A reserve to protect the bank from financial market loss of confidence

    Primary (= required) reserves: vault cash and deposits at the Fed district bank

    Secondary reserves: money market instruments held by the bank

    T-bills

    Federal agency securities

    repurchase agreements

    federal funds

    negotiable certificates of deposit (CDs): high denomination (>$100,000)

    bankers' acceptances: drafts used in international trade "accepted" by banks

    commercial paper: promissory notes issued by major US corporations
- *Liability* liquidity adjustment: purchase the funds needed
  - Correspondent balances of smaller banks with larger banks
  - Risks

Concluding Wrap-Up

- **What have we learnt?**
  - How commercial banks function
  - What the principal risk management ratios are
  - How banks effect asset/liability management
  - What bank liquidity management means
- **Where we go next:** to electronic banking and off-balance sheet activities as forms of financial innovation