Lecture 3:
Financial Markets and Institutions

FINANCIAL INTERMEDIATION

Lecture Review

- The process of financial intermediation
- Apply Classical microeconomic theory
- Will examine the case of single person 2-period problem
- Introduce financial intermediation
- Aggregate up to the Loanable Funds Theory
- Explain why banks are different from other FIs

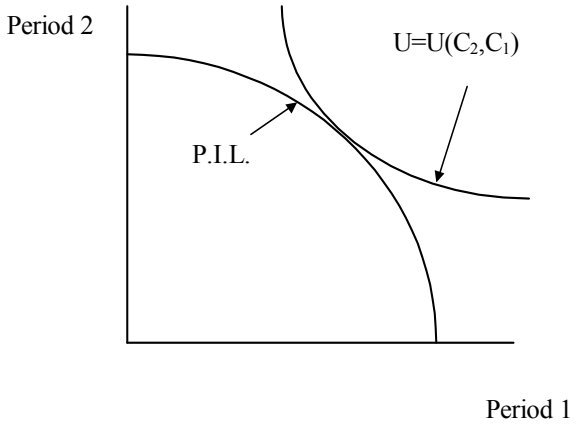
Assumptions

- 2 period analysis
- Perfect capital market
- Borrow or lend at the same rate of interest
- Perfect knowledge of investment returns
- No transactions costs
- No distortionary taxes
- Maximising framework
- Investment opportunities are infinitely divisible
- Diminishing returns

Building Blocks

- Intertemporal utility function $U = U(C_2, C_1)$
- Consumption today is C_1 and future consumption is C_2
- Physical transformation function $C_2 = F(Y - C_1)$. $F( )$ is the production technology
- Average rate of return $C_2/(Y-C_1)$
- Equilibrium $dC_2/dC_1 = -F' = -U_1/U_2$

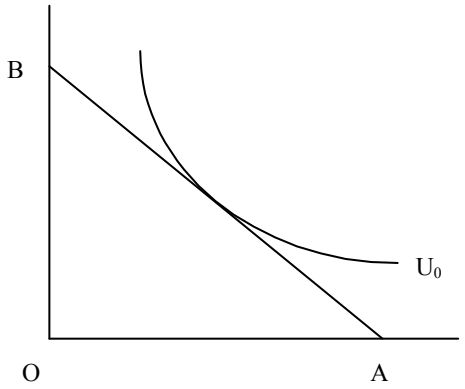
Physical Investment Opportunity Line (PIL)

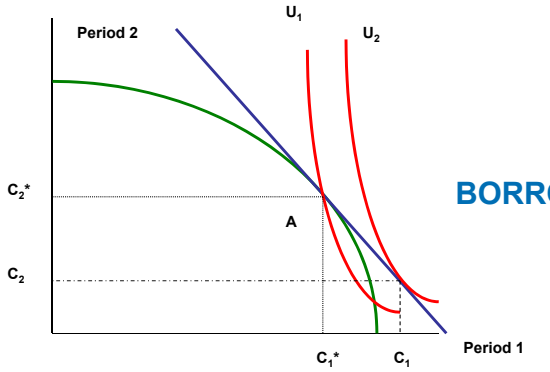


Financial Investment Opportunity Line

To introduce a capital market we introduce a *Financial Opportunity Line* (FIL)

FIL OB=(1+r)OA



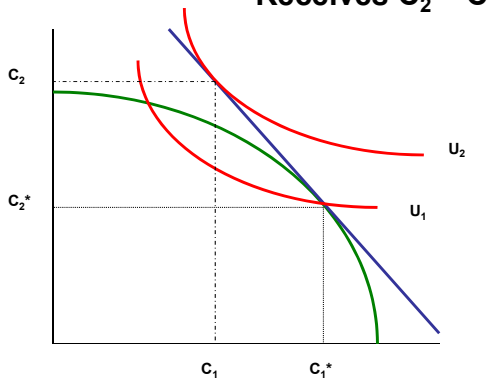


BORROWER

$C_1 - C_1^*$ is borrowed in period 1. $C_2^* - C_2$ debt repayment

SAVER

Saves $C_1^* - C_1$ in period 1.
Receives $C_2 - C_2^*$ in period 2



Micro to Macro

- The borrower/saver is a price taker
- If everyone is a price taker – who sets the price?
- There is a market for savers and borrowers.
- Borrowers are investors, lenders are savers.
- Savers demand securities, Investors issue securities

Savers lend by demanding claims to capital (buying bond)

Investors borrow by supplying claims to capital (issue bond)

$S = \Delta B^d$ demand for flow bond

$I = \Delta B^s$ supply of flow bond

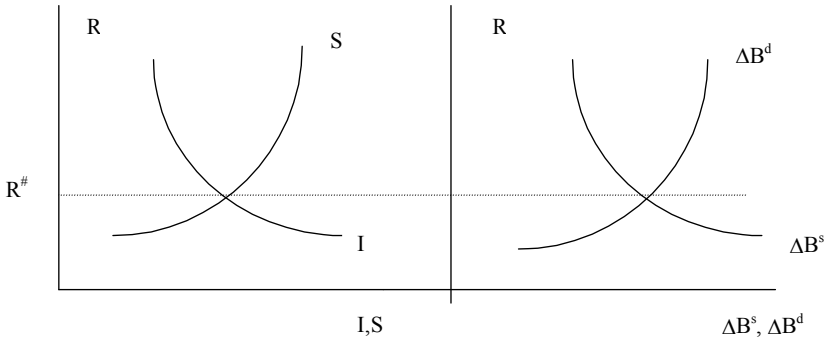
The price of bond varies inversely with the rate of interest, then;

$$\Delta B^d = f(r), f' > 0$$

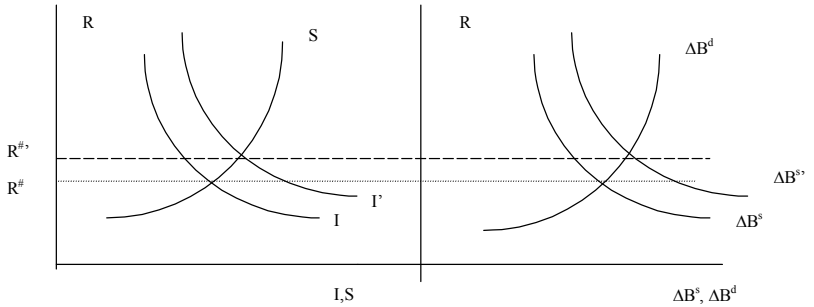
$$\Delta B^s = g(r), g' < 0$$

Then;

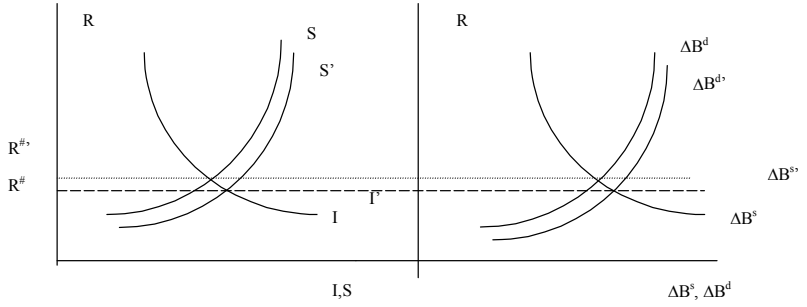
$$S = f(r)$$
$$I = g(r)$$



Increase in desired Investment by Firms



Increase in desired savings by Households



Criticisms

- Borrowers preferences will be those of long-term investors
- LF theory assumes that savers are willing to lend long-term and accept 'liquidity risk' associated with assets of long-term maturity.
- But Savings are done for many reasons

Motives for Savings

- Life Cycle or consumption smoothing
- Precautionary
- Short-term liquidity
- Target Expenditure

Preference Mismatch in Financial Markets

- Savers want low-risk liquid assets
- Investors want long-term secure funds
- There is a maturity mismatch in the characteristics of investors and savers
- Borrowers are looking to issue long-term risky claims. Savers want short-term low-risk claims
- Borrowers are seeking funds greater than what any one lender can provide.

Different Types of Transactions Costs

- Search Costs
- Contract costs (Asymmetric Information)
- Screening costs (Adverse Selection)
- Monitoring costs (Moral Hazard)
- enforcement costs (Moral Hazard)

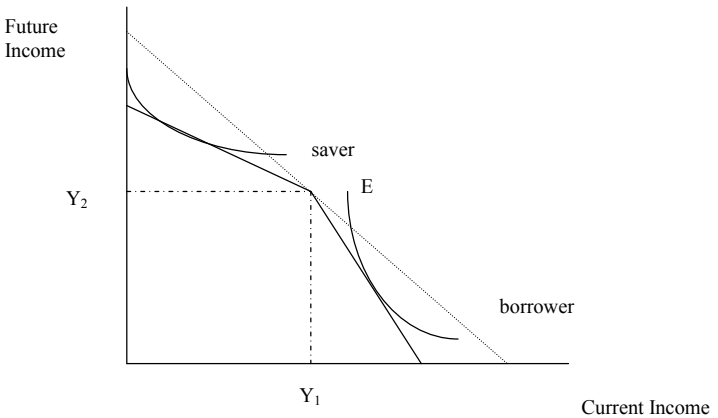
Let T_L = Transaction costs of lenders,

Let T_B = Transaction costs of borrowers.

And R = Return (interest rate) Then;

Net return of lender	$R_L = R - T_L$
Net cost to borrower	$R_B = R + T_B$
A FI introduces a new element of cost	$R_L = R - T_L^F$
	$R_B = R + T_B^F$
The margin of intermediation is	$R_B - R_L = (T_B + T_L)$
The margin of financial intermediation is	$R_B - R_L = (T_B^F + T_L^F)$
A profit opportunity exists if	$(T_B + T_L) > (T_B^F + T_L^F)$

Under this condition, financial intermediary will exist!



BANKING INSTITUTIONS

Importance of Banks: Non-trivial

- Banks play an important role in channeling funds (about $6 trillion annually) to finance productive investment opportunities.
- They provide loans to businesses, finance college educations, and allow us to purchase homes with mortgages.

The Bank Balance Sheet

- The Balance Sheet is a list of a bank's assets and liabilities
- Total assets = total liabilities + capital

The Bank Balance Sheet

- A bank's balance sheet lists *sources* of bank funds (liabilities) and *uses* to which they are put (assets)
- Banks invest these liabilities (sources) into assets (uses) in order to create value for their capital providers

The Bank Balance Sheet

TABLE 17.1 Balance Sheet of All Commercial Banks (items as a percentage of the total, 2010)

Assets		Liabilities	
Reserves and cash items	2	Checkable deposits	4
Securities		Nontransaction deposits	
U.S. government and agency	9		
State and local government and other securities	8	Small-denomination time deposits (<$100,000) + savings deposits	62
Loans		Large-denomination time deposits	12
Commercial and industrial	9		
Real estate	25	Other liabilities	4
Interbank	3		
Consumer	5	Borrowings	12
Other	32	Bank capital	6
Other assets (for example, physical captial)	7		
Total	100	Total	100

Source: http://www.federalreserve.gov/releases/h8/Current

Flow of funds (tab down to commercial banks)
http://www.federalreserve.gov/releases/z1/current/z1r-4.pdf

Thai Commercial Bank Balance Sheet

Assets		Liabilities	
1. Cash	233,907	14. Deposits	7,864,597
2. Interbank and money market items, net	1,589,805	15. Interbank and money market items, net	716,545
3. Claims on securities	68,746	16. Liabilities payable on demand	52,046
4. Derivatives assets	337,748	17. Liabilities to deliver securities	68,748
5. Investments - net	1,900,741	18. Financial liabilities designated at fair value through profit or loss	16,195
6. Investments in subsidiaries and associates, net	167,173	19. Derivatives liabilities	340,517
7. Loans to customers, net	8,199,588	20. Debt issued and Borrowings	2,004,532
7.1 Credits Loans	8,561,697	21. Bank's liabilities under acceptances	5,151
7.2 Valuation adjustment arising from Hedging	2	22. Provision	59,854
7.3 Accrued Interest Receivables	23,057	23. Deferred tax liabitities	1,643
7.4 Less Deferred Income	85,921	24. Other liabilities	261,004
7.5 Less Allowance for Possible Loan Losses	287,331		**11,390,832**
7.6 Less Revaluation Allowance for Debt Restructuring	11,916		
8. Customers' liabilities under acceptances	5,151		
9. Properites foreclosed, net	110,941		
10. Premises and equipment, net	170,995	**25. Shareholders' Equity**	**1,058,548**
10.1 Land (Net)	78,688	25.1 Isssued and Paid-up Share Capital	387,228
10.2 Building (Net)	59,701	25.1.1 Preferred Share	93
10.3 Equipment and Others (Net)	30,222	25.1.2 Common Share	387,135
10.4 Others (Net)	2,384	25.2 Retained Earnings (Deficits)	458,097
11. Goodwill and other intangible assets, net	41,917	25.3 Other Equity	213,223
12. Deferred tax assets	6,815	26. Head office and other branches of the same Juristic person's Ent	532,006
13. Other assets, net	147,859		
Total Assets	**12,981,386**	Liabilities and Equities / Equity of Head Office	**12,981,386**

The Bank Balance Sheet: Liabilities

- **Deposits**: are the overall primary source of bank liabilities (68%); examples include savings accounts, current accounts and time deposits.
  - CASA are a bank's lowest cost funds because depositors want safety and liquidity and will accept a lesser interest return from the bank in order to achieve such attributes.
- **Interbank and money market**: are ways for banks to borrow from another bank.

The Bank Balance Sheet: Liabilities

- **Debts and Borrowings**: banks obtain funds by borrowing from the BOT, other banks, and corporations; these borrowings are called: discount loans/advances (from the BOT),, commercial paper and notes (from companies and institutional investors), and from issuing Bill of Exchange (B/E) for investors and savers, even promissory notes.
  - Smaller banks have turned to B/E to replace shrinking deposit base due to the lowering of DPA's protection.

The Bank Balance Sheet: Liabilities

- **Bank Capital**: is the source of funds supplied by the *bank owners*, either directly through purchase of ownership shares or indirectly through retention of earnings (retained earnings being the portion of funds which are earned as profits but not paid out as ownership dividends). This is about 3.5% of assets.

The Bank Balance Sheet: Liabilities

- Since assets minus liabilities equals capital, capital is seen as protecting the liability suppliers from asset devaluations or
  write-offs (capital is also called the balance sheet's "shock absorber," thus capital levels are important).

The Bank Balance Sheet: Assets

- **Investment**: these are either. government/agency debts, and other (non-equity) securities held by the bank, either for sales, for hold to maturity, or as trading instruments. These make-up about 14% of assets.
  - Short-term debt security is often referred to as **secondary reserves** because of its high liquidity.

The Bank Balance Sheet: Assets

- **Loans**: representing 63% of assets, these are a bank's income-earning assets, such as business loans, auto loans, and mortgages. These are generally not very liquid.
  - Most banks tend to specialize in either consumer loans or business loans, and even take that as far as loans to specific groups (such as a particular industry).

Asset transformation is, for example, when a bank takes your savings deposits and uses the funds to make, say, a mortgage loan. Banks tend to "*borrow short and lend long*" (in terms of maturity).

- T-account Analysis:
  - —Deposit of $100 cash into First National Bank

First National Bank

Assets		Liabilities	
Vault cash	+$100	Checkable deposits	+$100

- Deposit of $100 check

Assets		Liabilities	
Cash items in process of collection	+$100	Checkable deposits	+$100

First National Bank

Assets		Liabilities	
Reserves	+$100	Checkable deposits	+$100

Second National Bank

Assets		Liabilities	
Reserves	–$100	Checkable deposits	–$100

- Conclusion: When bank receives deposits, reserves ↑ by equal amount; when bank loses deposits, reserves ↓ by equal amount

This simple analysis gets more complicated when we add bank regulations to the picture. For example, if we return to the $100 deposit, recall that banks must maintain reserves, or vault cash. This changes how the $100 deposit is recorded.

Basics of Banking

- T-account Analysis:
  - —Deposit of $100 cash into First National Bank

First National Bank

Assets		Liabilities	
Required reserves	+$10	Checkable deposits	+$100
Excess reserves	+$90		

Basics of Banking

As we can see, $10 of the deposit must remain with the bank to meeting federal regulations. Now, the bank is free to work with the $90 in its asset transformation functions. In this case, the bank loans the $90 to its customers.

Basics of Banking

- T-account Analysis:
  - —Deposit of $100 cash into First National Bank

Assets		Liabilities	
Required reserves	+$10	Checkable deposits	+$100
Loans	+$90		

General Principles of Bank Management

Now let's look at how a bank manages its assets and liabilities. The bank has four primary concerns:

1. Liquidity management
2. Asset management
   - Managing credit risk
   - Managing interest-rate risk
3. Liability management
4. Managing capital adequacy
5. Credit Risk → for later

Liquidity Management

Reserves requirement = 10%, Excess reserves = $10 million

Assets		Liabilities	
Reserves	$20 million	Deposits	$100 million
Loans	$80 million	Bank capital	$ 10 million
Securities	$10 million		

Deposit outflow of $10 million

Assets		Liabilities	
Reserves	$10 million	Deposits	$90 million
Loans	$80 million	Bank capital	$10 million
Securities	$10 million		

- With 10% reserve requirement, bank still has excess reserves of $1 million: no changes needed in balance sheet

No excess reserves

Assets		Liabilities	
Reserves	$ 0	Deposits	$90 million
Loans	$90 million	Bank capital	$10 million
Securities	$10 million		

Deposit outflow of $10 million

Assets		Liabilities	
Reserves	$10 million	Deposits	$100 million
Loans	$90 million	Bank capital	$ 10 million
Securities	$10 million		

- With 10% reserve requirement, bank has $9 million reserve shortfall

1. Borrow from other banks or corporations

Assets		Liabilities	
Reserves	$ 9 million	Deposits	$90 million
Loans	$90 million	Borrowings from other banks or corporations	$ 9 million
Securities	$10 million		
		Bank capital	$10 million

2. Sell securities

Assets		Liabilities	
Reserves	$ 9 million	Deposits	$90 million
Loans	$90 million	Bank capital	$10 million
Securities	$ 1 million		

Liquidity Management: Choices

3. Borrow from Fed

Assets		Liabilities	
Reserves	$ 9 million	Deposits	$90 million
Loans	$90 million	Borrowings from the Fed	$ 9 million
Securities	$10 million	Bank capital	$10 million

4. Call in or sell off loans

Assets		Liabilities	
Reserves	$ 9 million	Deposits	$90 million
Loans	$81 million	Bank capital	$10 million
Securities	$10 million		

- **Conclusion: Excess reserves are insurance against above 4 costs from deposit outflows**

Asset Management

- Asset Management: the attempt to earn the highest possible return on assets while minimizing the risk.
  1. Get borrowers with low default risk, paying high interest rates
  2. Buy securities with high return, low risk
  3. Diversify
  4. Manage liquidity

Liability Management

- Liability Management: managing the source of funds, from deposits, to B/Es, to other debts.
  1. When interest rate goes up, what do banks do?
  2. Can it adjust quantity of deposits?
  3. Can it adjust maturity/duration of deposits?
- It's important to understand that banks now manage both sides of the balance sheet together, whereas it was more separate in the past. Indeed, most banks now manage this via the *asset-liability management committee (ALCO) → more on this later*

Capital Adequacy Management

1. **Bank capital is a cushion that prevents bank failure**. For example, consider these two banks:

High Capital Bank

Assets		Liabilities	
Reserves	$10 million	Deposits	$90 million
Loans	$90 million	Bank capital	$10 million

Low Capital Bank

Assets		Liabilities	
Reserves	$10 million	Deposits	$96 million
Loans	$90 million	Bank capital	$ 4 million

Capital Adequacy Management

What happens if these banks make loans or invest in securities (say, subprime mortgage loans, for example) that end up losing money? Let's assume both banks lose $5 million from bad loans.

Capital Adequacy Management

- Impact of $5 million loan loss

High Capital Bank

Assets		Liabilities	
Reserves	$10 million	Deposits	$90 million
Loans	$85 million	Bank capital	$ 5 million

Low Capital Bank

Assets		Liabilities	
Reserves	$10 million	Deposits	$96 million
Loans	$85 million	Bank capital	–$ 1 million

Conclusion: A bank maintains reserves to lessen the chance that it will become insolvent.

Capital Adequacy Management

2. Higher is bank capital, lower is return on equity
   - *ROA* = Net Profits/Assets
   - *ROE* = Net Profits/Equity Capital
   - *EM* = Assets/Equity Capital
   - *ROE* = *ROA* × *EM*
   - Capital ↑, *EM* ↓, *ROE* ↓
3. Tradeoff between safety (high capital) and ROE
4. Banks also hold capital to meet capital requirements

Measuring Bank Performance

Much like any business, measuring bank performance requires a look at the income statement. For banks, this is separated into three parts:

- Operating Income
- Operating Expenses
- Net Operating Income

Note how this is different from, say, a manufacturing firm's income statement.

Banks' Income Statement (a)

TABLE 17.2 Income Statement for All Federally Insured Commercial Banks, 2009

	Amount ($ billions)		Share of Operating Income or Expenses (%)
Operating Income			
Interest income		482.1	66.5%
Interest on loans	368.8		50.9%
Interest on securities	86.2		11.9%
Other interest	27.1		3.7%
Noninterest income		242.5	33.5%
Service charges on DA	41		5.7%
Other noninterest income	201.5		27.8%
Total operating income		724.6	100%
Operating Expenses			
Interest expense		122.3	17.3%
Interest on deposits	84		11.9%
Interest on fed funds and repos	5.3		0.8%
Other	33		4.7%

Banks' Income Statement (b)

Noninterest expenses		353.1	50.0%
Salaries and empolyee benefits	151		21.4%
Premises and equipment	41.4		5.9%
Other	160.7		22.8%
Provisions for loan losses		230.9	32.7%
Total operating expense		706.3	100.0%
Net Operating Income		18.3	
Gain loss on securities		–0.9	
Extraordinary items net		–3.8	
Income taxes		–4	
Net Income		9.6	

http://www2.fdic.gov/SDI/main4.asp
Go to main site/create or modify report. Choose all commercial banks. Make reasonable assumptions.

Income Statement of Thai CBs

	2011
1. Interest income	534,593
1.1 Loans	397,221
1.2 Transactions with financial institutions and money market	57,925
1.3 Hire purchase and Financial leasing	35,975
1.4 Investments	43,398
1.5 Others	75
2. Interest expenses	214,918
2.1. Deposits	100,795
2.2 Transactions with financial institutions and money market	24,237
2.3 Debt issued and Borrowings	60,209
2.4 Fees from the borrowings	46
2.5 Premium to deposit insurance	29,503
2.6 Others	128
3. Fees and service income	115,878
3.1 Acceptances, aval, and guarantees	6,105
3.2 Credit cards	22,813
3.3 ATM cards and other e-banking services	20,953
3.4 Money transfer and collection	15,491
3.5 Consultance	1,079
3.6 Management fee	6,699
3.7 Underwriting	2,251
3.8 Securities custodian	1,865
3.9 Cheque-related fee	2,228
3.10 Letters of credits	2,060
3.11 Commissions	14,957
3.12 Other fee and services	19,377
4. Fees and service expenses	22,987

Income Statement of Thai CBs

5. Gains (Losses) on tradings and foreign exchange transactions	34,907
6. Gains (Losses) on financial instrument designated at fair value throuth profit (	-231
7. Gains (Losses) on investments	3,483
8. Share of profit (loss) from investment for using equity method	0
9. Others operation incomes	40,178
10. Other operatiing expenses	232,657
10.1 Salaries and employee benefits	108,516
Number of employees	258,506
10.2 Directors' remuneration	458
Number of directors	364
10.3 Premises and equipments	45,408
10.4 Tax and duties	17,237
10.5 Others	61,038
11. Impairment loss of loans and debt securities	62,620
12. Profit (loss) before income tax and extraordinary items	195,626
13. Income tax	48,418
14. Net profit (loss)	147,208

Measuring Bank Performance

As, much like any firm, ratio analysis is useful to measure performance and compare performance among banks. The following slide shows both calculations and historical averages for key bank performance measures.

Recent Trends in Bank Performance Measures (a)

- *ROA* = Net Profits/ Assets
- *ROE* = Net Profits/ Equity Capital
- *NIM* = [Interest Income – Interest Expenses]/ Assets

TABLE 17.3 Measures of Bank Performance, 1980–2009

Year	Return on Assets (ROA) (%)	Return on Equity (ROE) (%)	Net Interest Margin (NIM)(%)
1980	0.77	13.38	3.33
1981	0.79	13.68	3.31
1982	0.73	12.55	3.39
1983	0.68	11.60	3.34
1984	0.66	11.04	3.47
1985	0.72	11.67	3.62
1986	0.64	10.30	3.48
1987	0.09	1.54	3.40
1988	0.82	13.74	3.57
1989	0.50	7.92	3.58
1990	0.49	7.81	3.50
1991	0.53	8.25	3.60
1992	0.94	13.86	3.89
1993	1.23	16.30	3.97

Recent Trends in Bank Performance Measures (b)

- *ROA* = Net Profits/ Assets
- *ROE* = Net Profits/ Equity Capital
- *NIM* = [Interest Income – Interest Expenses]/ Assets

1994	1.20	15.00	3.95
1995	1.17	14.66	4.29
1996	1.19	14.45	4.27
1997	1.23	14.69	4.21
1998	1.18	13.30	3.47
1999	1.31	15.31	4.07
2000	1.19	14.02	3.95
2001	1.15	13.09	3.90
2002	1.30	14.08	3.96
2003	1.38	15.05	3.73
2004	1.28	13.20	3.54
2005	1.30	12.73	3.50
2006	1.28	12.31	3.31
2007	0.81	7.75	3.29
2008	0.03	0.35	3.16
2009	0.05	0.7	2.03

Source: http://www2.fdic.gov/qbp/2010mar/all1a.html.