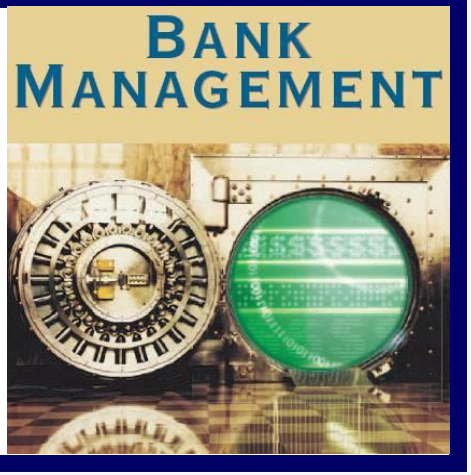
Funding the Bank and Managing Liquidity

Lecture 8



The Relationship Between Liquidity Requirements, Cash, and Funding Sources

- The amount of cash that a bank holds is influenced by the bank's liquidity requirements
- The size and volatility of cash requirements affect the liquidity position of the bank
  - Deposits, withdrawals, loan disbursements, and loan payments affect the bank's cash balance and liquidity position

Effect of Maturing Certificates of Deposit and Loan Use on a Bank's Deposit Balances at the Federal Reserve

Maturing Certificate of Deposit Not Rolled Over

Commercial Bank

ΔASSETS	ΔLIABILITIES	
Demand deposit at Federal Reserve −$100,000	Certificate of deposit −$100,000	CD not rolled over; CD holder directs the Federal Reserve to wire funds to another institution.

Loan Customer Borrows against a Credit Line

Commercial Bank

ΔASSETS	ΔLIABILITIES	
Commercial loans +$250,000		Customer borrows against outstanding credit line.
Demand deposit at Federal Reserve −$250,000		Wire transfer to cover purchase of goods or services.

Borrowing against a New Term Loan

Commercial Bank

ΔASSETS	ΔLIABILITIES	
Commercial loan +$500,000	Demand deposit +$500,000	Bank grants loan and deposits proceeds in customer's account.
Demand deposit at Federal Reserve −$500,000	Demand deposit −$500,000	Customer spends full amount of loan proceeds by writing check.

Recent Trends in Bank Funding Sources

- Bank customers have become more rate conscious
- Many customers have demonstrated a a strong preference for shorter-term deposits
- Core deposits are viewed as increasingly valuable
- Bank often issue hybrid CDs to appeal to rate sensitive depositors

Types of Hybrid CDs

- Jump Rate (Bump-up) CDs
  - Customers have the option (right) to request a change in rate one time prior to maturity.
- Indexed CD
  - CD rates float with some base rate (index) such that the yield changes as the index changes
- CD Special
  - CDs with unusual maturities (13 months or 23 months) in which the bank pays an above market rate. At maturity the CD converts to a traditional 12 month or 2-year CD.

Recent Trends in Bank Funding Sources

- Retail Funding
  - Deposit Accounts
    - Transaction accounts
    - Money market deposit accounts
    - Savings accounts
    - Small time deposits
- Borrowed Funding
  - Federal Funds purchased
  - Repurchase agreements
  - Federal Home Loan Bank borrowings

Recent Trends in Bank Funding Sources

- Wholesale Funding
  - Includes borrowed funds plus large CDs
- Equity Funding
  - Common stock
  - Preferred stock
  - Retained earnings

Recent Trends in Bank Funding Sources

- Volatile Liabilities
  - Funds purchased from rate-sensitive investors
    - Federal Funds purchased
    - Repurchase agreements
    - Jumbo CDs
    - Eurodollar time deposits
    - Foreign Deposits
  - Investors will move their funds if other institutions are paying higher rates

Characteristics of Retail-Type Deposits

- **Retail Deposits**
  - **Small denomination (under $100,000) liabilities**
  - **Normally held by individual investors**
  - **Not actively traded in the secondary market**

Transaction Accounts

- Most banks offer three different transaction accounts
  - Demand Deposits
    - DDAs
  - Negotiable Order of Withdrawal
    - NOWs
  - Automatic Transfers from Savings
    - ATS

Transaction Accounts

- Demand Deposits
  - Checking accounts that do not pay interest
  - Held by individuals, business, and governmental units
    - Most are held by businesses since Regulation Q prohibits banks from paying explicit interest on for-profit corporate checking accounts

Transaction Accounts

- NOW Accounts
  - Checking accounts that pay interest
- ATS Accounts
  - Customer has both a DDA and savings account
  - The bank transfers enough from savings to DDA each day to force a zero balance in the DDA account
- For-profit corporations are prohibited from owning NOW and ATS accounts

Transaction Accounts

- Although the interest cost of transaction accounts is very low, the non-interest costs can be quite high
  - Generally, low balance checking accounts are not profitable for banks due to the high cost of processing checks

Non-Transaction Accounts

- Non-transaction accounts are interest-bearing with limited or no check-writing privileges
- Money Market Deposit Accounts
  - Pay interest but holders are limited to 6 transactions per month, of which only three can be checks
  - Attractive to banks because they are not required to hold reserves against MMDAs

Non-Transaction Accounts

- Savings Accounts
  - Have no fixed maturity
- Small Time Deposits (Retail CDs)
  - Have a specified maturity ranging from 7 days on up
- Large Time Deposits (Jumbo CDs)
  - Negotiable CDs of $100,000 or more
  - Typically can be traded in the secondary market

Estimating the Cost of Deposit Accounts

- Interest Costs
- Legal Reserve Requirements
- Check Processing Costs
- Account Charges
  - NSF fees
  - Monthly fees
  - Per check fees

Estimating the Cost of Deposit Accounts

- Transaction Account Cost Analysis
  - Classifies check-processing as:
    - Deposits
      - Electronic
      - Non-Electronic
    - Withdrawals
      - Electronic
      - Non-Electronic

Estimating the Cost of Deposit Accounts

- Transaction Account Cost Analysis
  - Classifies check-processing as:
    - Transit Checks
      - Deposited
      - Cashed
    - Account Opened or Closed
    - On-Us checks cashed
    - General account maintenance
      - Truncated
      - Non-Truncated

Estimating the Cost of Deposit Accounts

- Transaction Account Cost Analysis
  - Electronic Transactions
    - Conducted through automatic deposits, Internet, and telephone bill payment
  - Non-Electronic Transactions
    - Conducted in person or by mail
  - Transit Checks
    - Checks drawn on any bank other than the bank it was deposited into

Estimating the Cost of Deposit Accounts

- Transaction Account Cost Analysis
  - On-Us Checks Cashed
    - Checks drawn on the bank's own customer's accounts
  - Deposits
    - Checks or currency directly deposited in the customer's account
  - Account Maintenance
    - General record maintenance and preparing & mailing a periodic statement

Estimating the Cost of Deposit Accounts

- Transaction Account Cost Analysis
  - Truncated Account
    - A checking account in which the physical check is ‘truncated’ at the bank and the checks are not returned to the customer
  - Official Check Issued
    - A check for certified funds.
  - Net Indirect Costs
    - Those costs not directly related to the product such as management salaries or general overhead costs

Calculating the Average Net Cost of Deposit Accounts

- **Average Historical Cost of Funds**
  - **Measure of average unit borrowing costs for existing funds**
- **Average Interest Cost**
  - **Calculated by dividing total interest expense by the average dollar amount of liabilities outstanding**

$$\text{Average Net Cost of Bank Liabilities} = \frac{\text{Interest Expense} + \text{Noninterest Expense} - \text{Noninterest Income}}{\text{Average Balance Net of Float} \times (1 - \text{Required Reserve Ratio})}$$

Calculating the Average Net Cost of Deposit Accounts

- **Example:**
  - **A demand deposit account that does not pay interest has $20.69 in transaction costs charges, $7.75 in fees, an average balance of $5,515, and 5% float would have a net cost of 3.29%**

$$\text{Average Net Cost of Demand Deposit} = \frac{\$0 + \$20.69 - \$7.75}{\$5{,}515 \times (1 - .05) \times (1 - .10)} \times 12 = 3.29\%$$

Characteristics of Large Wholesale Liabilities

- **Wholesale Liabilities**
  - **Customers move these investments on the basis of small rate differentials, so these funds are labeled:**
    - **Hot Money**
    - **Volatile Liabilities**
    - **Short-Term Non-Core funding**

Characteristics of Large Wholesale Liabilities

- **Wholesale Liabilities**
  - **Includes:**
    - **Jumbo CDs**
    - **Federal Funds Purchased**
    - **Repurchase Agreements**
    - **Eurodollar Time Deposits**
    - **Foreign Deposits**

Characteristics of Large Wholesale Liabilities

- Jumbo CDs
  - $100,000 or more
  - Negotiable
    - Can be traded on the secondary market
  - Minimum maturity of 7 days
  - Interest rates quoted on a 360-day year basis
  - Insured up to $100,000 per investor per institution
  - Issued directly or indirectly through a dealer or broker (Brokered Deposits)

Characteristics of Large Wholesale Liabilities

- Jumbo CDs
  - Fixed-Rate
  - Variable-Rate
    - Jump Rate (Bump-up) CD
      - Depositor has a one-time option until maturity to change the rate to the prevailing market rate
  - Callable
  - Zero Coupon
  - Stock Market Indexed
    - Rate tied to stock market index performance

Characteristics of Large Wholesale Liabilities

- Individual Retirement Accounts
  - Each year, a wage earner can make a tax-deferred investment up to $3,000 of earned income
  - Funds withdrawn before age 59 ½ are subject to a 10% IRS penalty
    - This makes IRAs an attractive source of long-term funding for banks

Characteristics of Large Wholesale Liabilities

- **Foreign Office Deposits**
  - **Eurocurrency**
    - **Financial claim denominated in a currency other than that of the country where the issuing bank is located**
  - **Eurodollar**
    - **Dollar-denominated financial claim at a bank outside the U.S.**

The Origin and Expansion of Eurodollar Deposits

Stage I: U.S. manufacturer opens $10 million Eurodollar account at Bank of England, London (BE-L).
Stage II: Bank of England, London, opens Eurodollar account at U.S. Money Center Bank, London (MCB-L).
Stage III: U.S. Money Center Bank, London, extends $10 million Eurodollar loan to British corporation in London (MCB-NY).

	U.S. Manufacturer, New York		U.S. Money Center Bank, New York		U.S. Money Center Bank, London		Bank of England, London	
	ΔASSETS	ΔLIABILITIES	ΔASSETS	ΔLIABILITIES	ΔASSETS	ΔLIABILITIES	ΔASSETS	ΔLIABILITIES
Stage I:	Demand deposits due from MCB-NY −$10 million Eurodollar deposit due from BE-L +$10 million			Demand deposits due to U.S. manuf.-NY −$10 million Demand deposit due to BE-L +$10 million			Demand deposit due from MCB-NY +$10 million	Eurodollar deposit due to U.S manuf.-NY +$10 million
Stage II:				Demand deposit due to BE-L −$10 million Demand deposit due to MCB-L +$10 million	Demand deposit due from MCB-NY +$10 million	Eurodollar deposit due to BE-L +$10 million	Demand deposit due from MCB-NY −$10 million Eurodollar deposit due from MCB-L +$10 million	
Stage III:				Demand deposit due to MCB-L −$10 million Demand deposit due to British corp. +$10 million	Demand deposit due from MCB-NY −$10 million Eurodollar loan to British corp. +$10 million			

British Corp., London	
ΔASSETS	LIABILITIES
Demand deposit due from MCB-NY 1$10 million	Eurodollar loan from MCB-L 1$10 million

Characteristics of Large Wholesale Liabilities

- **Federal Funds Purchased**
  - **The term Fed Funds is often used to refer to excess reserve balances traded between banks**
    - **This is grossly inaccurate, given reserves averaging as a method of computing reserves, different non-bank players in the market, and the motivation behind many trades**
  - **Most transactions are overnight loans, although maturities are negotiated and can extend up to several weeks**
  - **Interest rates are negotiated between trading partners and are quoted on a 360-day basis**

Characteristics of Large Wholesale Liabilities

- Repurchase Agreements (RPs or Repos)
  - Short-term loans secured by government securities that are settled in immediately available funds
  - Identical to Fed Funds except they are collateralized
  - Technically, the RPs entail the sale of securities with a simultaneous agreement to buy them back later at a fixed price plus accrued interest

Characteristics of Large Wholesale Liabilities

- Repurchase Agreements (RPs or Repos)
  - Most transactions are overnight
  - In most cases, the market value of the collateral is set above the loan amount when the contract is negotiated.
    - This difference is labeled ***the margin***
  - The lender's transaction is referred to as a Reverse Repo

Characteristics of Large Wholesale Liabilities

- Borrowing from the Federal Reserve
  - Discount Window
  - Discount Rate
    - Policy is to set discount rate 1% (1.5%) over the Fed Funds target for primary (secondary) credit loans
    - To borrow from the Federal Reserve, banks must apply and provide acceptable collateral before the loan is granted
      - Eligible collateral includes U.S. government securities, bankers acceptances, and qualifying short-term commercial or government paper

Characteristics of Large Wholesale Liabilities

- Borrowing from the Federal Reserve
  - Primary Credit
    - Available to generally sound depository institutions on a very short-term basis, typically overnight
    - It serves as a backup source of short-term funds for sound depository institutions
  - Secondary Credit
    - Available to depository institutions that are not eligible for primary credit

Characteristics of Large Wholesale Liabilities

- Borrowing from the Federal Reserve
  - Seasonal Credit
    - Designed to assist small depository institutions in managing significant seasonal swings in their loans and deposits
  - Emergency Credit
    - May be authorized in unusual and exigent circumstances by the Board of Governors to individuals, partnerships, and corporations that are not depository institutions

Characteristics of Large Wholesale Liabilities

- **Federal Home Loan Bank Advances**
  - **The FHLB system is a government-sponsored enterprise created to assist in home buying**
  - **The FHLB system is one of the largest U.S. financial institutions, rated AAA because of the government sponsorship**
  - **Any bank can become a member of the FHLB system by buying FHLB stock**
  - **If it has the available collateral, primarily real estate related loans, it can borrow from the FHLB**
  - **FHLB *advances* have maturities from 1 day to as long as 20 years**

Electronic Money

- Intelligent Card
  - Contains a microchip with the ability to store and secure information
- Memory Card
  - Simply store information
- Debit Card
  - Online
    - PIN based
    - Transaction goes through the ATM system
  - Offline
    - Signature based transactions
    - Transaction goes through the credit card system

The Check Clearing Process

Bay Area National Bank, San Jose

ΔASSETS		ΔLIABILITIES	
1. CIPC	+$500	Demand deposit owed the business	+$500
4. CIPC	−$500		
Demand deposit at BOC	+$500		

Bank of California, San Francisco

ΔASSETS		ΔLIABILITIES	
2. CIPC	1$500	Demand deposit (BANB)	1$50
5. CIPC	−$500		
Demand deposit at FRB of San Francisco	+$500		

Federal Reserve Bank of San Francisco

ΔASSETS		ΔLIABILITIES	
3. CIPC	+$500	DACI	+$500
5.		DACI	−$500
		Demand deposit (BOC)	+1$500
6. CIPC	−$500	Demand deposit (CNB)	−$500

Community National Bank, Portland

ΔASSETS		ΔLIABILITIES	
6. Demand deposit at FRB of San Francisco	−$500	Demand deposit owed the individual	−$500

Check Clearing Process

- Banks typically place a hold on a check until it verifies that the check is “good”
- Expedited Funds Availability Act
  - Under Reg CC, it states that:
    - Local check must clear in no more than two business days
    - Non-local checks must clear in no more than five business days
    - Government, certified, and cashiers checks must be available by 9 a.m. the next business day

Measuring the Cost of Funds

- **Average Historical Cost of Funds**
  - **Many banks incorrectly use the average historical costs in their pricing decisions**
  - **The primary problem with historical costs is that they provide no information as to whether future interest costs will rise or fall.**
    - **Pricing decisions should be based on *marginal costs* compared with *marginal revenues***

Measuring the Cost of Funds

- Marginal Cost of Funds
  - Marginal Cost of Debt
    - Measure of the borrowing cost paid to acquire one additional unit of investable funds
  - Marginal Cost of Equity
    - Measure of the minimum acceptable rate of return required by shareholders
  - Marginal Cost of Funds
    - The marginal costs of debt and equity

Measuring the Cost of Funds

- **Costs of Independent Sources of Funds**
  - **It is difficult to measure marginal costs precisely**
  - **Management must include both the interest and noninterest costs it expects to pay and identify which portion of the acquired funds can be invested in earning assets.**
  - **Marginal costs may be defined as :**

$$\text{Marginal Cost of Liability } j = \frac{\text{Interest Rate} + \text{Servicing Costs} + \text{Acquistion Costs} + \text{Insurance}}{\text{Net Investable Balance of Liability } j}$$

Measuring the Cost of Funds

- **Costs of Independent Sources of Funds**
  - **All elements in the numerator are *expected* costs**

Measuring the Cost of Funds

- **Costs of Independent Sources of Funds**
  - **Example:**
    - **Market interest rate is 2.5%**
    - **Servicing costs are 4.1% of balances**
    - **Acquisition costs are 1.0% of balances**
    - **Deposit insurance costs are 0.25% of balances**
    - **Net investable balance is 85% of the balance (10% required reserves and 5% float)**

$$\text{Marginal Cost} = \frac{0.025 + 0.041 + 0.01 + 0.0025}{0.85} = 0.0924 = 9.24\%$$

Measuring the Cost of Funds

- **Cost of Debt**
  - **Equals the effective cost of borrowing from each source, including interest expense and transactions costs**
  - **This cost is the discount rate, which equates the present value of expected interest and principal payments with the net proceeds to the bank from the issue**

Measuring the Cost of Funds

- **Cost of Debt**
  - **Example:**
    - **Assume the bank will issue:**
      - **$10 million in par value subordinated notes paying $700,000 in annual interest and a 7-year maturity.**
      - **It must pay $100,000 in flotation costs to an underwriter.**
      - **The effective cost of borrowing (k_d) is 7.19%:**

$$\$9{,}900{,}000 = \sum_{t=1}^{7} \frac{\$700{,}000}{(1+k_d)^t} + \frac{\$10{,}000{,}000}{(1+k_d)^7}$$

$$\text{Thus } k_d = 7.19\%$$

Measuring the Cost of Funds

- Cost of Equity
  - The marginal cost of equity equals the required return to shareholders
    - It is not directly measurable because dividend payments are not mandatory.
  - Several methods are commonly used to approximate this required return:
    - Dividend Valuation Model
    - Capital Asset Pricing Model (CAPM)
    - Target Return on Equity Model
      - Cost of Debt + Risk Premium

Measuring the Cost of Funds

- **Preferred Stock**
  - **Preferred stock acts as a hybrid of debt and common equity**
    - **Claims are superior to those of common stockholders but subordinated to those of debt holders**
    - **Preferred stock pays dividends that may be deferred when management determines that earnings are too low.**
    - **The marginal cost of preferred stock can be approximated in the same manner as the Dividend Valuation Model however, dividend growth is zero**

Measuring the Cost of Funds

- **Trust Preferred Stock**
  - **Trust preferred stock is attractive because it effectively pays dividends that are tax deductible**
    - **To issue the securities, a bank or bank holding company establishes a trust company.**
    - **The trust company sells preferred stock to investors and loans the proceeds of the issue to the bank**
    - **Interest on the loan equals dividends paid on the preferred stock**
    - **This loan interest is tax deductible such that the bank effectively gets to deduct dividend payments as the preferred stock**

Measuring the Cost of Funds

- **Weighted Marginal Cost of Total Funds**
  - **This is the best cost measure for asset-pricing purposes**
  - **It recognizes both explicit and implicit costs associated with any single source of funds**
  - **It assumes that all assets are financed from a pool of funds and that specific sources of funds are not tied directly to specific uses of funds**

Measuring the Cost of Funds

- **Weighted Marginal Cost of Total Funds**
  - **Steps to compute WMC**
    1. **Forecast the desired dollar amount of financing to be obtained from each individual debt and equity source**
    2. **Estimate the marginal cost of each independent source of funds**
    3. **Combine the individual estimates to project the weighted costs, which equals the sum of the weighted component costs across all sources**

Measuring the Cost of Funds

- **Weighted Marginal Cost of Total Funds**
  - **Steps to compute WMC**
    4. **Management should combine the individual estimates to project the weighted cost, where w_j equals each source's weight and k_j equals the single-source j component cost of financing such that:**

$$WMC = \sum_{j=1}^{m} w_j k_j$$

Measuring the Cost of Funds

- **Example**

Liabilities and Equity	(a) Average Amount	(b) Percent of Total	(c) Interest Cost	(d) Processing and Acquisition Costs	(e) Nonearning Percentage	(f) Component Marginal Costs	(g) Weighted Marginal Cost of Funds (b) x (f)
Demand deposits	$ 28,210	31.0%		8.0%	18.0%	9.76%	0.0302
Interest checking	$ 5,551	6.1%	2.5%	6.5%	15.0%	10.59%	0.0065
Money market demand accounts	$ 13,832	15.2%	3.5%	3.0%	3.0%	6.70%	0.0102
Other savings accounts	$ 3,640	4.0%	4.5%	1.2%	1.5%	5.79%	0.0023
Time deposits < $100,000	$ 18,382	20.2%	4.9%	1.4%	1.0%	6.36%	0.0129
Time deposits > $100,000	$ 9,055	10.0%	5.0%	0.3%	0.5%	5.34%	0.0053
Total deposits	$ 78,670	86.5%					
Federal funds purchased	$ 182	0.2%	5.0%	0.0%	0.0%	5.00%	0.0001
Other liabilities	$ 4,550	5.0%		0.0%	40.0%	0.00%	
Total liabilities	$ 83,402	91.7%					
Stockholders' equity	$ 7,599	8.4%	18.9%*		4.0%	19.69%	0.0164
Total liabilities and equity	$ 91,001	100.0%					
Weighted marginal cost of capital ——————————————————————————>							8.39%

Funding Sources and Banking Risks

- **Banks face two fundamental problems in managing liabilities. Uncertainty over:**
  - **What rates they must pay to retain and attract funds**
  - **The likelihood that customers will withdraw their money regardless of rates**

Funding Sources: Liquidity Risk

- The liquidity risk associated with a bank's deposit base is a function of:
  - The competitive environment
  - Number of depositors
  - Average size of accounts
  - Location of the depositor
  - Specific maturity and rate characteristics of each account

Funding Sources: Liquidity Risk

- **Interest Elasticity**
  - **How much can market interest rates change before the bank experiences deposit outflows?**
  - **If a bank raises its rates, how many new funds will it attract?**
  - **Depositors often compare rates and move their funds between investment vehicles to earn the highest yields**
  - **It is important to note the liquidity advantage that stable core deposits provide a bank**

Funding Sources: Interest Rate Risk

- Today, many depositors and investors prefer short-term instruments that can be rolled over quickly as interest rates change
- Banks must offer a substantial premium to induce depositors to lengthen maturities
- Those banks that choose not to pay this premium will typically have a negative one-year GAP

Funding Sources: Interest Rate Risk

- One strategy is to compete for aggressively compete for retail core deposits
  - Individual are not as rate sensitive as corporate depositors and will often maintain their balances through rate cycles as long as the bank provides good service

Funding Sources: Credit and Capital Risk

- Changes in the composition and cost of bank funds can indirectly affect a bank's credit risk by forcing it to reduce asset quality
  - For example, banks that substitute purchased funds for lost demand deposits will often see their cost of funds rise
  - Rather than let their interest margins deteriorate, many banks make riskier loans at higher promised yields
  - While they might maintain their margins in the near-term, later loan losses typically rise with the decline in asset quality

Holding Liquid Assets

- Banks hold cash assets to satisfy four objectives:
  1. To meet customers' regular transaction needs
  2. To meet legal reserve requirements
  3. To assist in the check-payment system
  4. To purchase correspondent banking services

Holding Liquid Assets

- Banks own four types of liquid assets
  - Vault Cash
  - Demand Deposit Balances at the Federal Reserve
  - Demand Deposit Balances at private financial institutions
  - Cash Items in Process of Collection (CIPC)

Holding Liquid Assets

- "Cash Assets"
  - Do not earn any interest
  - Represents a substantial opportunity cost for banks
    - Banks attempt to minimize the amount of cash assets held and hold only those required by law or for operational needs
- Liquid Assets
  - Can be easily and quickly converted into cash with minimum loss

Holding Liquid Assets

- **“Cash Assets” do not generally satisfy a bank’s liquidity needs**
  - **If the bank holds the minimum amount of cash assets required, an unforeseen drain on vault cash (perhaps from an unexpected withdrawal) will cause the level of cash to fall below the minimum for legal and operational requirements**

Holding Liquid Assets

- **Assets That Provide Bank Liquidity**
  - **Cash and due from banks in excess of requirements**
  - **Federal funds sold**
  - **Reverse repurchase agreements**
  - **Short-term Treasury and agency obligations**
  - **High-quality, short-term corporate and municipal securities**

Holding Liquid Assets

- For a financial institution that regularly borrows in the financial markets, liquidity takes on the added dimension of the ability to borrow funds at minimum cost or even the ability to issue stock.
  - It explicitly recognizes that such firms can access cash by:
    - Selling assets
    - New borrowings
    - New stock issues
  - Bank Liquidity
    - Refers to a bank's capacity to acquire immediately available funds at a reasonable price

Objectives of Cash Management

- Banks must balance the desire to hold a minimum amount of cash assets while meeting the cash needs of its customers
- The fundamental goal is to accurately forecast cash needs and arrange for readily available sources of cash at minimal cost

Reserve Balances at the Federal Reserve Bank

- **Banks hold deposits at the Federal Reserve because:**
  - **The Federal Reserve imposes legal reserve requirements and deposit balances qualify as legal reserves**
  - **To help process deposit inflows and outflows caused by check clearings, maturing time deposits and securities, wire transfers, and other transactions**

Reserve Balances at the Federal Reserve Bank

- Required Reserves and Monetary Policy
  - The purpose of required reserves is to enable the Federal Reserve to control the nation's money supply
  - The Fed has three distinct monetary policy tools:
    - Open market operations
    - Changes in the discount rate
    - Changes in the required reserve ratio

Reserve Balances at the Federal Reserve Bank

- **Required Reserves and Monetary Policy**
  - **Changes in reserve requirements directly affect the amount of legal required reserves and thus change the amount of money a bank can lend out**

Reserve Balances at the Federal Reserve Bank

- **Required Reserves and Monetary Policy**
  - **For example, a required reserve ratio of 10% means that a bank with $100 in demand deposits outstanding must hold $10 in legal required reserves in support of the DDAs**
    - **The bank can thus lend out only 90% of its DDAs**
  - **If the bank has exactly $10 in legal reserves, the reserves do not provide the bank with liquidity**
    - **If the bank has $12 in legal reserves, $2 is excess reserves, providing the bank with $2 in immediately available funds**

Reserve Balances at the Federal Reserve Bank

- **Impact of Sweep Accounts on Required Reserve Balances**
  - **Under Reg. D, banks have reserve requirements of 10% on demand deposits, ATS, NOW, and other checkable deposit (OCD) accounts**
  - **MMDAs are considered personal saving deposits and have a zero required reserve requirement ratio.**
  - **Sweep accounts are accounts that enable depository institutions to shift funds from OCDs, which are reservable, to MMDAs or other accounts, which are not reservable**

Reserve Balances at the Federal Reserve Bank

- Sweep Accounts
  - Two Types
    - Weekend Program
      - Reclassifies transaction deposits as savings deposits at the close of business on Friday and back to transaction accounts at the open on Monday
      - On average, this means that for three days each week, the bank does not need to hold reserves against those balances

Reserve Balances at the Federal Reserve Bank

- Sweep Accounts
  - Two Types
    - Threshold Account
      - The bank's computer moves the customer's DDA balance into an MMDA when the dollar amount reaches some minimum and returns funds as needed
      - The number of transfers is limited to 6 per month, so the full amount of funds must be moved back into the DDA on the sixth transfer of the month

Meeting Legal Reserve Requirements

- Required reserves can be met over a two-week period
- There are three elements of required reserves:
  - The dollar magnitude of base liabilities
  - The required reserve fraction
  - The dollar magnitude of qualifying cash assets

Meeting Legal Reserve Requirements

Type of Deposit		Percentage	Effective Date of Applicable Percentages
Net transactions Accounts			
Exempt amt.	$ 7.00 mill	0.00%	12/23/2004
Up to	$ 47.60 mill	3.00%	12/23/2004
Over	$ 47.60 mill	10.00%	12/23/2004
All other liabilities		0.00%	12/27/1990

Meeting Legal Reserve Requirements

- **Historical Problems with Reserve Requirements**
  - **Historically, reserve requirements varied with the type of bank charter and each bank's geographic location**
  - **Currently, banks use a lagged reserve account (LRA) system**
    - **Reserves are held for a two-week period against deposit liabilities held for the two-week period ending almost three weeks earlier**

Meeting Legal Reserve Requirements

- Lagged Reserve Accounting
  - Computation Period
    - Consists of two one-week reporting periods beginning on a Tuesday and ending on the second Monday thereafter
  - Maintenance Period
    - Consists of 14 consecutive days beginning on a Thursday and ending on the second Wednesday thereafter

Meeting Legal Reserve Requirements

- Lagged Reserve Accounting
  - Reserve Balance Requirements
    - The balance to be maintained in any given maintenance period is measured by:
      - Reserve requirements on the reservable liabilities calculated as of the computation period that ended 17 days prior to the start of the maintenance period
      - Less vault cash as of the same computation period

Meeting Legal Reserve Requirements

- **Lagged Reserve Accounting**
  - **Reserve Balance Requirements**
    - **Both vault cash and Federal Reserve Deposits qualify as reserves**
    - **The portion that is not met by vault cash is called the *reserve balance requirement***

Reserve Requirement Percentages for Depository Institutions

Type of Deposit		Percentage	Effective Date of Applicable Percentages
Net transactions accounts			
Exempt amt.	$ 7.0 mill	0.0%	12/23/2004
Up to	$ 47.6 mill	3.0%	12/23/2004
Over	$ 47.6 mill	10.0%	12/23/2004
All other liabilities		0.0%	12/27/1990

Correspondent Banking Services

- **System of interbank relationships in which the *correspondent bank* (upstream correspondent) sells services to the *respondent bank* (downstream correspondent)**

Correspondent Banking Services

- Common Correspondent Banking Services
  - Check collection, wire transfer, coin and currency supply
  - Loan participation assistance
  - Data processing services
  - Portfolio analysis and investment advice
  - Federal funds trading
  - Securities safekeeping
  - Arrangement of purchase or sale of securities
  - Investment banking services
  - International financial transactions

Liquidity Planning

- **Short-Term Liquidity Planning**
  - **Objective is to manage a legal reserve position that meets the minimum requirement at the lowest cost**

Short-Term Liquidity Planning

- **Below are some of the factors that affect the bank's legal reserve position**

Factors Increasing Reserves	Factors Decreasing Reserves
Nondiscretionary	*Nondiscretionary*
Yesterday's immediate cash letter	Remittances charged
Deferred availability items	Deficit in local clearinghouse
Excess from local clearinghouse	Treasury tax and loan account calls
Deposits from U.S. Treasury	Maturing certificates of deposit, Eurodollars not rolled over
Discretionary	*Discretionary*
Currency/coin shipped to Federal Reserve	Currency and coin received from Federal Reserve
Security sales	Security purchases
Borrowing from Federal Reserve	Payment on loans from Federal Reserve
Federal funds purchased	Federal funds sold
Securities sold under agreement to repurchase	Securities purchased under agreement to resell
Interest payments on securities	
New certificates of deposit, Eurodollar issues	

Managing Float

- During any single day, more than $100 million in checks drawn on U.S. commercial banks is waiting to be processed
  - Individuals, businesses, and governments deposit the checks but cannot use the proceeds until banks give their approval, typically in several days.
  - Checks in process of collection, called ***float***, are a source of both income and expense to banks.

The Payments System

- Payments between banks can be made either by check or electronically
  - Checks drawn against transactions accounts are presented to the customer's bank for payment and ultimately "cleared" by reducing the bank's deposit balance at the Federal Reserve or a correspondent bank
  - Payments made electronically directly and immediately alter balances held at Federal Reserve Banks

The Payments System

Example of the Check Clearing Process

Bay Area National Bank, San Jose

ΔASSETS		ΔLIABILITIES	
1. CIPC	+$500	Demand deposit owed the business	+$500
4. CIPC	−$500		
Demand deposit at BOC	+$500		

Bank of California, San Francisco

ΔASSETS		ΔLIABILITIES	
2. CIPC	1$500	Demand deposit (BANB)	1$50
5. CIPC	−$500		
Demand deposit at FRB of San Francisco	+$500		

Federal Reserve Bank of San Francisco

ΔASSETS		ΔLIABILITIES	
3. CIPC	+$500	DACI	+$500
5.		DACI	−$500
		Demand deposit (BOC)	+1$500
6. CIPC	−$500	Demand deposit (CNB)	−$500

Community National Bank, Portland

ΔASSETS		ΔLIABILITIES	
6. Demand deposit at FRB of San Francisco	−$500	Demand deposit owed the individual	−$500

The Payments System

- Electronic Funds Transfer Networks
  - Fedwire
    - Operated by the Federal Reserve
  - Clearinghouse Interbank Payments System (CHIPS)
    - Operated by New York Clearing House
    - Typically handles Eurodollar transfers or foreign exchange trading

Liquidity versus Profitability

- There is a short-run trade-off between liquidity and profitability
  - The more liquid a bank is, the lower are its return on equity and return on assets, all other things equal
    - In a bank's loan portfolio, the highest yielding loans are typically the least liquid
    - The most liquid loans are typically government-guaranteed loans

The Relationship Between Liquidity, Credit, and Interest Rate Risk

- Liquidity risk for a poorly managed bank closely follows credit and interest rate risk
  - Banks that experience large deposit outflows can often trace the source to either credit problems or earnings declines from interest rate gambles that backfired
- Potential liquidity needs must reflect estimates of new loan demand and potential deposit losses

The Relationship Between Liquidity, Credit, and Interest Rate Risk

- New Loan Demand
  - Unused commercial credit lines outstanding
  - Consumer credit available on bank-issued cards
  - Business activity and growth in the bank's trade area
  - The aggressiveness of the bank's loan officer call programs

The Relationship Between Liquidity, Credit, and Interest Rate Risk

- Potential deposit losses are affected by:
  - The composition of liabilities
  - Insured versus uninsured deposits
  - Deposit ownership between: money fund traders, trust fund traders, public institutions, commercial banks by size, corporations by size, individuals, foreign investors, and Treasury tax and loan accounts
  - Large deposits held by any single entity
  - Seasonal or cyclical patterns in deposits
  - The sensitivity of deposits to changes in the level of interest rates

Traditional Aggregate Measures of Liquidity Risk

- **Asset Liquidity Measures**
  - **The most liquid assets mature near term and are highly marketable**
  - **Any security or loan with a price above par, in which the bank could report a gain at sale, is viewed as highly liquid**
  - **Liquidity measures are normally expressed in percentage terms as a fraction of total assets**

Traditional Aggregate Measures of Liquidity Risk

- **Highly Liquid Assets**
  - **Cash and due from banks in excess of required holdings**
  - **Federal funds sold and reverse RPs.**
  - **U.S. Treasury securities and agency obligations maturing within one year**
  - **Corporate obligations and municipal securities maturing within one year and rated Baa and above**
  - **Loans that can be readily sold and/or securitized**

Pledging Requirements

- Not all of a bank's securities can be easily sold
  - Like their credit customers, banks are required to pledge collateral against certain types of borrowings
  - U.S. Treasuries or municipals normally constitute the least-cost collateral and, if pledged against debt, cannot be sold until the bank removes the claim or substitutes other collateral

Pledging Requirements

- Collateral is required against four different liabilities:
  - Repurchase agreements
  - Discount window borrowings
  - Public deposits owned by the U.S. Treasury or any state or municipal government unit
  - FLHB advances

Liability Liquidity Measures

- **Liability Liquidity**
  - **The ease with which a bank can issue new debt to acquire clearing balances at reasonable costs.**
  - **Measures typically reflect a bank's asset quality, capital base, and composition of outstanding deposits and other liabilities.**

Liability Liquidity Measures

- The following measures are commonly used:
  - Total equity to total assets
  - Risk assets to total assets
  - Loan losses to net loans
  - Reserve for loan losses to net loans
  - The percentage composition of deposits
  - Total deposits to total liabilities
  - Core deposits to total assets
  - Federal funds purchased and RPs to total liabilities
  - Commercial paper and other short-term borrowings to total liabilities.

Liability Liquidity Measures

- **Volatile Deposits**
  - **The difference between actual current deposits and the base estimate of core deposits**

Longer-Term Liquidity Planning

- Projections are separated into:
  - Base Trend
  - Short-Term Seasonal
  - Cyclical
- Liquidity Needs
  - Equals
    - Forecasted change in loans + change in required reserves – forecasted change in deposits

Monthly liquidity needs

- **The bank's monthly liquidity needs are estimated as the forecasted change in loans plus required reserves minus the forecast change in deposits:**
  - **Liquidity needs =**
    Forecasted ΔLoans + ΔRequired reserves - forecasted ΔDeposits

Estimates of Liquidity Needs

End of Month	ΔDeposits	ΔRequired Reserves	ΔLoans	Liquidity Needs*
January	11.0	1.1	$ 33.0	$42.9
February	56.0	5.6	-24.0	-74.4
March	110.0	11.0	-48.0	-147.0
April	153.0	15.3	-51.0	-188.7
May	56.0	5.6	10.0	-40.4
June	-25.0	-2.5	106.0	128.5
July	-72.0	-7.2	216.0	280.8
August	-26.0	-2.6	211.0	234.4
September	19.0	1.9	177.0	159.9
October	96.0	9.6	129.0	42.6
November	155.0	15.5	125.0	-14.5
December	96.0	9.6	168.0	81.6

Liquidity GAP measures

- **Management can supplement this information with projected changes in purchased funds and investments with specific loan and deposit flows.**
- **The bank can calculate a liquidity GAP by classifying potential uses and sources of funds into separate time frames according to their cash flow characteristics.**
- **The Liquidity GAP for each time interval *equals the dollar value of uses of funds minus the dollar value of sources of funds.***

Liquidity gap estimates (millions of dollars)

	0–30 Days	31–90 Days	91–365 Days
Potential Uses of Funds			
Add: Maturing time deposits			
Small time deposits	5.5	8.0	34.0
Certificates of deposit over $100,000	40.0	70.0	100.0
Eurodollar deposits	10.0	10.0	30.0
Plus: Forecast new loans			
Commercial loans	60.0	112.0	686.0
Consumer loans	22.0	46.0	210.0
Real estate and other loans	31.0	23.0	223.0
Minus: Forecast net change in transactional accounts			
Demand deposits	- 6.5	105.5	10.0
NOW accounts	0.4	5.5	7.0
Money market deposit accounts	1.6	3.0	6.0
Total uses	$173.0	155.0	1,260.0
Potential Sources of Funds			
Add: Maturing investments			
Money market instruments	8.0	16.5	36.5
U.S. Treasury and agency securities	7.5	10.5	40.0
Municipal securities	2.5	1.0	12.5
Plus: Principal payments on loans	80.0	262.0	903.0
Total sources	98.0	290.0	992.0
Periodic Liquidity GAP	75.0	-135.0	268.0
Cumulative Liquidity GAP	75.0	- 60.0	208.0

Potential funding sources (millions of dollars)

	Time Frame		
	0–30 Days	31–90 Days	91–365 Days
Purchased Funds Capacity			
Federal funds purchased (overnight and term)	$20	$20	$30
Repurchase agreements	10	10	10
Negotiable certificates of deposit			
Local	50	50	60
National	20	20	25
Eurodollar certificates of deposit	20	20	20
Total	$120	$120	$145
Additional Funding Sources			
Reductions in federal funds sold	$5	$5	$5
Loan participations	20	20	20
Sale of money market securities	5	5	5
Sale of unpledged securities	10	10	10
Total	$40	$40	$40
Potential Funding Sourcesa	$160	$160	$185
Potential Extraordinary Funding Needs			
50% of outstanding letters of credit	5	10	15
20% of unfunded loan commitments	25	30	35
Total	$30	$40	$50
Excess Potential Funding Sources	$130	$120	$135

Considerations in Selecting Liquidity Sources

- **Asset Sales**
  - **Brokerage fees**
  - **Securities gains or losses**
  - **Foregone interest income**
  - **Any increase or decrease in taxes**
  - **Any increase or decrease in interest receipts**

Considerations in Selecting Liquidity Sources

- New Borrowings
  - Brokerage fees
  - Required reserves
  - FDIC insurance premiums
  - Servicing or promotion costs
  - Interest expense

Considerations in Selecting Liquidity Sources

- The costs should be evaluated in present value terms because interest income and expense may arise over time
- The choice of one source over another often involves an implicit interest rate forecast