Principles of Finance

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Show graphically and explain verbally what happens in the Bond market if expected returns in the economy decrease.

Calculate the liquidity premium for a multi-year bond with a current 5% annual bond interest rate and a maturity in 3 years if the (expected future) one-year bond interest rates are 2%, 4%, and 6% in years 1, 2, and 3 respectively.

A company has just announced a 2-for-1 stock split, edective immediately. Prior to the split, the company had a market value of $6 billion with 100 million shares outstanding. Assuming that the split conveys no new information about the company, what is the value of the company, the number of shares outstanding, and price per share after the split? If the actual market price immediately following the split is $32.00 per share, what does this tell us about market e=ciency?

How does the adverse selection problem manifest itself in the securities markets? Do you think the advserse selection problem would be more severe for stocks traded on the London Stock Exchange or those traded over-the-counter? Explain.

How do $nancial intermediaries deal with the moral hazard problem? Give two examples.

How can unexpected deeation (the opposite of ineation) cause a decrease in lending?

Review

There will be some time for discussing speci$c questions / problems in our last session.

Send me the speci$c questions / problems you want me to discuss until Monday, January 19th.

Banking and the Management of Financial Institutions

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

Assets

- Reserves
- Cash items in process of collection
- Deposits at other banks
- Securities
- Loans
- Other assets

Liabilities

- Checkable deposits
- Nontransaction deposits
- Borrowings
- Bank capital

Balance Sheet of All Commercial Banks

(items as a percentage of the total, June 2011

Assets		Liabilities	
Reserves and cash items	16	Checkable deposits	2
Securities		Nontransaction deposits	
U.S. government and agency	14		
State and local government and other securities	8	Small-denomination time deposits (<$100,000) + savings deposits	58
Loans		Large-denomination time deposits	11
Commercial and industrial	11		
Real estate	26	Other liabilities	6
Interbank	1		
Consumer	8	Borrowings	12
Other	7	Bank capital	11
Other assets (for example, physical capital)	9		
Total	100	Total	100

The Bank Balance Sheet: Liabilities

Checkable Deposits accounts that allow the owner (depositor) to write checks to third parties

- non-interest earning checking accounts
- money-market deposit accounts
- Lowest cost funds - safe and liquid, but oder low interest.
- Make up about 4% of bank liabilities.

Nontransaction Deposits primary source of bank liabilities (69%) and are accounts from which the depositor cannot write checks

- savings accounts
- time deposits (CDs or certi$cates of deposit)
- Highest cost of funding, but most stable for bank

The Bank Balance Sheet: Liabilities

Borrowings funds from the Central Bank, other banks, and corporations

- discount loans/advances (from the Central Bank)
- Central Bank funds (from other banks)
- interbank odshore (dollar) deposits (from other banks),
- repurchase agreements (a.k.a., ReposS)
- commercial paper and notes
- More volatile than other liabilities, make up 12% of bank liabilities

Bank Capital is the source of funds supplied by the bank owners

- About 11% of assets.

The Bank Balance Sheet: Assets

- Reserves, Cash items in Process of Collection, and Deposits at Other Banks are collectively referred to as Cash Items.
- Account for 16% of assets

Reserves funds held in account with the Fed (vault cash as well).
- Required reserves represent what is required by law under current required reserve ratios.
- Any reserves beyond this area called excess reserves.

Cash items in Process of Collection checks deposited at a bank, funds from other bank have not yet been transferred.

Deposits at Other Banks usually deposits from small banks at larger banks (referred to as correspondent banking)

The Bank Balance Sheet: Assets

Securities
- government / agency debt
- municipal debt
- other (non-equity) securities
- These make-up about 22% of assets.
- Short-term Treasury debt is a secondary reserve because of its high liquidity.

Loans a bank's income-earning assets
- business loans, auto loans, and mortgages
- Not very liquid
- About 53% of assets

Other Assets bank buildings, computer systems, and other equipment.

Basic Banking: Cash Deposit

Opening of a checking account leads to an increase in the bank's reserves equal to the increase in checkable deposits

First National Bank		First National Bank	
Assets	Liabilities	Assets	Liabilities
Vault Cash +$100	Checkable deposits +$100	Reserves +$100	Checkable deposits +$100

Basic Banking: Cash Deposit

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

When a bank receives additional deposits, it gains an equal amount of reserves; when it loses deposits, it loses an equal amount of reserves

First National Bank		Second National Bank	
Assets	Liabilities	Assets	Liabilities
Reserves +$100	Checkable deposits +$100	Reserves -$100	Checkable deposits -$100

Basic Banking: Making a Pro- t

Asset transformation: selling liabilities with one set of characteristics and using the proceeds to buy assets with a diderent set of characteristics
The bank borrows short and lends long (in terms of maturity).

First National Bank	
Assets	Liabilities
Required reserves +$100	Checkable deposits +$100
Excess reserves +$90	

First National Bank	
Assets	Liabilities
Required reserves +$100	Checkable deposits +$100
Loans +$90	

General Principles of Bank Management

- Liquidity Management
- Asset Management
  - Credit Risk
  - Interest-rate Risk
- Liability Management
- Capital Adequacy Management

Liquidity Management: Ample Excess Reserves

- Bank regulations complicate the picture.
- Bank may be required to hold a minimum reserve

- Suppose bank's required reserves are 10%
- If a bank has ample excess reserves, a deposit outeow does not necessitate changes in other parts of its balance sheet

Assets		Liabilities	
Reserves	$20M	Deposits	$100M
Loans	$80M	Bank Capital	$10M
Securities	$10M		

Assets		Liabilities	
Reserves	$10M	Deposits	$90M
Loans	$80M	Bank Capital	$10M
Securities	$10M		

Liquidity Management: Shortfall in Reserves

Reserves are a legal requirement and the shortfall must be eliminated
Excess reserves are insurance against the costs associated with deposit outeows

Assets		Liabilities	
Reserves	$10M	Deposits	$100M
Loans	$90M	Bank Capital	$10M
Securities	$10M		

Assets		Liabilities	
Reserves	$0	Deposits	$90M
Loans	$90M	Bank Capital	$10M
Securities	$10M		

Liquidity Management: Borrowing

Cost incurred is the interest rate paid on the borrowed funds

Assets		Liabilities	
Reserves	$9M	Deposits	$90M
Loans	$90M	Borrowing	$9M
Securities	$10M	Bank Capital	$10M

Liquidity Management: Securities Sale

The cost of selling securities is the brokerage and other transaction costs

Assets		Liabilities	
Reserves	$9M	Deposits	$90M
Loans	$90M	Bank Capital	$10M
Securities	$1M		

Liquidity Management: Central Bank

Borrowing from the Central Bank also incurs interest payments based on the discount rate

Assets		Liabilities	
Reserves	$9M	Deposits	$90M
Loans	$90M	Borrow from Fed	$9M
Securities	$10M	Bank Capital	$10M

Why might a bank be willing to borrow funds from other banks at a higher rate than it can borrow from the Central Bank?

Liquidity Management: Reduce Loans

- Reduction of loans is the most costly way of acquiring reserves
- Calling in loans antagonizes customers
- Other banks may only agree to purchase loans at a substantial discount

Assets		Liabilities	
Reserves	$9M	Deposits	$90M
Loans	$81M	Bank Capital	$10M
Securities	$10M		

Why has the development of overnight loan markets made it more likely that bank hold fewer excess reserves?

Asset Management: Three Goals

1. Seek the highest possible returns on loans and securities
2. Reduce risk
3. Have adequate liquidity

Asset Management: Four Tools

1. Find borrowers who will pay high interest rates and have low possibility of defaulting
2. Purchase securities with high returns and low risk
3. Lower risk by diversifying
4. Balance need for liquidity against increased returns from less liquid assets

Liability Management

- Managing the source of funds, from deposits, to CDs, to other debt.
- Increased importance since 1960
- Expansion of overnight loan markets and new $nancial instruments (such as negotiable CDs)
- Checkable deposits have decreased in importance as source of bank funds
- When banks see loan opportunities, they borrow or issue CDs to acquire funds

Capital Adequacy Management

- Bank capital helps prevent bank failure
- The amount of capital adects return for the owners (equity holders) of the bank
- Regulatory requirement

Capital Adequacy Management: Preventing Bank Failure

- What happens if 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.

High Bank Capital				Low Bank Capital			
Assets		Liabilities		Assets		Liabilities	
Reserves	$10M	Deposits	$90M	Reserves	$10M	Deposits	$96M
Loans	$90M	Bank Capital	$10M	Loans	$90M	Bank Capital	$4M

High Bank Capital				Low Bank Capital			
Assets		Liabilities		Assets		Liabilities	
Reserves	$10M	Deposits	$90M	Reserves	$10M	Deposits	$96M
Loans	$85M	Bank Capital	$5M	Loans	$85M	Bank Capital	-$1M

So, why don't banks want to hold a lot of capital?

Capital Adequacy Management

- Return on assets: net pro$t after taxes per Euro of assets

$$RoA = \frac{\text{net pro\$t after taxes}}{\text{assets}}$$

- Return on equity: net pro$t after taxes per Euro of equity capital

$$RoE = \frac{\text{net pro\$t after taxes}}{\text{equity capital}}$$

- Equity Multiplier: amount of assets per Euro equity capital

$$EM = \frac{\text{assets}}{\text{equity capital}}$$

$$\frac{\text{net pro\$t after taxes}}{\text{equity capital}} = \frac{\text{net pro\$t after taxes}}{\text{assets}} \times \frac{\text{assets}}{\text{equity capital}}$$

$$RoE = RoA \times EM$$

The higher is bank capital, the lower is return on equity.

If a bank $nds that its Return on Equity is too low because it has too much bank capital, what can it do to raise its RoE?

Too much capital?

- Sell or retire stock
- Increase dividends to reduce retained earnings
- Increase asset growth via debt (like CDs)

Too little capital?

- Issue stock
- Decrease dividends to increase retained earnings
- Slow asset growth (retire debt)

Capital Adequacy Management: Safety

- Bene$ts the owners of a bank by making their investment safe
- Costly to owners of a bank because the higher the bank capital, the lower the return on equity
- Choice depends on the state of the economy and levels of con$dence

How a Capital Crunch Caused a Credit Crunch During the Global Financial Crisis

- Shortfalls of bank capital led to slower credit growth
  - Huge losses for banks from their holdings of securities backed by residential mortgages.
  - Losses reduced bank capital
- Banks were forced to either
  - raise new capital or
  - reduce lending.

  Guess which route they chose.
- Banks could not raise much capital on a weak economy, and had to tighten their lending standards and reduce lending.

How a Capital Crunch Caused a Credit Crunch During the Global Financial Crisis

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True, False, or Uncertain:
RBecause diversi$cation is a desirable strategy for avoiding risk, it never makes sense for a bank to specialize in making speci$c types of loans.S

Managing Credit Risk

- Screening and Monitoring
  - Specialization in lending
  - Monitoring and enforcement of restrictive covenants
- Long-term customer relationships
- Loan commitments
- Collateral and compensating balances
- Credit rationing

If you are a banker and expect interest rates to rise in the future, would you want to make short-term or long-term loans?

Managing Interest-Rate Risk

If a bank has more rate-sensitive liabilities than assets, a rise in interest rates will reduce bank pro$ts and a decline in interest rates will raise bank pro$ts

First National Bank			
Assets		Liabilities	
Rate-sensitive assets	$20M	Rate-sensitive liabilities	$50M
Variable-rate and short-term loans		Variable-rate CDs	
Short-term securities		Money market deposit accounts	
Fixed-rate assets	$80M	Fixed-rate liabilities	$50M
Reserves		Checkable deposits	
Long-term loans		Savings deposits	
Long-term securities		Long-term CDs	
		Equity capital	

Gap Analysis

- Basic gap analysis:
  (rate sensitive assets - rate sensitive liabilities) x
  interest rates = Δ in bank pro$t
- Maturity bucked approach
  - Measures the gap for several maturity subintervals.
- If a bank has more rate-sensitive liabilities than assets, a rise in interest rates will reduce pro$ts and a decline in interest rates will raise pro$ts.
- Standardized gap analysis
  - Accounts for dimerent degrees of rate sensitivity.

Oh-Balance-Sheet Activities

- Loan sales (secondary loan participation)
- Generation of fee income. Examples:
  - Servicing mortgage-backed securities
  - Creating SIVs (structured investment vehicles) which can potentially expose banks to risk, as it happened in the global nnancial crisis
- Trading activities and risk management techniques
  - Financial futures, options for debt instruments, interest rate swaps, transactions in the foreign exchange market and speculation.
  - Principal-agent problem arises
- Internal controls to reduce the principal-agent problem
  - Separation of trading activities and bookkeeping
  - Limits on exposure
  - Value-at-risk
  - Stress testing

Rogue Traders

Od-balance sheet activities with devastating results:

Barings Nick Leeson engaged in speculative trades on the Nikkea, and personally generated $1.3 billion in losses over a 3-year period.
Barings had to close!
PRogue TraderS, 1999

Daiwa Bank Toshihide Iguchi racked up $1.1 billion in losses in trading. When he fessed up, the bank decided to hide this from regulators. The bank was eventually $ned $340 million and barred from U.S. operations.

J.P. Morgan Chase Face a trading loss of over $2 billion by Bruno Iksill, who was colorfully nicknamed Sthe London Whale.S