The Financial System and Money
(Mishkin ch.2 and ch.3; recommended: ch.8)

Mishkin ch.2:
• Role of the Financial System as a whole.
• Financial Markets and Intermediaries – overview.
• Economic questions.
• Financial Innovation and Regulation – problems.
• Current issues.

Mishkin ch.3:
• What is money?
The Role of the Financial System

1. Channel funds from lenders/savers to borrowers/spenders

2. Facilitate payments from buyers to sellers => Money (ch.3)
Economic Question #1: Why is the Financial System important?

1. Includes payment system – vital and sensitive to disruption.

2. Economic growth requires investment – investment needs financing.
   - History of financial crises: Subprime mortgage crisis 2007-08;
     The Great Depression; Japan in the 1990s; Mexico 1995.
   - History of financial repression: credit controls, allocations, regulations.
     => in normal times: Don’t take efficient financing for granted.

3. Personal finance – mistakes are costly.
From Mishkin ch.2: Components of the Financial System

**Financial Markets: Short Term**

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>Principal Money Market Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Instrument</strong></td>
<td>1980</td>
</tr>
<tr>
<td>U.S. Treasury bills</td>
<td>216</td>
</tr>
<tr>
<td>Negotiable bank certificates of deposit (large denominations)</td>
<td>317</td>
</tr>
<tr>
<td>Commercial paper</td>
<td>122</td>
</tr>
<tr>
<td>Federal funds and security repurchase agreements</td>
<td>64</td>
</tr>
</tbody>
</table>


- Note that rankings by market size change over time. (All grow in nominal terms.)
TABLE 2 Principal Capital Market Instruments

<table>
<thead>
<tr>
<th>Type of Instrument</th>
<th>1980</th>
<th>1990</th>
<th>2000</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate stocks (market value)</td>
<td>1,601</td>
<td>4,146</td>
<td>17,627</td>
<td>21,363</td>
</tr>
<tr>
<td>Residential mortgages</td>
<td>1,106</td>
<td>2,886</td>
<td>5,463</td>
<td>9,863</td>
</tr>
<tr>
<td>Corporate bonds</td>
<td>366</td>
<td>1,008</td>
<td>2,230</td>
<td>6,436</td>
</tr>
<tr>
<td>U.S. government securities (marketable</td>
<td>407</td>
<td>1,653</td>
<td>2,184</td>
<td>4,359</td>
</tr>
<tr>
<td>long-term)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S. government agency securities</td>
<td>193</td>
<td>435</td>
<td>1,616</td>
<td>6,199</td>
</tr>
<tr>
<td>State and local government bonds</td>
<td>310</td>
<td>870</td>
<td>1,192</td>
<td>2,925</td>
</tr>
<tr>
<td>Bank commercial loans</td>
<td>459</td>
<td>818</td>
<td>1,091</td>
<td>1,175</td>
</tr>
<tr>
<td>Consumer loans</td>
<td>355</td>
<td>813</td>
<td>536</td>
<td>679</td>
</tr>
<tr>
<td>Commercial and farm mortgages</td>
<td>352</td>
<td>829</td>
<td>1,214</td>
<td>2,463</td>
</tr>
</tbody>
</table>

# Financial Intermediaries

## TABLE 4 Primary Financial Intermediaries and Value of Their Assets

<table>
<thead>
<tr>
<th>Type of Intermediary</th>
<th>1980</th>
<th>1990</th>
<th>2000</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depository institutions (banks)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial banks</td>
<td>1,481</td>
<td>3,334</td>
<td>6,469</td>
<td>12,670</td>
</tr>
<tr>
<td>Savings and loan associations and mutual savings banks</td>
<td>792</td>
<td>1,365</td>
<td>1,218</td>
<td>2,157</td>
</tr>
<tr>
<td>Credit unions</td>
<td>67</td>
<td>215</td>
<td>441</td>
<td>1,005</td>
</tr>
<tr>
<td>Contractual savings institutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life insurance companies</td>
<td>464</td>
<td>1,367</td>
<td>3,136</td>
<td>6,035</td>
</tr>
<tr>
<td>Fire and casualty insurance companies</td>
<td>182</td>
<td>533</td>
<td>862</td>
<td>1,527</td>
</tr>
<tr>
<td>Pension funds (private)</td>
<td>504</td>
<td>1,629</td>
<td>4,355</td>
<td>7,966</td>
</tr>
<tr>
<td>State and local government retirement funds</td>
<td>197</td>
<td>737</td>
<td>2,293</td>
<td>4,846</td>
</tr>
<tr>
<td>Investment intermediaries</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finance companies</td>
<td>205</td>
<td>610</td>
<td>1,140</td>
<td>1,474</td>
</tr>
<tr>
<td>Mutual funds</td>
<td>70</td>
<td>654</td>
<td>4,435</td>
<td>11,527</td>
</tr>
<tr>
<td>Money market mutual funds</td>
<td>76</td>
<td>498</td>
<td>1,812</td>
<td>2,678</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Regulatory Agency</th>
<th>Subject of Regulation</th>
<th>Nature of Regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Securities and Exchange Commission (SEC)</td>
<td>Organized exchanges and financial markets</td>
<td>Requires disclosure of information; restricts insider trading</td>
</tr>
<tr>
<td>Commodities Futures Trading Commission (CFTC)</td>
<td>Futures market exchanges</td>
<td>Regulates procedures for trading in futures markets</td>
</tr>
<tr>
<td>Office of the Comptroller of the Currency</td>
<td>Federally-chartered commercial banks and thrift institutions</td>
<td>Charters and examines the books of federally-chartered commercial banks and thrift institutions; imposes restrictions on assets they can hold</td>
</tr>
<tr>
<td>National Credit Union Administration (NCUA)</td>
<td>Federally-chartered credit unions</td>
<td>Charters and examines the books of federally-chartered credit unions and imposes restrictions on assets they can hold</td>
</tr>
<tr>
<td>State banking and insurance commissions</td>
<td>State-chartered depository institutions and insurance companies</td>
<td>Charter and examine the books of state-chartered banks and insurance companies, impose restrictions on assets they can hold and impose restrictions on branching</td>
</tr>
<tr>
<td>Federal Deposit Insurance Corporation (FDIC)</td>
<td>Commercial banks, mutual savings banks, savings and loan associations</td>
<td>Provides insurance of up to $250,000 for each depositor at a bank, examines the books of insured banks, and imposes restrictions on assets they can hold</td>
</tr>
<tr>
<td>Federal Reserve System</td>
<td>All depository institutions</td>
<td>Examines the books of commercial banks and systemically important financial institutions; sets reserve requirements for all banks</td>
</tr>
</tbody>
</table>
Financial Markets: Key Concepts
(Each: Definitions? Examples? Why relevant?)

- Debt Markets vs. Equity Markets.
- Money Market vs. Capital Market. How does the Money Market differ from the “Market for Money” in macroeconomics?
- Exchanges vs. Over-the-Counter Markets.
- Direct vs. Indirect Finance: Legal/institutional definition. If intermediated products essentially replicate marketable securities, the distinction is economically unimportant (e.g., stocks vs. index funds)
Economic Question #2: Why do Financial Intermediaries matter?

- What’s the social value of placing intermediaries between borrowers and lenders? Could intermediaries be replaced by financial markets? Answers:

1. **Asymmetric information.** Types: moral hazard and adverse selection.  
   *Problem: Someone must have incentives to produce reliable information.*
   - Intermediaries = answer to asymmetric information: collect information about borrowers; make loan decisions; profit from bearing credit risks.
   - Strong incentives to screen borrowers – mitigate adverse selection.
   - Strong incentives to monitor borrowers – mitigate moral hazard.

2. **Risk Sharing:** Diversification reduces risk — applies to loans, credit cards etc.
   *But: Markets can also provide diversification, plus more liquidity. Trend:*
   - **Securitization:** Packaging pools of loans into traded securities. Problem: weak incentives to produce information. (Example: Mortgage backed securities)

3. **Transactions Cost.** Examples: Mutual funds, ETFs.
   *Convenient but not essential – does not matter much for the economy.*
Economic Question #3: Why is Financial Regulation needed?

• Asymmetric information #1: Financial intermediaries are also borrowers.
  Who can produce credible information about intermediaries?
  - Depositors themselves: Costly. Lack of information => Bank runs.
  - Markets: Partly (credit ratings). Incentives distorted by “Too-Big-To-Fail”.
  - Regulation: avoids duplication of effort; efficiency argument if threat of no-bailouts is not credible. Deposit insurance to avoid bank runs (FDIC).

• Asymmetric information #2: Financial markets can be manipulated.
  - Motivates regulations against fraud, insider trading, front-running (SEC).
    => Financial markets are not “free markets”. Legal framework matters.

• Arguments against regulation: Costly, subject to abuse, blocks innovation.
  => Financial history = Cycles of regulation and deregulation.
Financial Innovation

• Perspective on chapter 2: The Financial System is always changing. 
  
  *When you study current institutions, study them as examples that teach you about economic incentives that shape the system.*

• Competitive pressures due to fundamental technical and economic changes
  - Individual investing: shift from specific stocks to Mutual Funds to ETFs
  - Securitization: packaging illiquid loans into traded securities
  - Globalization: driven by demographics (population aging) & better information

• Competitive pressures to “innovate around” costly government regulations.
  - Example: Mortgage pools split into tranches designed for ratings/regulation.
  - Tension: avoiding outdated regulations is efficient/profitable, but avoidance may creates instability / risk of systemic failures.


- Boom in house prices until 2006. Financed by mortgage-backed securities (MBS)

- Collapse of major financial institution as MBS prices fell:
  - Bear Stearns (Mar’08): top-5 investment bank; unable to refines overnight Repo loans – assets sold to JP Morgan, with Federal Reserve assistance.
  - Countrywide Financial (Jul’08): #1 mortgage lender.
  - FNMA & Freddie Mac (9/7/08): government-sponsored mortgage insurers, taken into “conservatorship” – taxpayer cost >> $100 billion.
  - Lehman Brothers (9/14/08) – bankrupt. Merrill Lynch sold to Bank of America
  - Prime Reserve fund “breaks the buck.” Starts run on money market funds.
  - Goldman & Morgan Stanley convert to bank holding companies.
Responses to the Financial Crisis

- **Federal Reserve**: expands discount lending (Dec.’07); invokes emergency rules to make loans to non-banks (Mar.’08); starts quantitative easing (Sept.’08).

- **Fiscal Policy**:  
  - Treasury guarantees solvency of money market funds (Sept’08) – stops the run.  
  - Troubled Asset Relief Program (TARP, Oct.’08): increase in bank capital.  
  - Pres. Obama’s “stimulus” (Feb.’09): $800 billion fiscal expansion.

- **Bank regulation**: Dodd-Frank Act (2010):  
  - Financial Stability Oversight Council headed by Treasury secretary, nine members including Fed chair. Monitors Too-Big-To-Fail institutions.  
  - Consumer Financial Protection Bureau – regulator inside the Fed.  
  - Restrictions on proprietary trading by banks.

- Markets responses: Tighter credit standards. Less securitization.
Related Questions

• Why did a decline in house prices have such catastrophic consequences?
  - Misjudgments about diversification: mortgage pools were split into tranches; top tier is safe only if risks are idiosyncratic, not aggregate/common.
  - Risky financing: banks/investment banks used Repo market to finance MBS Repo = overnight loan, technically sale followed by next-day repurchase Repo borrowers relied on refinancing. Surprise: Run on non-banks.
  - The “Too-Big-To-Fail” problem – distorted market signals (premiums, ratings)

• Why did the government allow these problems to persist?
  - Political support for home ownership – bipartisan policy goal.
  - Mandates for low-income lending; e.g. 1977 Community Reinvestment Act.

• How can we revive private mortgage markets?
  - Now mostly government-run or guaranteed: FHA, FNMA, Freddie Mac.

• Will the new regulations prevent the next crisis?
Diversification – Illustrative Example

- Mortgage-backed securities (MBS) are claims on pools of mortgages.
- Securities have seniority ranking, intended to make top tiers very safe

Example: Pool with 3 mortgages divided into 3 tranches (A,B,C).
- Assume initial default rate \( p = 5\% \). What are prob. of \( N = \{3,2,1\} \) payments?
  Math: \( P(N) = \binom{3}{N} (1-p)^N p^{3-N} \Rightarrow \{ \sim 85.7\%, \sim 13.5\%, \sim 0.7\% \} \). \( P(0) = 0.0125\% \)
- What are probabilities of the various tranches paying off?
  \( P(A) = 99.9875\% \) safe; \( P(B) = \sim 99.3\% \) quite safe; \( P(C) = \sim 85.7\% \) risky

  Key insight: Most tranches are less risky than the underlying mortgages.

- Suppose the default rate per mortgage rises to \( p = 6\% \). Recalculate:
  \( P(A) = 99.9784\% \) still safe; \( P(B) = \sim 99.0\% \); \( P(C) = \sim 83.0\% \)

- Shock: Discovery of aggregate risk. Ex: Prob. \( q = 1\% \) that all mortgages default
  Math: \( P(N) = (1-q) \binom{3}{N} (1-\frac{p}{1-q})^N (\frac{p}{1-q})^{3-N} \), \( P(0) = q + (1-q)(\frac{p}{1-q})^{3-N} \sim 1.013\% \)

  => \( P(A) = \sim 98.99\% \); \( P(B) = \sim 98.3\% \); \( P(C) = \sim 84.7\% \)

  Key insight: Tranching does not remove aggregate risk.

  Default rates on “safe” tiers are highly sensitive to aggregate risk.
## What is Money

(Mishkin ch.3)

### Theoretical Answer
- Medium of exchange
- Unit of account
- Store of value

=> Money is whatever serves these functions

### Practical Answer
- M1 = Currency + Checking Dep.
- M2 = M1 + ….
- M… = Sum of monetary aggregates

=> List of items that serve as money at a particular time

- Measurement of money should change when payment habits change.
- Historical examples (see Mishkin): Shells. Gold. Bitcoin?
## Money in the U.S. today
(Memorize!)

### TABLE 1 Measures of the Monetary Aggregates

<table>
<thead>
<tr>
<th></th>
<th>Value as of August 18, 2014, ($ billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M1 = Currency</strong></td>
<td></td>
</tr>
<tr>
<td>+ Traveler’s checks</td>
<td>3.3</td>
</tr>
<tr>
<td>+ Demand deposits</td>
<td>1,089.9</td>
</tr>
<tr>
<td>+ Other checkable deposits</td>
<td>477.4</td>
</tr>
<tr>
<td><strong>Total M1</strong></td>
<td>2,776.7</td>
</tr>
<tr>
<td><strong>M2 = M1</strong></td>
<td></td>
</tr>
<tr>
<td>+ Small-denomination time deposits</td>
<td>533.0</td>
</tr>
<tr>
<td>+ Savings deposits and money market deposit accounts</td>
<td>7,338.2</td>
</tr>
<tr>
<td>+ Money market mutual fund shares (retail)</td>
<td>642.5</td>
</tr>
<tr>
<td><strong>Total M2</strong></td>
<td>11,290.4</td>
</tr>
</tbody>
</table>

Questions about Money

1. Why do we care about M? (And if so, which M?)
   - Classic answer: if the Fed controls M, it can control inflation.
   - **Quantity Theory** (see later: ch.19)
     \[ M \times V = P \times Y \] (Money * Velocity = Price level * Real output)
     - If velocity V is stable, M controls nominal output PY.
     - If real output is given, M determines P => Money growth is inflationary.

2. Which measure of M is relevant?
   Tradeoff between controllability (favors narrow measures) and relevance
   (predictable velocity, favors broad measures):
   - Related measure: **Monetary base** MB = Currency + Reserves, also known as “high powered money” – under direct Fed control.
   - Fed cannot control M1 or M2 directly, has indirect control via MB and the “money multiplier” process (later topic - ch.14).
   - Defer analysis for now: use generic “M” and assume Fed controls it.
   - Does the choice matter? See…

[Notes on Mishkin Ch.13 - P.3]
Growth Rates of M1 and M2

- Similar in the long run – significant differences in the short run.
  => Fed monitors multiple measures of money