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.

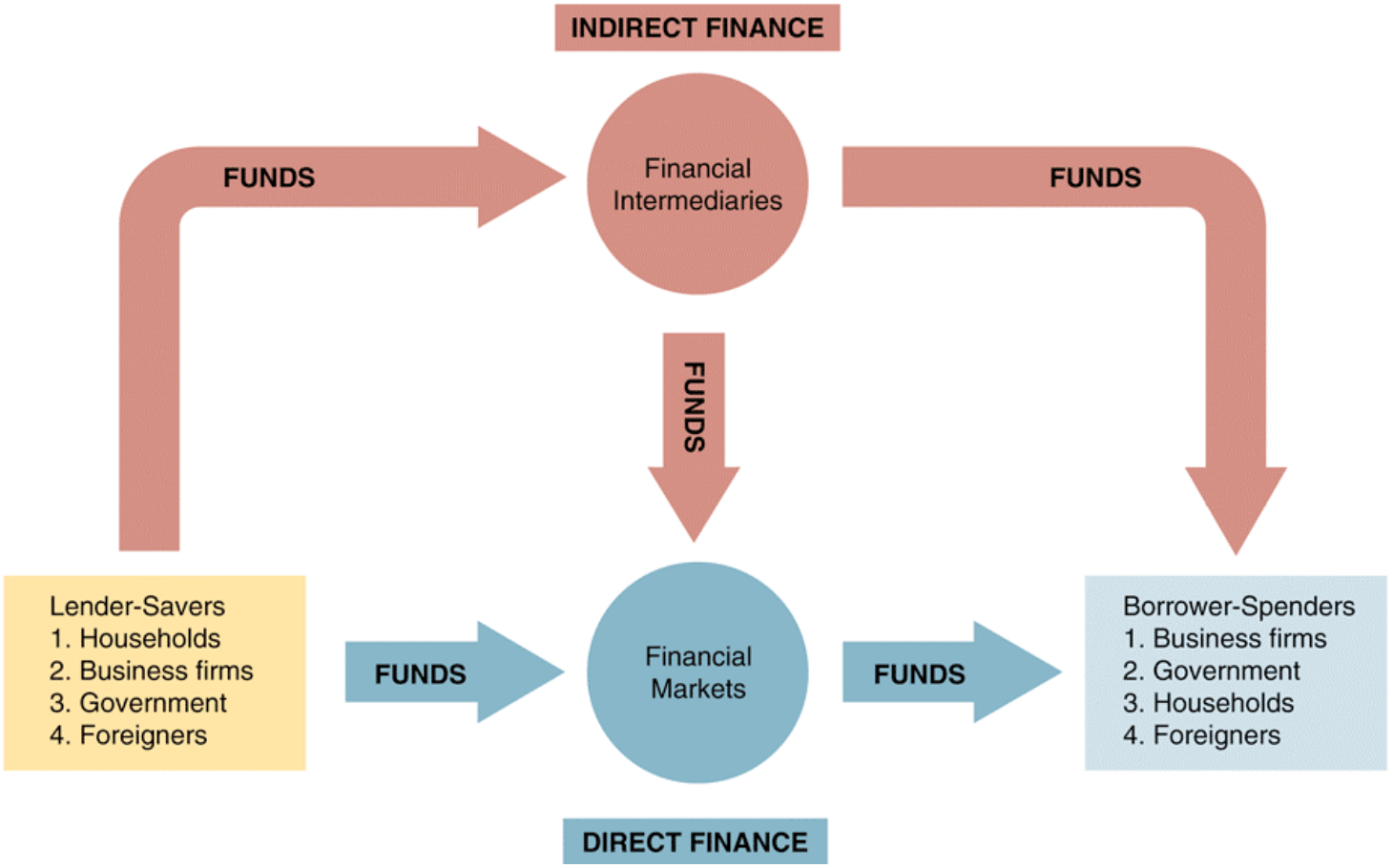
Mishkin ch.3:

- 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 the 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: The U.S. Financial System – Snapshot as of 2016

Financial Markets: Short Term

Table 1 Principal Money Market Instruments

	Amount ($ billions, end of year)			
Type of Instrument	**1990**	**2000**	**2010**	**2016**
U.S. Treasury bills	527	647	1,767	1,816
Negotiable bank certificates of deposit (large denominations)	547	1,053	1,923	1,727
Commercial paper	558	1,602	1,058	885
Federal funds and security repurchase agreements	372	1,197	3,598	3,778

Source: Federal Reserve Flow of Funds Accounts; http://www.federalreserve.gov

- Most markets show growth in nominal terms.
- Ranking by market size change over time – the financial systems keep changing.

Financial Markets: Long Term

Table 2 Principal Capital Market Instruments

	Amount ($ billions, end of year)			
Type of Instrument	**1990**	**2000**	**2010**	**2016**
Corporate stocks (market value)	3,530	17,628	23,567	38,685
Residential mortgages	2,676	5,205	10,446	10,283
Corporate bonds	1,703	4,991	10,337	12,008
U.S. government securities (marketable long-term)	2,340	3,171	7,405	12,064
U.S. government agency securities	1,446	4,345	7,598	8,531
State and local government bonds	957	1,139	2,961	3,030
Bank commercial loans	818	1,497	2,001	3,360
Consumer loans	811	1,728	2,647	3,765
Commercial and farm mortgages	838	1,276	2,450	2,850

Source: Federal Reserve Flow of Funds Accounts; http://www.federalreserve.gov

Financial Intermediaries

Table 4 Primary Financial Intermediaries and Value of Their Assets

	Value of Assets ($ billions, end of year)			
Type of Intermediary	**1990**	**2000**	**2010**	**2016**
Depository institutions (banks)	Blank	Blank	Blank	Blank
Commercial banks, savings and loans, and mutual savings banks	4,744	7,687	12,821	16,834
Credit unions	217	441	876	1,238
Contractual savings institutions	Blank	Blank	Blank	Blank
Life insurance companies	1,367	3,136	5,168	6,764
Fire and casualty insurance companies	533	866	1,361	1,908
Pension funds (private)	1,619	4,423	6,614	9,099
State and local government retirement funds	820	2,290	4,779	6,103
Investment intermediaries	Blank	Blank	Blank	Blank
Finance companies	612	1,140	1,589	1,385
Mutual funds	608	4,435	7,873	13,616
Money market mutual funds	493	1,812	2,755	2,728

Government Agencies supervise Financial Markets & Institutions

Table 5 Principal Regulatory Agencies of the U.S. Financial System

Regulatory Agency	Subject of Regulation	Nature of Regulations
Federal Deposit Insurance Corporation (FDIC)	Commercial banks, mutual savings banks, savings and loan associations	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
Federal Reserve System	All depository institutions	Examines the books of commercial banks and systemically important financial institutions; sets reserve requirements for all banks
Securities and Exchange Commission (SEC)	Organized exchanges and financial markets	Requires disclosure of information; restricts insider trading
Office of the Comptroller of the Currency	Federally-chartered commercial banks and thrift institutions	Charters and examines the books of federally chartered commercial banks and thrift institutions; imposes restrictions on assets they can hold
National Credit Union Administration (NCUA)	Federally-chartered credit unions	Charters and examines the books of federally chartered credit unions and imposes restrictions on assets they can hold
State banking and insurance commissions	State-chartered depository institutions and insurance companies	Charter and examine the books of state-chartered banks and insurance companies, impose restrictions on assets they can hold, and impose restrictions on branching
Commodities Futures Trading Commission (CFTC)	Futures market exchanges	Regulates procedures for trading in futures markets

Perspective on Ch.2: Financial Innovation

- Financial Innovation => The Financial System is always changing.

  When you study current financial markets and 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.

- Basic forces: Profits. Diversification/risk. Information/liquidity. Regulation.

Some Key Concepts and Distinctions

(Each: Definition? Examples? Why relevant?)

- Primary Markets vs. Secondary Markets.
  New security issues << Outstanding quantities.
- 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.
  Caveat: Some intermediated products essentially replicate marketable securities – economic interpretation requires care.

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.

- Example: Great Depression => Regulated banking => Massive inefficiency with inflation in 1970s => Deregulation => Crisis of 2007-2009.

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 various 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?

Measures of Money in the U.S. today

(Worth memorizing!)

Table 1 Measures of the Monetary Aggregates

Blank	Value as of July 3, 2017 ($ billions)
M1 = Currency	1,481.5
+ Traveler's checks	2.0
+ Demand deposits	1,501.5
+ Other checkable deposits	574.8
Total M1	3,559.8
M2 = M1	Blank
+ Small-denomination time deposits	357.7
+ Savings deposits and money market deposit accounts	8,923.9
+ Money market mutual fund shares (retail)	673.7
Total M2	13,515.1

Questions about Money

1. Why do we care about M? (And if so, which measure of M?)

- Classic answer: if the Fed controls M, it can control inflation.
- Quantity Theory (see later: ch.19)

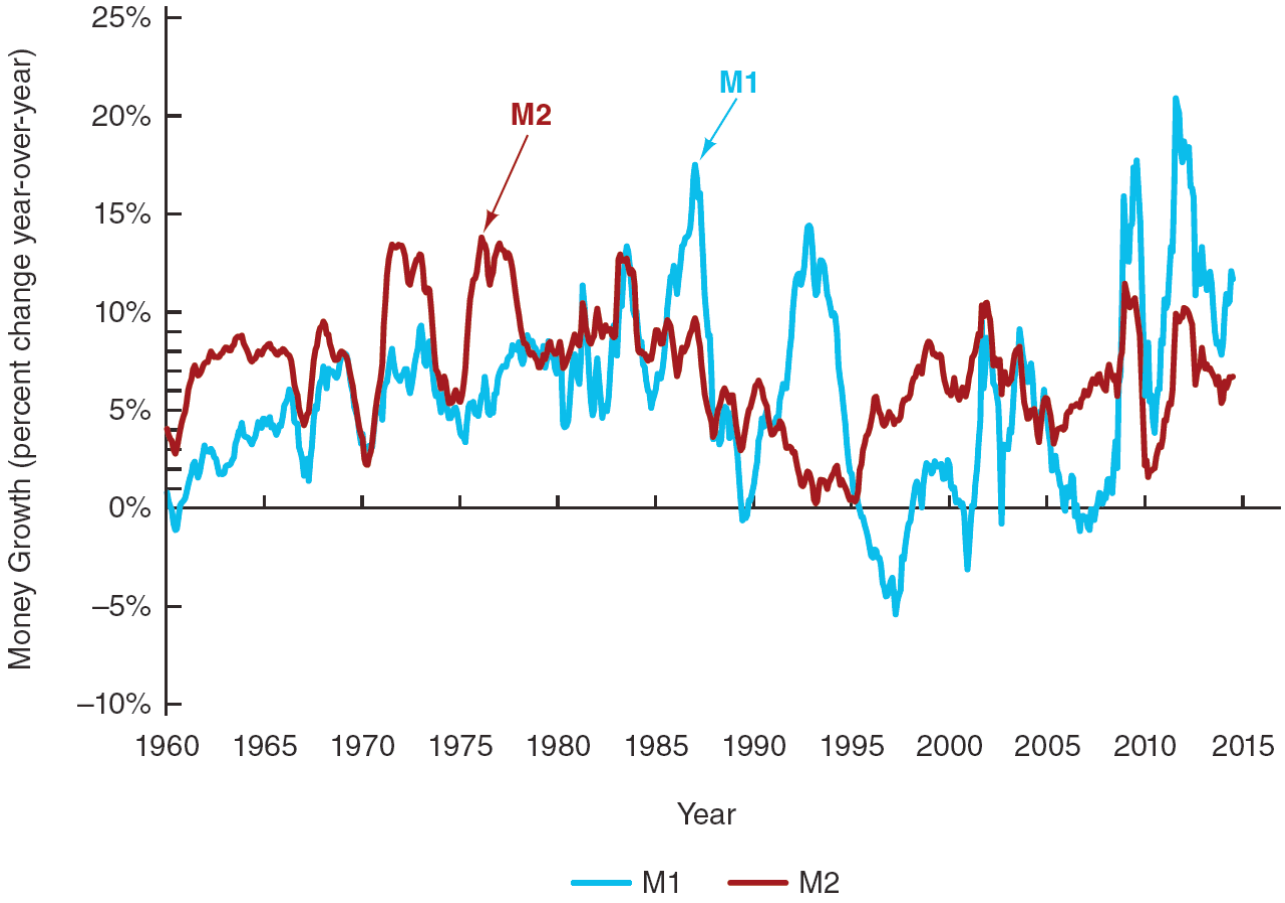
$$M * V = P * Y$$ (Money * Velocity = Price level * Real output)

- If velocity V is stable, M controls nominal output PY.
- If real output Y 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).
- Other candidate measure: **Monetary base** (MB) = Currency + Bank 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 (see later: ch.14).
- Defer analysis for now: use generic "M" and assume Fed controls it.
- Does the choice matter? See…

Growth Rates of M1 and M2

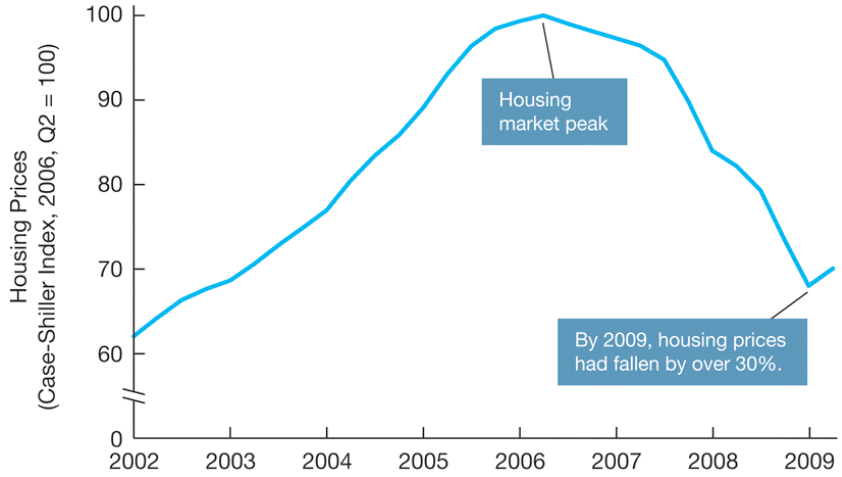


• Similar growth rates in the long run – significant differences in the short run.

=> Fed monitors multiple measures of money (M1, M2, MB).

The 2007-2009 Financial Crisis: What Happened?

• 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 refinance overnight Repo loans – assets sold to JP Morgan, with Federal Reserve assistance.
- Countrywide Financial (Jul'08): #1 mortgage lender, bankrupt.
- FNMA & Freddie Mac (9/7/08): government-sponsored mortgage insurers, taken into "conservatorship" – taxpayer cost >> $100 billion.
- Lehman Brothers bankrupt (9/14/08). 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 (QE, Sept.'08).
  - QE = large-scale open market purchases to increase the Monetary Base.

- Fiscal Policy:
  - Treasury guarantees solvency of money market funds (Sept'08) – stops the run.
  - Troubled Asset Relief Program (TARP, Oct.'08): reinforce bank capital.
  - Pres. Obama's "stimulus" (Feb.'09): $800billion 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 tiers are safe only if risks are idiosyncratic, not aggregate/common. [Example on next slide]
  - 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 – An 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 independent risk of default *p=5%.* How likely are N={3,2,1} payments?
  - Math: $P(N) = \binom{3}{N}(1-p)^N p^{3-N}$ => {~85.7%, ~13.5%, ~0.7%}. P(0)=0.0125%
  - Implied probabilities of the various tranches paying off:
    P(A) = 99.9875% safe; *P(B) = ~99.3%* quite safe; *P(C) = ~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%; *P(B) = ~99.0%*; *P(C) = ~83.0%* => A&B remain safe
- 2008: recognition 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) = ~98.99%; P(B) = ~98.3%; P(C) = ~84.7% => A&B much more risky

  Key insights: Default rates on "safe" tranches are highly sensitive to aggregate risk. With aggregate risk, securitization cannot produce safe securities.