Financial Structure

1. Debt (Liabilities)
   
   Promised Return
   
   No control over firm
   unless default.
   Creditors, bondholders, etc.

2. Equity ("Capital", "NW")
   
   Gets residual return after creditors paid.
   
   Controls firm if not in default.
   Owners - Shareholders

Bankruptcy

Creditors get first claim on assets.
Limited Liability (Corp. shield)

- Corporations, Ltd Liability Co's (LLCs) have limited liability.

- Creditors have no claim on assets of owners beyond their equity in firm.

  => Equity owners share equally in losses can separate personal finances from business interests.

- Creditors notified of limit by "Inc." or "LLC" in borrower's legal name.
Bankruptcy

Ch. 7 Liquidation

firm liquidated, creditors get first claim, equity may be wiped out.

Ch. 11 Reorganization

firm stays in business, debt marked down by court if better for creditors than liquidation.

- Airlines, GM, etc.
Leverage

\[
\frac{\text{Assets}}{\text{Equity}} = 1
\]

- Allows owners to control more assets
- Increases their expected return
- Increases riskiness of their return
- Allows investors to specialize
  - Risk averse, unknowledgeable
    - Hold debt
  - Risk tolerant, knowledgable
    - Hold equity
- Increases chance of default, losses to creditors in event of default.
Debt Seniority

Senior secured debt generally has prior claim over Junior debt since Jr. debt increases leverage, default risk.

- 1st mortgage = Sr. Debt.
- 2nd mortgage = Jr. Debt.

But new debt used to buy new asset may have first claim (lien) on that asset.

Debt Securitization

eg 1,000,000 bonds @ $1,000 each.

- If borrower sells later on, 1st is Sr to 2nd, etc., so not equal claims.

- If borrower sells all 1,000,000 at once to single buyer or syndicate of buyers, all are equal, have better 2ndary mkt.

- Investment Banks underwrite such offerings. Risky but profitable.
Preferred Stock (vs Common Stock)

- Intermediate between Debt, Equity
- Has promised return like Debt. Common Stock gets no dividends unless preferred paid.
- Ordinarily doesn’t vote
  Unless promised payment not met.
- But failure to make promised return doesn’t trigger Bankruptcy.
- Exact terms vary with issue.

Examples:
- Warren Buffett’s Berkshire Hathaway made 35% in 2.5 yrs on $5B in 2008 Preferred Stock investment in Goldman Sachs (+ $16B in Warrants)
- 2008 TARP program invested $70B in Bank Holding Co. Preferred Stock
Holding Companies

A corp whose purpose is to own stock of + control other corps.

May itself be leveraged, ⇒ Double Leverage

- N.C. stock controls many assets w/o impairing claims of creditors of underlying corps.
- N.C. debt riskier than ordinary debt, because assets are riskiest part of underlying investments.

"Junk Bonds" often N.C. Debt

- Used for Leveraged Buyouts
- Similar to Preferred Stock.
- N.C. Failure gives subsidiary new owners, does not affect their operations.
Commercial Banks

\[ \frac{NW}{A} = 11.1 \% \quad 12/2010 \]

\[ (6.8 \% \quad 12/2002) \]

Leverage Ratio

\[ \frac{A}{NW} = 9.0:1 \quad 12/10 \quad (14.7:1 \quad 12/02) \]

Very high for ordinary corps.

But

Bank assets almost all others' debt.

\[ \Rightarrow \text{Assets safe from default if} \]

- borrowers not excessively leveraged,
- loans well collateralized.

\[ \Rightarrow \text{Deposit Liabilities safe if} \]

- default risks well diversified
- A + L Durations not excessively mismatched
- Capital adequate to absorb residual losses.
Today, most US commercial banks are owned by holding companies.

E.g., Citibank, NA (Nat'l Assn)

- Commercial banks
- Well capitalized
- FDIC insured
- Deposits safe, equity risky

Citigroup, Inc.

= Holding Co.

- Owns Citibank stock, share in Morgan Stanley Smith Barney Investment Bank.

2008 TARP (Troubled Asset Relief Program)

- Bought $245B preferred stock
  in Bank Holding Co's like Citigroup.

- Rescued H.C. shareholders, creditors

- Did not help depositors, FDIC.
Ponzi Funds

- Chao Ponzi
  Boston N. End 1920's
- Bernie Madoff (B.L.M. Investment Securities)
  Wall St -> Collapsed 2008.
  $50B losses

- Pays high rate of return,
  attracts new investors,
  high return paid with new investment, not with profits
  \[ NW \text{ goes negative as assets sold to pay dividends.} \]
  Balance sheet fraudulently claims \( NW > 0 \).

- Has gimmick to generate "profits"
  - Ponzi - Postal Rate Arbitrage
  - Modoff - Trading strategy to generate (moderately) high returns with little risk.
Enron Corp. - Ken Lay

- Traded positions in energy, paper, etc. $10b Revenue 2000
- Declared profits, paid dividends

- Violent losses in "Black Box" subsidiaries
- Accountants Arthur Andersen collaborated

- Fraud exposed 2001-02
  Lay guilty on 10 charges
  Died before sentencing
  20-30 yrs?
  Andersen firm ruined.

Fed now uses similar "Black Box" accounting

to hide losses in AIG, Bear Stearns etc.

- Maiden Lane I, II, III LLC.

- Fannie Mae, Freddie Mac
**FINANCIAL INTERMEDIATION**

Credit Market Assets of Households and Financial Intermediaries, 2008Q1.

($ Trillions)

<table>
<thead>
<tr>
<th>Household</th>
<th>3.89</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financial Intermediaries:</strong></td>
<td>36.52</td>
</tr>
<tr>
<td>Commercial Banks</td>
<td>8.88</td>
</tr>
<tr>
<td>Thrifts*</td>
<td>1.60</td>
</tr>
<tr>
<td>Life Insurance Companies</td>
<td>2.92</td>
</tr>
<tr>
<td>Pension Funds</td>
<td>4.48</td>
</tr>
<tr>
<td>Finance Companies</td>
<td>1.63</td>
</tr>
<tr>
<td>Money Market Mutual Funds</td>
<td>2.25</td>
</tr>
<tr>
<td>Other non-equity Mutual Funds</td>
<td>2.27</td>
</tr>
<tr>
<td>Government-sponsored Agencies**</td>
<td>2.89</td>
</tr>
<tr>
<td>Federally Related Mortgage Pools**</td>
<td>4.59</td>
</tr>
<tr>
<td>Misc. Fin. Intermediaries</td>
<td>5.01</td>
</tr>
<tr>
<td>Business and Government</td>
<td>2.09</td>
</tr>
<tr>
<td>Rest of World</td>
<td>7.11</td>
</tr>
<tr>
<td><strong>Total all sectors</strong></td>
<td>49.61</td>
</tr>
</tbody>
</table>

Data source: *FR Bulletin, 9/08, Table 1.60.*

* Savings and Loan Assns, Savings Banks, Credit Unions.
** Includes Fannie Mae, Freddie Mac, and GNMA assets and guaranteed pools.
Credit Market Equilibrium

Diagram showing the relationship between credit and interest rate with the equilibrium point at Q₀.
Food Market Equilibrium

Food Intermediaries
- Grocery Stores
- Distributors
- Producers
Functions of FI's

- Absorb differences in timing.
- Absorb differences in quantity.
- Repackage payment stream
  CDs → Amortized Loans.
- Improve quality of product
  → Credit information specialists
  → Diversification of default risks
  → Leveraging residual risk onto equity.

Misfunction of F.I.'s:

- Transforming maturities
  causes interest rate risk.
Thrift Institutions

- Savings and Loan Assn. (S&Ls)
- Savings Banks
- Credit Unions

Specialize in

- Non-MI Deposits
  - Savings
  - MMDA since 80's
  - CDs since 70's

- Long-Term Loans
  5+25-
  30 yr. Fixed Rate Mortgage

Savings Bank -
Bonds, Mortgages
Mortgage Intermediation

Pre-1930's

Some mortgage "balloon" loans

interest only for 3-5 yrs

then all due at once.

1929-32

30% Deflation, high U

⇒ Many defaults on home, business loans.

⇒ Many Banks, thrift failures.

Federal Home Loan Act of 1932

Created Federal Savings & Loan Assns

(S&Ls)

⇒ Collect Passbook Savings

0 maturity, 0 Duration

⇒ Make Amortized home loans

up to m = 30 yrs.

⇒ Got tax advantage

⇒ After 1934, insured by Fed. S&L Ins. Corp

FS&LC "Fizzle"
Amortized Loans

Constant monthly payments calculated to pay off loan at maturity m.

balloon:

##付息principal##

amortized:

##付息principal##

Unpaid balance
Amortized loan Duration is always less than m/2, but generally is greater than m/3.
Amortized Loans (cont'd)

Note collateralized by lien (mortgage) on house
  * Due on sale of house (usually)
  * May be prepaid early (e.g., to refinance at lower i)
  * But may charge points up front to compensate for prepayment option.

Relatively safe from credit risk if
  * 20% down (buyer's equity)
  * 20% max payment (P+I)/income ratio
  * Matches life of loan to life of collateral

But long term, so PV fluctuates with i:

\[
D < \frac{1}{i}, \text{ but } D > 10 \text{ for } m = 30
\]

(see graph)

⇒ S & L's prone to interest rate risk

\[
\text{if } i \uparrow
\]

Since Passbook Savings Duration = 0

"Maturity Transformation"
1950 - 1980

1 ✪ ✪ as π, π ✪ ✪

- S+L Assets ↓ in P.V.
- S+L Liabilities ↓ only slightly if at all.
  (Some COS after 1971, but still short-term)

⇒ Economic NW ↓

- Most S+L's economically insolvent by 1980.

Even if Assets carried at book value, profits < 0 since i↑ while i↑ fixed.
⇒ Accounting NW inexorably eroded
    industry doomed to fail.

1980s

- "Zombie Thrifts"
  = Living Dead

- End Game Strategies
  S+L's took increasing risks to recover losses,

1987 -
- FSLIC fails, depositors bailed out by taxpayers.
- Banks, COSs became primary Mkt. Intermediaries.
Affordability, Tilt Effect

\[ \Pi = 0 \Rightarrow i = r \]
\[ r = 4\% \Rightarrow i = 4\% \]
\[ \Rightarrow \text{Const. nom. putts have const. real value} \]

Traditional 20% max P+I (Principal + Int.)
to Income ratio works well.
\[ \sigma \sim 25\% \text{ P+I+Taxes+Insurance (PITI)} \]

- \[ \Pi > 0 \Rightarrow i = r + \Pi \]
- \[ r = 4\%, \Pi = 5\% \Rightarrow i = 9\% \]
- \[ \Pi = 10\% \Rightarrow i = 14\% \]
\[ \Rightarrow \text{amortized const., nom. putt much higher} \]

But real putt falls \( \Pi \) each yr.
Same loan wouldn't qualify @ 5% or 10% PT as at 0%.

Traditional 20% max DTI raised to 25%, 28% or 31% in 60's, 70's.

Borrowers couldn't really afford initial payments, counted on IT to relieve burden.

Currently

FHA max DTI 31%

Conforming 33%

(F + F)

even the IT = 67% (10/07-10/09 avg)
Adjustable Rate Mortgages (ARMs)

- Adjusted to index (e.g., Prime Rate) periodically (e.g., every 5 yrs), put adjusted to amortize over original life.

- Like Balloon, except:
  - amortization reduces principal some
  - borrower pre-qualified.

- Shortens Effective Duration to less than reset period.

- Reduces Interest Rate Risk for trad. Thrift
  - Increasing portion of loans in 1980s
  - But too late to save 5ths.

- But shifts Int. Rate Risk to Borrowers
  - May not afford new put if to 2006 high, many reset.

- Teaser Rates
  - Initial rate set below reset rate @ initial index
  - Improves initial affordability, qualification but not often reset!
Federal & Fed. Sponsored Mortgage Intermediaries

2008 Q2

<table>
<thead>
<tr>
<th>Asset</th>
<th>Guaranteed Pools + MBS **</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3,021 B *</td>
<td>$2,444 B</td>
</tr>
</tbody>
</table>

Fannie Mae


Freddie Mac


Ginnie Mae

GNMA = Gov't Nat'l Mort. Assn. (Packages FHA, VA loans.)


*** As of 2007 per GNMA annual report.

**** Per Federal Reserve Bulletin 9/08 Table 1.54

MBS = Mort. Backed Security
Gov't Sponsored Enterprises (GSE's)

Freddie & Fannie

- Private corps w/shareholders
- Sell bonds, buy mortgages
  can match maturities, avoid interest risk.
- Unique Federal Charters from Congress

"Government Sponsored Enterprises"

Like 1st, 2nd Banks of US in 19c.

- FNMA exempt from state, local income taxes.
- $2.25 B Line of Credit with Treasury.
- Assumed Federal Guarantee on debt.
  Not explicit so far until 9/7/2008
  ⇒ Private Profit, Public Risk

- Exempt from SEC

"Regulated" by Office of Federal Housing Enterprise Oversight (OFHEO)

Replaced by Fed. Housing Finance Agency,
7/30/08
<table>
<thead>
<tr>
<th></th>
<th>Fannie Mae</th>
<th>Freddie Mac</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GAAP</strong></td>
<td>+9B</td>
<td>-14B</td>
</tr>
<tr>
<td><strong>Fair Value</strong></td>
<td>-46B</td>
<td>-42B</td>
</tr>
</tbody>
</table>

- **GAAP** - Mix of Historical, Market value.
- **Fair Value** - Value if sold (est.)
Fed has become a major mortgage intermediary

Mort. Backed Securities $1046 B
Fannie & Freddie Debt $149 B
Total $1195 B

Primary Sources of these Funds:

Bank Excess Reserves $984 B
Treasury Deposits $222 B
Total $1206 B

Position like 1970's 5+2:
Long-term mortgages financed by 0-maturity savings accounts.

Now Fed, not banks, bears Interest Rate Risk from these mortgages, as well as default risk?

Meanwhile banks collect fees to service their loans!
Sound Mortgage Intermediation

- Buyer Equity
  - 20% down norm - as pre-2000
- Predictable, affordable payments
  - 20-30 yr fixed rate
  - 20% PI norm (as 50's, 60's)
    - (Principal + Interest to income ratio)
    - verified by pay stubs!
- Balanced Intermediation
  - Match A, L Duration
    - with bonds, long CDs.
      - like Fannie/Freddie
      - Unlike trad. Thrifts.
  - Well capitalized, Free to Fail
    - Unlike Fannie/Freddie
    - >5% capital, SEC oversight.

Fannie & Freddie resolution (IMHO)

- Ch. 11 reorganization
  - Write down debt 10-20% until solvent.
    - shred old stock, give creditors new stock.
  - End SEC status
- Don't close - just reorganize w/bailout.
US Tax Code encourages excessive
Home leverage, intermediation

- Home Mortgage Interest Deductible
  
  by Itemizers 1st Mortgage and HELOC!

  → Incentive to borrow as much as possible,
  Repay as slow as possible

  Invest savings in stocks etc,
  not home equity.

  → Too little home equity
  - Housing, stock bubbles

  → Too much intermediation.

  in tax rates

  → More home equity
    - More stable housing, stock market

  → Fewer mortgage intermediation problems.

  → More incentive to work

Please in over 10 yrs?