Lecture notes on risk management, public policy, and the financial system

Credit and counterparty risk

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Debt and default

Bankruptcy and resolution
Debt and default

- Equity, debt and leverage
- Cost of credit intermediation
- Default
- Counterparty risk

Bankruptcy and resolution
**Firm balance sheet**

**Equity:** residual claim on earnings
- Ownership of firm and control over management
- Prevalent since 19th century: enjoys **limited liability**
- Value of equity $\geq 0$, no **recourse** to property of shareholders or partners beyond value of assets ($A_t$)

**Debt:** fixed-income obligations; claims only to contractually-stipulated returns

**Hybrids** have characteristics of both, e.g. preferred shares

Schematic balance sheet:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of assets ($A_t$)</td>
<td>Equity ($E_t$)</td>
</tr>
<tr>
<td></td>
<td>Debt ($D_t$)</td>
</tr>
</tbody>
</table>
Leverage

- Balance sheet constraint:

\[ A_t = E_t + D_t \]

- “Negative equity” if debt exceeds asset value, but doesn’t lead to additional claim on owners

- **Leverage**: ratio of assets to equity \( L_t = \frac{A_t}{E_t} \)

- “Equity” can be shareholder or partner equity, down payment on a house, on a transaction with a dealer or exchange

- Leverage enhances returns or losses relative to equity capital (RoE)
  - Each “turn” of leverage increases RoE by the difference between return on assets and cost of debt
Credit intermediation faces special costs

**Information costs:** lending is an information-intensive business

**Agency costs:** intermediaries generally function as agents of principals, owners of funds being lent
  - Consequent potential for conflicts of interest costly to resolve

**Externalities:** actions by one market participant imposes costs or provides benefits to others that can’t be compensated through market mechanisms

Can be considered as **transaction costs**
  - All these special costs are interrelated
Information costs in credit intermediation

- **Asymmetric information**: borrower has more information about ability to repay than lender
- Mitigated through costly **monitoring**
- **Adverse selection**: likelihood a seller but not buyer knows of defects of a security (or any good—“lemons problem”)
  - **Examples**: market-maker widens bid-ask spread because of informed traders, originate-to-distribute model in securitization
Agency costs in credit intermediation

Principal-agent problem: costly to align incentives when a principal employs an agent

- Example: investment manager may maximize fee and trading income rather than investor returns
- Consequent potential for conflicts of interest costly to resolve

Risk shifting: asymmetry of risks and rewards → option-like payoffs

- Examples: equity investors vs. lenders, Too-Big-To-Fail

Moral hazard: insurance or guarantees diminishes incentives to monitor, perform due diligence, mitigate risks

*That inscrutable thing is chiefly what I hate; and be the white whale agent, or be the white whale principal, I will wreak that hate upon him.*

Ahab, in Melville, *Moby-Dick*
Externalities in credit intermediation

**Coordination failures** or **collective action problems:** parties cannot agree on action that benefits all

- **Examples:** holdouts in bankruptcy restructuring, bank runs

**Systemic risk:** risk-taking by one intermediary may increase risks of others
**Default concepts**

**Default** or **default event**: failure of **obligor** (borrower) to fulfill terms of debt contract, e.g.

- **Failure to pay** contractually-agreed interest or principal
- **Fraud** or **breach of representations and warranties** (e.g. lying)
- **Cross-default**: default under a different debt contract *may* be a triggering event

**Insolvency**: inability to pay debts, defined two ways

- **Cash-flow** insolvency: cash insufficient to meet debt obligations
- **Balance-sheet** insolvency: debt exceeds assets $\Rightarrow$ negative capital or **net worth**

**Bankruptcy**: legal procedure in which insolvent debtor “seeks relief” from creditors
U.S. default rates 1920–2016

Issuer-weighted default rates (fraction of rated issuers defaulting each year), annual, percent. *Source*: Moody’s Investors Service.
Collateral

- Many credit transactions are secured, i.e. supported by collateral:
  - Assets (securities, factory or subsidiary), cash flows or revenues pledged to repay debt if borrower fails to meet specific obligations
- Highly developed markets based on use of financial assets as collateral by intermediaries → collateralized securities transactions
- Collateral held by lender, but borrower retains ownership or other claim
  - And debt contract permits it to be sold by lender if borrower defaults
- Secured ↔ general obligation debt backed by overall cash flows
- Amount of collateral may be frequently adjusted in certain types of credit transactions, esp.
  - Collateralized securities and derivatives transactions
  - Central bank monetary operations
- Other forms of credit support include guarantees
Credit rating agencies

- Lenders may engage advisory services to assess and monitor obligors’ creditworthiness
- Particularly economical for
  - Smaller lenders and smaller loans (→credit scoring)
  - Bonds and other marketable credit exposures
- **Rating agencies**: services providing alphanumerical **credit ratings** of borrower or security creditworthiness
  - Distinction between **investment grade** (higher-rated) and **speculative grade** (lower-rated) securities
- Original **subscriber-pays** business model superseded by **issuer-pays**
  - Prompted by advances in copying technology from 1970s
  - Said to induce conflict of interest with investors
Ratings requirements in regulation

- 1936: banks’ bond holdings restricted to investment-grade rated
- 1975: ratings of “recognized” agencies used to determine securities firms’ capital requirements
  - SEC-sanctioned **Nationally Recognized Statistical Rating Organization** (NRSRO)
- Dodd-Frank reduces regulatory reliance on ratings by removing language requiring them
Credit rating migration

- **Credit rating migration**: change in credit rating,
  - May be **upgrade** or **downgrade**
  - Migration both a credit and market risk event
- Ratings correspond to probabilities of default and migration
- Summarized in **transition matrix**
  - Displays probability of obligor/security having a given rating at end of period, conditional on rating at beginning of period
Basics of counterparty risk

- **Counterparty**: not an obligor, but other party to a financial contract
- Major sources: OTC derivatives, e.g. options, interest rate swaps, credit derivatives
- Key differences from conventional credit risk:
  - Credit exposure not a fixed par value but varies with market risk factors
  - Credit exposure at time of default not known now, but uncertain
  - Combines market and credit risk
  - For swaps, forwards (but not options), cash flows bilateral, not one way → either party may owe other, depending on market conditions
  - Large gross notional amounts → high volatility of net exposure
- Managed/mitigated by monitoring, diversification of counterparties, limits, hedging via CDS, collateral, netting
  - Collateral, netting typically governed by ISDA Master Agreement
Some specific forms of counterparty risk

**Wrong-way risk**: asset-price fluctuations that increase credit exposure also adversely affect counterparty credit

- **Example**: foreign-exchange swap in which local bank pays dollars

**Double default risk** of CDS or guarantee

- Both underlying credit and counterparty must default to generate loss
Debt and default

Bankruptcy and resolution

Debt priority and capital structure
Bankruptcy
Debt priority

- **Debt priority**: order in which debts are required to be repaid
  - May be modified during bankruptcy
- Allocation of credit risk to lenders: last in line bears greatest risk
- Determined by law and by terms, characteristics of all debt contracts, including
  - **Security**: debt secured by collateral paid in full before unsecured
    - **Debenture**: bond backed by obligor’s general credit
  - **Seniority**: debt contract itself may provide for subordination to senior debt
    - Junior or subordinated debt has priority over dividends
- **Maturity**: short-term generally safer than long-term debt
- **Corporate structure**: holding company obligations generally subordinate to those of operating subsidiaries
- Top of “capital stack” generally bank loans, senior secured debt
What happens in bankruptcy?

- Legal process under bankruptcy court supervision
  - Adjudicate conflicting claims of creditors, shareholders
- **Automatic stay**: injunction stops creditor actions to recover debt
  - E.g. lawsuits, seizure of debtor’s property, netting of debts
  - Aims to prevent value-destroying race to grab assets by creditors
- **Resolution** via court of law
- Two forms under U.S. Title 11
  - **Reorganization** (U.S. Chapter 11): rehabilitate firm by restructuring balance sheet and operations
  - **Liquidation** (U.S. Chapter 7): firm goes out of business, with equitable distribution of remaining assets to creditors
- **Recovery**: bankrupt firm likely still has valuable assets, so creditor doesn’t lose entire amount of debt
  - Creditors share in losses beyond debtors ability to pay
- Bankruptcy culminates in **bankruptcy discharge**
Conflicts of interest among stakeholders

- Senior and secured creditors
  - Biased toward liquidation
  - Have less interest in realization of full value
- Junior creditors and equity owners
  - Biased toward reorganization
  - Have acute interest in realization of full value
- Latent subordination: subordination after the fact
  - Form of legal risk: new creditors get in front of old
  - Debtor-in-possession (DIP) financing in Chapter 7
  - Loans by supranationals to distressed sovereigns
  - European sovereign debt crisis: central bank, supranational purchases of peripherals’ debt subordinate private holdings
What happens to debt in bankruptcy?

- Impaired debt holders become residual claimants, gain control rights
  - Capital structure and judicial system determine **fulcrum security**
- **Liquidation:** debt receives proceeds in priority order
  - Senior and/or secured creditors may get full recovery
  - Subordinated debt may get “haircut” (reduction in par value)
- **Reorganization:** debt may be converted to equity in new reorganized firm
  - Subject to both bankruptcy rules and negotiation by creditors
  - **Cramdown:** plan forced upon dissenting class of creditors
    - Must adhere to **absolute priority rule:** if senior class impaired, any junior class, e.g. equity, must be wiped out
  - Senior creditors may get larger equity stake than subordinated
  - Senior creditors may get newly-issued bonds and subordinated creditors may get equity stake
- **Distressed exchanges:** creditor receives securities with lower value or an amount of cash less than par in exchange for the original debt.
  - **Examples:** CIT in 2009, Greece in 2012
- **Voluntary restructuring** as an alternative to bankruptcy: similar outcome, lower cost
Economic impact of resolution regimes

- **Resolution regime**: legal processes and institutions applied in event of firm insolvency or default
- Procedures for resolution of corporate insolvency related to several efficiency objectives
- Reorganization facilitates maximization of recovery to benefit of creditors and possibly owners
  - Solution of coordination/collective action problem among creditors
  - Facilitates fair distribution among claimants, prevents “race to courthouse”
  - Preserves *going-concern* value of estate if larger than liquidation value
- Alternative view: bankruptcy takes account of wider circle of stakeholders, e.g. employees, customers and suppliers
International differences in resolution regimes

- Countries vary widely in speed, efficiency, and certainty of legal procedures
- Better resolution regimes lead to higher recovery rates
- Insolvency leads to nonperforming loans (NPLs) on banks’ balance sheets
  - Slow and uncertain resolution leads to larger volume of NPLs for longer, slow recovery from crises e.g. Italian banks
- Resolution part of broader mechanisms of debt enforcement: ability of creditors to enforce contracts with debtors