Week 3

Agency problems

Lecture outline

- Agency costs of equity
- Agency costs of debt
- The principal-agent contract design
- Contract design in practice

Learning outcomes

- Understand the agency costs of debt and agency costs of equity
- Understand the basic principal-agent contract design
- Understand some issues/concerns about managers' compensation in reality

Principal – Agent relationship

- Principal is too busy to do a given job → hires agent

- Managers: maximize stockholder wealth → agents
- Stockholders have significant control over management: hire & fire managers via disciplinary mechanisms → principals
- But managers do not always act in the stockholders' best interest → conflict of interests → principal-agent problem (agency problem)

Agency costs (of equity) caused by

- **Separation of ownership from control** (hidden action)
  - Managers are in a position to maximise their own wealth without necessarily being “detected” by the owners of the company
- **Asymmetric information** (hidden information)
  - Managers have access to accounting data and financial reports whereas shareholders only receive annual reports which may be manipulated

Mechanisms to mitigate the agency costs of equity (1)

- Corporate governance is the system of rules, practices and processes by which a company is directed and controlled
- The role of corporate governance is to mitigate the conflict of interest without unduly burdening managers with the risk of the firm
- Corporate governance approaches:
  - Rules based (e.g., US)
  - Principals based (e.g., UK)

Mechanisms to mitigate the agency costs of equity (2)

- Direct managerial financial incentives
  - Incentives can be used to align management and stockholder interests
  - The incentives need to be structured carefully to make sure that they achieve their intended goal
  - Option to buy stock or opportunity for promotion
  - Tie management compensation to measures such as EPS growth

Agency costs of debt

- Conflict of interests between shareholders and debt holders arises if investment decisions have different consequences for the value of equity and the value of debt
- Such a conflict of interest is most likely to occur when there is a greater likelihood of financial distress
- We will illustrate the type of agency costs that may arise when managers take actions that benefit shareholders but harm debt holders and lower the total value of the firm

Example 1

- Consider Baxter, Inc., which is facing financial distress
  - Baxter has a loan of $1 million due at the end of the year
  - Without a change in its strategy, the market value of its assets will be only $900,000 at that time, and Baxter will default on its debt
  - Baxter is considering a new strategy which requires no upfront investment but it has only a 50% chance of success
    - If the new strategy succeeds, it will increase the value of the firm's asset to $1.3 mil
    - If the new strategy fails, the value of the firm's assets will fall to $300,000
    - Expected value of assets =
  - Can shareholders benefit if Baxter changes its strategy? What's about debt holders?

Baxter’s balance sheet

No action

Assets = 900,000	Liabilities = 1,000,000
	Equity = 0

New strategy – success (50%)

Assets = 1,300,000	Liabilities = 1,000,000
	Equity = 300,000

New strategy – failure (50%)

Assets = 300,000	Liabilities = 1,000,000
	Equity = 0

Excessive risk taking & Over-investment

- The debt holders' $ loss corresponds to the $ expected decline in firm value due to the risky strategy and the equity holders' $ gain

⇒Equity holders are gambling with the debt holders' money

- When a firm faces financial distress, shareholders can gain at the expense of debt holders by taking a negative-NPV project (excessive risk taking)
- What can debt holders do?
  - pay less for the debt initially (and implement protective covenants restricting future actions)

Example 2

- Now assume Baxter does not pursue the risky strategy but instead the firm is considering an investment opportunity that requires an initial investment of $100,000 and will generate a risk-free return of 50%
- If the current risk-free rate is 50%, this investment clearly has a positive NPV
  - If Baxter raise $100,000 in new equity to make the investment, who benefits?
  - If you were Baxter's shareholders, would you invest in this new project?

Baxter’s balance sheet (raising 100,000 in equity)

Without new project

Assets = 900,000	Liabilities = 1,000,000
	Equity = 0

With new project

Assets = 900,000 + 150,000	Liabilities = 1,000,000
	Equity = 50,000

Debt overhang & Under-investment

- Shareholders have no incentives in making this new investment
- Debt overhang: A situation in which equity holders choose not to invest in a positive NPV project because the value of undertaking the investment opportunity will accrue to bondholders rather than themselves

Cashing out

- When a firm faces financial distress, shareholders have an incentive to withdraw money from the firm, if possible
  - E.g., if it is likely the company will default, the firm may sell assets below market value and use the funds to pay an immediate cash dividend to the shareholders
- This is another form of under-investment that occurs when a firm faces financial distress

Contract design

- Contract design can be used to align the managerial incentives with the interests of business owners in order to mitigate agency costs
- The first major insights were derived in the context of employment contracts involving risk-averse agents (employees) whose actions could not be directly observed by the principal (employer)
- Instead, the principal could only imperfectly observe a measure of the agent's performance

Basic principal-agent model – some definitions

- Rewards = outcomes that people care about (both financial and non-financial rewards)
- Effort = actions that people won't take without rewards (not just hours worked)
- Incentives = links between rewards and effort (not just compensation contract)
  - E.g., compensation sensitive to performance, concern about future labour market outcomes

Basic principal-agent model – setup

- 2 individuals: principal and agent
- The role of the principal is to supply capital, bear risk, and design an incentive scheme (a contract) for the agent
  - The principal can be thought of as a “representative shareholder” or the board of directors
- The role of the agent is to exert effort in order to make sound managerial decisions on behalf of the principal

The technology of production

- The agent’s contribution to firm value ()
  - Change in shareholders’ wealth
- The action (effort) the agent takes to produce output ()
- Other exogenous factors that are beyond the agent’s control (). For simplicity, assume
- The production function:

Contract

- The agent's total compensation for the period of the contract, denoted by *w*, is a linear function of output:

- In such a contract, *s* can be viewed as salary and *b* as the agent's bonus rate

Payoffs

- The principal's payoff (or "profit"):

For simplicity, we assume the principal is risk neutral

- The agent's payoff (or "utility"):

where *c(a)* is the dollar amount necessary to compensate the agent for taking a particular action, *a*

For simplicity, the agent is risk-averse

Sequence of events

1. The Principal and the Agent sign a compensation contract
2. The Agent chooses an action () which could be either low effort (a_L) or high effort (a_H) (in most cases, the Principal cannot observe this choice)
3. Events beyond the Agent's control () occur
4. Together, the action and the noise determine the Agent's output ()
5. Output is observed by the Principal and the Agent: (success) or (failure)
6. The Agent receives the compensation specified by the contract

Unobservable effort

- The principal can base the contract on performance only (not on effort)

Effort/Performance	(success)	(failure)

What should be the optimal contract?

Optimal contract

•Maximize the Principal's expected payoff:

s.t.:

- Incentive compatibility constraint (IC) (the agent should be compensated so as to prefer to exert high effort)

- Individual rationality constraints (IR) (the contract should be attractive to the agent)

where is the Agent's reservation utility (opportunity cost, e.g., outside offer)

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Britain's CEOs get 16% pay rise to 3.9 mln pounds even as workers struggle

By **Tommy Wilkes**

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Is higher compensation necessary good for firms?

Things to consider:

- Moral hazard
- Unequal pay

Quiz 1

The Board of Directors of Baxter, Inc. are designing an employment contract for the company's new CEO. The CEO can either exert either a high effort (the equivalent monetary value is 1) or a low effort (the equivalent monetary value is 0) in managing the company. The Board of Directors are expecting that effort will have an impact on the company's earnings in the way given in the table below. They also know that the CEO has also offers from other companies providing her with a satisfaction level .

The manager's utility function is given by:

Assume the manager's effort is not observable, derive the optimal contract for the manager.

Effort/Performance	(success)	(failure)