

Asymmetric Information: Moral Hazard

Week 13

M. Pelliccia

“The game seems to be going on rather better now”, she said, “Tis so”, said the Duchess: “and the moral of it is – Oh, ’tis love, ’tis love, that makes the world go round.” “Somebody said”, whispered Alice, “that it’s done by everyone minding their own business.”

— Lewis Carroll, *Alice’s Adventures in Wonderland* (1865)

Moral Hazard

The term *moral hazard* originates in the insurance industry: tendency of clients to alter their behaviour in ways that are costly to the insurance company, after having purchased insurance

Examples from Insurance

Being insured makes people lax about taking precautions to avoid or minimise losses:

- We are likely to be much more careful in driving a rented car if we are financially responsible for all damage than if we have purchased the Collision Damage Waiver (and so insured also against the cost of scrapes)

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In both cases, the fact that we are insured alters our behaviour in ways that are costly to the insurer.

Moral Hazard

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⇒ Hidden Action

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Principal-Agent Problem

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A principal-agent problem arises when agents pursue their own goals rather than the goals of the principal.

Principal-Agent Problem

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- Hire contract

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Two types of efficiency:

- **Production:** situation in which the principal's and agent's combined value (profits, payoffs) is maximized.
- **Risk-bearing:** a situation in which risk sharing is optimal in that the person who least minds facing risk—the risk-neutral or less risk-averse person—bears more of the risk

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- Participation constraint (PC)
- Incentive compatibility (IC)

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In other words, 1) the principal needs to propose a contract with a large enough payoff for the agent such that he is willing to accept it, and 2) the agents wants to perform the assigned task rather than engage in opportunistic behaviour.

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If the IC is not satisfied, the principal can force the agent to perform the task only through monitoring.

Principal-Agent Problem: Example

- Pam (principal) and Alfredo (agent).
- The final award of the jury is $\pi(a, \theta)$, with a the Alfredo's number of hours worked, and $\theta \in (0, 1)$ the probability of a successful trial depending on exogenous and unknown factors. $\pi_a(a, \theta) > 0$.

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The contract is also NOT risk-efficient in the case Pam were more risk-averse than Alfredo.

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Production efficiency reached! \implies Alfredo works the optimal amount of hours a^* , or such that he is maximising the expected joint profit (the incentives of the principal and of the agent are aligned!).

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Alfredo bears all the risk.

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Alfredo bears all the risk. The contract will be risk-efficient if and only if Alfredo is less risk-averse than Pam.

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Wage per-hour contract:

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Pam's payoff will be $\pi(a, \theta) - wa$, Alfredo's payoff wa .

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- If Pam can monitor effectively: production efficiency
- If Pam cannot monitor effectively: risk that Alfredo will declare false information.

Pam's payoff will be $\pi(a, \theta) - wa$, Alfredo's payoff wa .
Pam bears all the risk, thus contract is risk-efficient if and only if Pam is less risk-averse than Alfredo.

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Contingent-fee contract:

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It can be risk-efficient if the share w is such that the less risk averse party gets relatively smaller share.

Type of Contract	Fixed Fee to Lawyer	Fixed Payment to Client	Lawyer Paid by the Hour	Contingent Contract
Lawyer's payoff	F	$\pi(a, \theta) - F$	wa	$\alpha\pi(a, \theta)$
Client's payoff	$\pi(a, \theta) - F$	F	$\pi(a, \theta) - wa$	$(1 - \alpha)\pi(a, \theta)$
Production efficiency	No*	Yes	No*	No*
Person bearing risk	Client	Lawyer	Client	Shared

*Production efficiency is possible if the client can monitor and enforce optimal effort by the lawyer.

Figure: Efficiency of Client-Lawyer contracts

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It reflects the trade-off between production and risk-efficiency!

Monitoring and Bonding

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Suppose that the value that a worker puts on the gain from taking it easy on the job is G pounds. Moreover, suppose he must post a bond of B pounds that the worker forfeits if caught not working. Assume that the probability to be caught is $\theta \in (0, 1)$.

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$$G \leq \theta B.$$

Example

Workers post bonds of B that are forfeited if they are caught stealing (but no other punishment is imposed). Each extra unit of monitoring, M , raises the probability that a firm catches a worker who steals, θ , by 5%. A unit of M costs \$10. A worker can steal a piece of equipment and resell it for its full value of G dollars. What is the optimal M that the firm uses if it believes that workers are risk neutral? In particular, if $B = \$5,000$ and $G = \$500$, what is the optimal M ?

Example

If $G = 500$ and $\theta = 0.2$, what is the minimum bond that deters stealing?

Deferred Payments

A firm may offer its workers one of two wage payment schemes.

- the firm pays w per year for each year that the worker is employed by the firm.
- the starting wage is less than w but rises over the years to a wage that exceeds w .

Efficiency wages

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A risk-neutral worker does not shirk if $\theta(w - \bar{w}) \geq G$, or

$$(w - \bar{w}) \geq \frac{G}{\theta}.$$

Example

Suppose that for each \$1.000 of bonding, the firm is required to pay extra \$10 per period to the worker. What is the minimum B that deters stealing?

Principal-Agent Problem

Example: the manager is an agent, the shareholders of a firm are the principal.

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Maximise size of the firm, or revenues, rather than profits?

Correlation between CEO's salaries and company performance is not clear!

Principal-Agent Problem

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Tie executive pay to the long-term performance of the company: stock options.

Example

A company hires a salesman.

The number of units of the good that the salesman manages to sell depends on how much effort he puts in his job and also on other, market related factors.

Given that neither the company nor the salesman can control these other market related factors, let us call them: good luck and bad luck.

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	Bad luck	Good luck
Works hard	20k	40k
Does not work hard	10k	20k

Hence the salesman can double the revenue for the company if he works hard, but bad luck could half his results.

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	Bad luck	Good luck
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Hence the salesman can double the revenue for the company if he works hard, but bad luck could half his results.

Suppose that the company does not observe if the salesman works hard or not. All that the company observes is the number of sales, and hence the revenue.

Example

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If the revenue is 20k, the company cannot tell whether the salesman has worked hard but been unlucky, or has not worked hard and been lucky.

Suppose that good luck and bad luck are equally likely. It is costly for the salesman to work hard: the cost of not working hard is zero; the cost of working hard is equivalent to 10k for the salesman.

Example

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Suppose that **the company pays a fixed wage of 10k.**

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Of course the company would prefer the agent to work hard.

Example

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Of course the salesman will not put in effort.

Note that the same result would follow for any fixed wage:

- for any fixed wage the firm will prefer the salesman to put higher effort.
- for any fixed wage the salesman will prefer not to put effort.

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Why?

Example (cont.)

Suppose the company proposed a contract of the following form:

"If you work hard, you will be paid 15, if you do not work hard you will be paid zero"

Example (cont.)

Expected Utility from “working hard”: $15 - 10 = 5$.

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...the contract will not work!

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right incentives here is of the form,

*"If the revenue you generate is \$\$\$\$ then you will be
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right incentives here is of the form,

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A **BONUS** scheme.

Example (cont.)

Consider the following bonus scheme:

"if your revenues are 10k or 20k, you will receive 0; if your revenues reach 40k, you will be paid 24k".

Example (cont.)

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What is the utility of the salesman if he puts in high effort:

$$\frac{1}{2}0 + \frac{1}{2}24 - 10 = 2$$

Example (cont.)

What is the utility of the salesman if he does NOT put in high effort:

$$\frac{1}{2}0 + \frac{1}{2}0 = 0$$

Example (cont.)

What is the utility of the salesman if he does NOT put in high effort:

$$\frac{1}{2}0 + \frac{1}{2}0 = 0$$

The salesman will prefer to work hard.

Example (cont.)

Is this contract maximizing the company's profit?

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Without bonus scheme, the salesman will not work hard, thus

$$\frac{1}{2}(10 - 0) + \frac{1}{2}(20 - 0) = 15$$

Example (cont.)

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The company will use the bonus scheme.

Moral Hazard: Too big to Fail?

“Addressing the problem of too big to fail is therefore the next central step in the reform program...Effective regimes must enable the authorities to resolve financial crises without systemic disruptions and without taxpayer losses...”

—Mario Draghi (Head of the FSB) (Financial Times, September 2010)

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In the midst of a crisis it is often the fastest and most certain option to stabilise the system and avoid widespread economic damage.

Investors can rationally surmise that the government is likely to rescue systemically important institutions as their collapse would cause the most damage to the financial system and broader economy. This leads to a belief that some institutions are too-big-to-fail that they receive an implicit government guarantee.

Moral Hazard: Too big to Fail?

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Investors may believe they will not make a loss, even if the institution fails, so they have less incentive to monitor the institution's risks and apply market discipline. This can lead to a lower cost of funding for these institutions. Any lower funding costs might allow the institutions to become larger and more systemically important.

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Many global financial institutions had too little capital to withstand a large shock.

Moral hazard was prevalent!

Moral Hazard: Too big to Fail?

Solutions?

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Solutions?

- Policymakers can use stress testing and contingency planning to identify the most systemically important institutions.
- Policies providing liquidity more rapidly to creditors when failure occurs.
- Close faltering banks before they can impose larger losses on creditors, require deposit coinsurance, and alter existing payment systems to limit the amount that banks owe each other through the system.
- Etc...

Discussion Questions

How is “reputation” like a performance bond?

Discussion Questions

Analyse a typical professional athlete's contract in terms of the concepts in this chapter.

Discussion Questions

Should college professors be paid based on the number of students enrolled in their classes?