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Moral hazard

- The decision an individual makes can have implications not only for the decision-maker itself, but also other individuals.
- These individuals affected are those that have a contractual relationship with the decision-maker and it is through that contractual relationship that the decision affects the individual.
- This relationship might be an employment contract and the effort the employee exerts will affect its employer.
- What in economics is referred to as moral hazard is a situation in which the decision that is optimal for the decision-maker will be sub-optimal for the contractual partner.
- A similar concept are external effects, where the decision-maker affects other individuals; in contrast to moral hazard there is usually no contractual relationship between the parties.

Incentives to take risk

- Risks are reducing the utility of individuals, but often the costs of risks are shared, while the benefits are not shared
- Such a situation gives an incentive to increase risks
- This is referred to a moral hazard

Incentives to take risk

→ In the context of finance, a particular concern is the risks that decision-makers take; we will look at the incentives for such behaviour.

- While higher risks reduce the utility of individuals, higher outcomes increase the utility. If higher risks are associated with higher outcomes, this compensates individuals for the risks they are taking.
- Often we face a situation where the decision-maker retains all the benefits of the decision, for example the higher outcomes,
- but the risks are shared, for example by not having to bear all the losses this might bring.

- If the benefits are accruing to the decision-maker, but the costs (loss in utility) is not fully accruing to him, he might have an incentive to increase risks beyond what would otherwise be optimal.
- This decision to increase risks beyond what would be optimal if the full costs of the risk had to be borne is referred to as moral hazard.

→ We will outline the challenges of moral hazard in finance and banking.

Examples of moral hazard

- Insurance policy holders might become less careful as losses are covered
- Councils might take more risks in spending as they expect to be bailed out if they fail
- Managers might make decisions that reduce their efforts rather than maximize company profits

Examples of moral hazard

→ We will give some illustrations of typical moral hazard situations.

- If an individual has taken out insurance, they know that any losses they have will be covered, for example losses from theft or damage. Within the confines of the terms and conditions, individuals might be less careful to prevent theft or damage than they would be without insurance in place.
- Public bodies, such as councils, might expect a bail-out from central government if they overspend; failing by not having sufficient funding for essential services will have less consequences if the council expects to be bailed out and might take higher risks with their spending or employ less stringent expenditure controls.
- In employment, managers might exert less effort to generate profits for the company or reduce risks by gathering m,ore information; this lower effort might benefit them as their workload reduces.

→ We can now look at the risk-taking incentives of companies when obtaining a loan and what its consequences are. This is a common situation considered in banking, but also in corporate finance.

Company decisions

- Assume companies can choose between two investments, one low-risk and the other high-risk
- The company invests the loans and obtains a return, provided the investment is successful, and then repays the loan
- $\Pi_C^i = \pi_i \left((1 + R_i) \, I - (1 + r_L) \, L \right)$
- Companies will choose the low-risk investment if $\Pi_C^H > \Pi_C^L$

$\Rightarrow \; 1 + r_L \leq 1 + r_L^* = \frac{\pi_H (1+R_H) - \pi_L (1+R_L)}{\pi_H - \pi_L}$

Company decisions

→ Let us first consider the decision as company makes when having to decide between investments.

- For simplicity assume that a company has the choice between two possible investments only.
  - One investment is low-risk in that it has a high probability of succeeding.
  - The other investment is high-risk in that it has a low probability of succeeding.
- The company makes its investment and obtains a return, which will depend on the type of investment made.
  - This return is only obtained if the investment is successful; an unsuccessful investment does not provide any funds.
  - The proceeds from the investment are then used to repay the loan. If the investment is not successful, the company does not repay the loan due to limited liability.
- *Formula*
- Companies choose the type of investment that provides them with the higher profits.
- [⇒] Solving this condition, we see that for the low-risk investment, the one with the high success rate, to be chosen, the loan rate much not be too high.

→ Companies choose high risk investments for higher loan rates as in this case the profits from the low-risk investment will be small due to the lower return on this investment, giving an incentive to switch to the high-risk investment, which is less likely to generate any profits, but if it does, the profits will be higher. Low-risk investments should have lower returns than high-risk investments as the risk premium on low-risk investments will be lower than on high-risk investments.

Bank lending

- If banks wanted to avoid companies choosing high-risk investments, they cannot charge a high loan rate
- Banks lending to low-risk companies would be repaid the loan if the investment is successful and repay their depositors
- $\Pi_B = \pi_H(1 + r_L)\, L - (1 + r_D)\, D$
- They lend only it is profitable: $\Pi_B \geq 0$

$\Rightarrow$ $1 + r_L \geq 1 + r_L^{**} = \frac{1+r_D}{\pi_H}$

→ Knowing which investment decision the company will make, we can now turn to the profits of the bank and the loan rate they are charging.

- Banks know that if they want to avoid companies making the high-risk investment, they cannot charge a loan rate too high. We assume here that due to the higher default rate, companies not repaying their loans due to unsuccessful investments, banks would find it not profitable to lend to companies taking high-risk loans.
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  - Banks will lend to low-risk companies, who repay their loan, provided the investment is successful.
  - From these proceeds, if any, they then repay the deposits who have financed the loan.
- *Formula*
- Banks provide a loan if this is profitable.
- [⇒] This implies that banks need to charge a minimum loan rate to be profitable.

→ We can now compbine the restrictions on the loan rate bfor banks to provide loans and companies to make low-risk investments.

Market breakdown

- As banks need to ensure the low-risk investment is chosen, we need a loan rate with $1 + r_L^{**} \leq 1 + r_L \leq 1 + r_L^*$

$\Rightarrow$ This condition might not be fulfilled, for example if $\pi_H (1 + R_H) \approx \pi_L (1 + R_L)$

- Low-risk investments might not be financed as the constraints on the loan rate are too strict

→

- In order for both conditions to be fulfilled, we need to find a loan rate that is larger than the minimum loan rate of the bank to provide a loan, but below the maximum loan rate for the company to choose the low-risk investment.
- [⇒]
  - Depending on parameter constellations, we might not find a solution that meets these two conditions. We might have a situation where $r_L^{**} > r_L^*$
  - This is the case, for example if the expected returns of the two investments are very similar.
- In this case, the constraints are too strict and no loans are provided as any loans provided would be invested into the high-risk project or the bank would not make a profit from even the low-risk project.

→ For such parameter constellations, the possibility of companies making high-risk investments leads to loans not being provided at all, even though the loan to low-risk investments would be beneficial. Hence the market for loans breaks down.

Preventing market breakdown

- Moral hazard can only be prevented if the decisions of the company can be controlled by the bank, for example through monitoring
- In other cases, only incentives can be given to choose low-risk investments, this might be the ability to obtain loans in the future
- Banks might choose mechanisms that do not affect their profitability or combine different mechanisms

Preventing market breakdown

→ Such a market breakdown is harmful for social welfare, but also reduces the profits of both companies and banks. As such it would be beneficial if a mechanism coould be identified that prevents moral hazard, that is here prevents the company from making the high-risk investment.

- A solution to prevent market breakdown would be if banks could directly control the decisions of banks.
- This might be achieved through monitoring of companies, of course with the ability to intervene if the company seeks to select the high-risk investment.

- If monitoring or other forms of direct intervention are not possible, banks might give incentives such that companies find the choice of low-risk investments always optimal.
- One way of achieving this might be if banks could commit themselves to not provide loans in the future if high-risk investments are taken.

- Not providing future loans would also affect the banks' ability to generate profits, so might not be fully credible to not provide loans in the future. Banks therefore might develop different mechanisms.
- They may also combine different mechanisms to make them more effective.

→ It is a topic in the banking as well as the corporate finance literature to explore such mechanisms.

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