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Moral hazard in capital structure decisions

Outline

- Introduction
- Optimal effort levels
- Risk shifting
- Summary

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Managerial decisions on investments

- ▶ Managers have a profound impact on the capital structure of a company
- ▶ Managers will choose the amount of debt and equity that are best for them
- ▶ This can lead to moral hazard as their decision might not be optimal for the company value

Effort and investment choice

- ▶ Managers can affect outcomes through their own actions, especially by through the effort they make to generate profits to shareholders
- ▶ As effort is costly, managers will balance these costs against the benefits that accrue to them
- ▶ Effort costs might include the working of long hours or working more intensely during the day
- ▶ Managers also decide which investments are pursued and these might not be in the best interest of shareholders or lenders
- ▶ The incentives of managers are affected by the capital structure and hence managers will make decisions that suit them

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Manager-owned company

- ▶ A company's manager can affect their success through his effort, the higher the effort the higher the success rate of an investment
 - ▶ Effort is costly and the marginal benefits are decreasing as the effort level increases
 - ▶ The company generates a return on its investment if successful, which depends on the effort level
 - ▶ If the company is fully financed by equity belonging to the manager, he will retain these profits and face the cost of effort
 - ▶ $\Pi_M = \pi (1 + R) E - ce$
 - ▶ The optimal effort level is given if $\frac{\partial \Pi_M}{\partial e} = 0$
- ⇒ $\frac{\partial \pi}{\partial e} = \frac{c}{1+R} \frac{1}{E}$

Financing with debt

- ▶ Assume that managers do not hold sufficient equity to finance the company and use loans for the remainder: $E = \hat{E} + L$
 - ▶ Any profits accrue to the manager again, but from these he has to repay the loan with interest
 - ▶ $\hat{\Pi}_M = \pi (1 + R) (\hat{E} + L) - (1 + r_L) L - ce$
 - ▶ The optimal effort level is given if $\frac{\partial \hat{\Pi}_M}{\partial e} = 0$
- ⇒ $\frac{\partial \pi}{\partial e} = \frac{c}{1+R} \frac{1}{\hat{E}+L}$
- ▶ As $E = \hat{E} + L$ the effort level is identical to the case where the manager finances the company fully
 - ▶ Increasing the amount of debt increases effort levels if not increasing the manager's investment into the company

Financing with outside equity

- ▶ Assume that managers do not hold sufficient equity to finance the company and use outside equity for the remainder: $E = \hat{E} + E^*$
 - ▶ Any profits accrue to the manager again, but he can only obtain a fraction in proportion to his ownership of the company
 - ▶ $\Pi_M^* = \pi (1 + R) \left(\hat{E} + E^* \right) \frac{\hat{E}}{\hat{E} + E^*} - ce = \pi (1 + R) \hat{E} - ce$
 - ▶ The optimal effort level is given if $\frac{\partial \hat{\Pi}_M}{\partial e} = 0$
- $\Rightarrow \frac{\partial \pi}{\partial e} = \frac{c}{1+R} \frac{1}{\hat{E}}$
- ▶ As $\hat{E} < E$ the effort level is lower to the case where the manager finances the investment through debt
 - ▶ This arises from the decreasing marginal success rate as the effort increases

Sharing benefits of efforts with outside equity

- ▶ Financing the company through outside equity lowers effort levels as the manager has to share the benefits of his effort with outside equity holders
- ▶ With debt financing, any surplus arising from increasing effort is retained by the manager as debt repayments are fixed
- ▶ The higher benefits arising from increased effort will be balanced against its costs

Attracting funding

- ▶ Outside equity needs to be attracted at the optimal effort level of the managers and return at least its costs
- ▶ $\pi^* (1 + R) E^* \geq (1 + r_E) E^*$
- ⇒ $\pi^* (1 + R) \geq 1 + r_E$
- ▶ Loans will only be given if they can be repaid at the optimal effort level of the manager
- ▶ $\pi (1 + R) (\hat{E} + L) - (1 + r_L) L \geq 0$
- ⇒ $\pi^{**} (1 + R) \geq (1 + r_L) \frac{L}{\hat{E} + L}$
- ▶ The effort when raising debt is higher, $\pi^{**} > \pi^*$, and as loan costs are lower than equity costs, it is easier to attract debt than equity

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Investment opportunities

- ▶ Suppose a company can choose between two investments
- ▶ One investment has a low risk and a low return if successful, while the other has a high risk and a high return if successful
- ▶ The company uses debt and equity to finance the investment
- ▶ $\Pi_C^i = \pi_i ((1 + R_i) (E + L) - (1 + r_L) L)$

Companies increasing risks

- ▶ Companies will choose the low-risk investment if $\Pi_C^H \geq \Pi_C^L$
- ⇒ $\frac{L}{E} \leq \frac{\pi_H(1+R_H) - \pi_L(1+R_L)}{\pi_L(R_L - r_L) - \pi_H(R_H - r_L)}$
- ▶ If the leverage is sufficiently low, companies will seek the low-risk investment
- ▶ Higher leverage will induce companies to take the more risky investment
- ▶ This is known as the risk shifting property of debt
- ▶ Lenders may seek to limit the amount of lending such that the company does not choose the high-risk investment

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Debt increases efforts and risks

- ▶ Using debt to finance investment increases effort levels, making companies more valuable
- ▶ Debt is easier to attract than outside equity
- ▶ Higher debt levels also provide managers with incentives to increase risks
- ▶ This might make debt unattractive to lenders and the company has to finance itself through outside equity

Optimal capital structure

- ▶ The optimal capital structure would balance the increased risks arising from debt with the increased effort
- ▶ The optimal leverage would be where the overall value of the company to the manager is highest
- ▶ As the manager bears the costs of effort, this leverage will not necessarily be maximizing company value



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