# Corporate Financing Ownership and Control

How to select the firm optimal financial structure?

Modigliani–Miller Theorem

capital structure irrelevance principle

Modigliani, F. and M. Miller (1958), The Cost of Capital, Corporation Finance and the Theory of Investment, *American Economic Review*, 261-97.

The Irrelevance Theorem →in a competitive
credit market the firm financial
structure has no impact on its market
value

Three sources →
- own funds
- debt
- equity
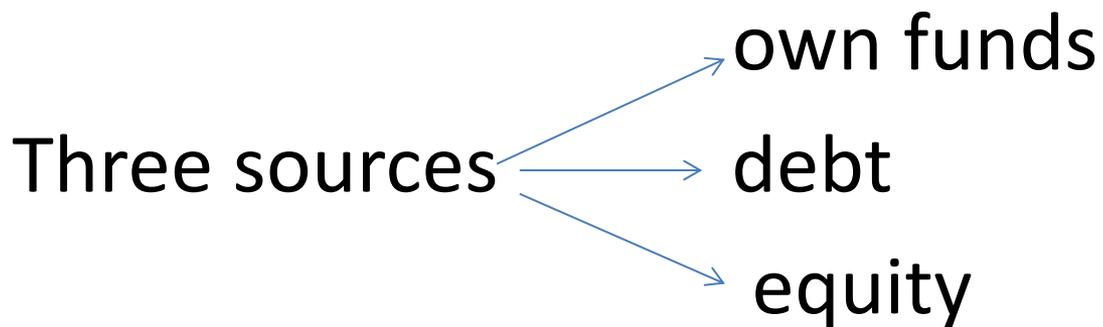
$\Rightarrow$problem of finding the optimal combination of the three different sources.

In the absence of own funds → to find the optimal allocation of equity and debt.

Modigliani-Miller

- assumption of perfect capital markets**→ perfect information**

- The firm cannot change its value by changing the distribution of its profits

=> No systematic choice of firms capital
   structure should emerge.

- Instead, several empirical studies have shown the presence of regularity.

Some works: the assumption of perfect information is completely unrealistic and misleading

Models that in the firm choice about its capital structure consider:

- the presence of asymmetric information
- the separation between <u>ownership</u> and <u>control</u>

- Jensen, M. and W. Meckling (1976), "Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure ", *Journal of Financial Economics* 11, 5-50.

    → MORAL HAZARD

- Myers, S. and N. Majluf (1984), "Corporate Financing and Investment Decisions when Firms Have Information That Investors Do Not Have", *Journal of Financial Economics* 13, 187-221.

    → ADVERSE SELECTION

OWNERSHIP AND CONTROL
Moral hazard and capital structure

Jensen, M. and W. Meckling (1976)

- There is a conflict of interest between:

    Management → the AGENT

    Stockholders/creditors → the PRINCIPAL

The optimal firm's capital structure is the one that minimizes the impact of this conflict on the firm's value.

THE MODEL

- One manager (inside owner) → *E*

  E is risk-neutral

  E has an investment project

- *V* = market value of the project

$$V = V(e) \geq 0 \qquad \text{for } e \geq 0;$$

$$V'(e) > 0;$$

$$V''(e) < 0$$

- Cost function:

$$C = C(e) \geq 0 \qquad \text{for } e \geq 0;$$

$$C'(e) > 0;$$

$$C''(e) > 0$$

(figures)

- **Efficient level of effort** :

$$\max_{e} V(e) - C(e)$$

- F.O.C is:

$$V'(e) - C'(e) = 0$$

(figure)

e* = **<u>efficient solution</u>**

$\rightarrow$ $e = e^*$

$$V'(e^*) = C'(e^*)$$

Is it always the efficient level of effort *e** that will be chosen by *E?*

E's level of effort crucially depends on the way the project is financed

I. **CASE 1:**

$w \geq k$

$w = E$'s personal wealth
$k = $ *cost of the project*

$U_R = E$'s reservation utility level = 0

⟶ if E gets no negative net utility from the project, he will prefer the project to any other activity

E solves the following problem:

$$\max_{e} U = V(e) - C(e)$$

$\hat{e}$ such that:

(figure)

$$V'(\hat{e}) = C'(\hat{e})$$

Same condition found for the efficient level of effort *e**.

$$\longrightarrow \quad \hat{e} = e^* \quad (1)$$

The level of effort chosen by *E* is (ex-post) efficient

<u>Ex ante</u>:

The manager will undertake all the projects such that:

$$V(\hat{e}) - C(\hat{e}) \geq k$$

Given $\hat{e} = e*$:

$$V(e*) - C(e*) \geq k$$

<u>All the projects that are undertaken are ex-ante efficient.</u>

II. CASE 2:

$$w < k$$

be: $w = 0$

Three possibilities to finance the project:

- **by equity shares without voting rights**,
- by equity shares with voting rights,
- **by debt titles**.

CASE 2.1:

Emission of equities without voting rights.

- E issues equities for a share:

$$\alpha\ V(e)$$

$\Rightarrow E$ will hold a fraction $(1- \alpha)\ V(e)$

E solves the following problem:

$$\max_{e} U = (1-\alpha)V(e) - C(e)$$

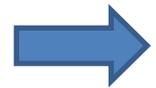FOC: $(1-\alpha)V'(e) - C'(e) = 0$

$\tilde{e}$ such that:

$$(1-\alpha)V'(\tilde{e}) = C'(\tilde{e})$$

Easy to show that:

$$\tilde{e} < \hat{e} = e^*$$

(Graphical and analytical Proof)

E's effort level is not ex-post efficient

$$V(\widetilde{e}) < V(\hat{e}) = V(e*)$$

Why??
When a project is financed by equities, *E* is not sufficiently incentivized and reduces his effort. Also the value of the project decreases.

Implications also in terms of **ex-ante efficiency**:

$$V(e^*) - C(e^*) \geq k$$

In fact:

- The creditors anticipate that, given α, E's effort will be only $\tilde{e}$ and, hence, are willing to finance only those projects for which:

$$\alpha V(\tilde{e}) \geq k$$

Financing the project by the emission of Equities without voting rights

$\Rightarrow$**gives rise to both ex-ante and ex-post inefficiency**

CASE 2.2:

Emission of debt titles.

E commits to paying those who have signed the debt titles, the amount:

$$D(1+r)$$

D = debt

r = interest rate

E's maximizing problem:

$$\max_{e} U = V(e) - C(e) - D(1+r)$$

$$e^D \text{ such that:}$$

$$V'(e^D) = C'(e^D)$$

(figure)

Same condition for the efficient level of effort *e**
(CASE 1).

$$e^D = e^*$$

**<u>The level of effort chosen by *E* is (ex-post)
efficient</u>**

What about **ex-ante efficiency**?

Further assumptions:

- *E* chooses also the kind of investment project. Higher expected returns are linked to their high variance and then to highly risky projects.

- Creditors cannot constrain their credit to the kind of project and only *E* has the task of selecting projects → distinction between

  residual claimants (the owners)

  and the controllers

- *E* is risk neutral → he always chooses the project with the highest expected returns.

- The probability that the creditors will be repaid is lower, the higher the expected return of the project, that is *E*'s expected benefit.

⇒ creditors will be reluctant to underwrite debt titles

And

⇒ efficient projects may not be funded.

(**In case of Repeated games?**)

In summary:

- It is better to finance a project through equities when the contribution of E to the value of the project is small, that is $V'(e)$ is small

- Instead, the use of debt is better when the contribution of the manager is relevant and projects are almost homogeneous in terms of risk.

  Or public utilities

$\Rightarrow$inconsistent with the existence of firms characterized by *diffuse ownership* (*diffuse shareholding*)

Unless $\quad V'(e) \approx 0$

How can they make profits?

1. Fraction α of the value of the firm $V(e)$ hold by the shareholders.

2. Even if α is high, it is possible to elaborate remuneration schemes that incentivize managers' effort, linking their remunerations to the economic results of the firm.