Corporate Financing
Ownership and Control

The theory of residual rights of control assumes that the efficient allocation of the residual rights can be achieved by the transfer of the assets on which the control is exercised

$\Rightarrow$This transfer requires that the transferor is compensated.

EXAMPLE:

- assume to be in a situation of non-integration and to have a significant increase in the buyer's marginal benefit of the ex-ante investment.
- All assets must be allocated under buyer's control

$\Rightarrow$the assets controlled by the seller are transferred from him to the buyer.

$\Rightarrow$The seller needs to be compensated for such transfer

$\Rightarrow$it is possible to get the efficient allocation of residual rights of control only if the buyer is able to compensate the seller,

- if the buyer has no liquidity constraints.

- The liquidity constraint to which the parties are subject, requires that the theory of residual rights of control is integrated with a theory of the financial structure.

- We analyse a theory of the firm's financial structure that is consistent with the GHM's approach
- Company's financing is a mechanism for the allocation of the residual rights of control.

How to select the firm's optimal financial structure?

To start:

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's financial structure has no impact on its market value

- Firms' decisions about investment projects are taken by comparing the expected benefits and costs of the project

- The necessary money to finance the investment project can be found by the firm:
  - its own funds;
  - in the financial market:
    - Through equity
    - Through debt

The use of each of these three sources (own funds, equity, debt) may require different costs

$\Rightarrow$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**
- firm cannot change its value by changing the distribution of its profits, as it is not possible to increase the size of a cake cutting it into slices of different size.
  It is only changing the ingredients, ie. by changing the total profit available for distribution that the firm is able to change its market value.

- According to Modigliani-Miller, the choice of the capital structure has no implications in terms of efficiency and so there is no reason to expect that one rather than the other prevail.

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

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

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

- We analyse those models that in the firm's choice about its capital structure consider the **presence of asymmetric information.**

- → In these models the financial structure chosen by the firm is considered as a tool to mitigate the effects of asymmetric information between the parties.

- 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

MORAL HAZARD AND CAPITAL STRUCTURE

Jensen, M. and W. Meckling (1976),

- There is a conflict of interest between:

  the entrepreneur → the AGENT

  his creditors → the PRINCIPAL

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

Jensen and Meckling (1976)

THE MODEL

- Consider an economy with a single entrepreneur:

  E

- The entrepreneur is risk-neutral
- *E* has an investment project (firm)
- *V* = market value of the project
- *V* depends on the level effort $e \geq 0$ that *E* devotes to the project.

- The market value of the project grows at decreasing rates w.r.t. increasing in the level of effort of *E*:

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

- *E*'s cost function is:

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

- The cost of effort grows at increasing rates.

- The **efficient level of effort** is the solution to the following problem:

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

- F.O.C is:

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

Be

e^* = the **efficient solution** to FOC

For:

$$e = e^*$$

Marginal benefit and marginal cost of effort are equal:

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

- But is it always the efficient level of effort e^* that will be chosen by the entrepreneur?

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

I. **CASE 1:**

E's personal wealth (*w*) is sufficient to finance the project

k = cost of the project

- *E*'s reservation utility is zero:

U_R=0

$\Rightarrow$if the project generates no negative utility *E* prefers the project to any other activity

- *E*'s utility depends on the value of the project net of the cost of effort devoted to the project.

- *E* then solves the following problem:

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

- Be:

$\hat{e}$ = solution to the problem

- That is the level of effort for which:

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

$\Rightarrow$Same condition found for the efficient level of effort e^*.

- Hence: $\hat{e} = e^*$ (1)

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

The entrepreneur will undertake all the projects whose utility is greater (at least equal to) than the cost of the project:

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

That is, for eq. (1):

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

$\Rightarrow$**All the projects that are undertaken are also ex-ante efficient.**

II. CASE 2:

$$k > w$$

- *E*'s personal wealth (*w*) is not sufficient to finance the project
- be: $w = 0$
- *E* has three possibilities to finance the project:
  - by equity shares without voting rights,
  - by equity shares with voting rights,
  - by debt titles.

we will consider the cases of equity without voting rights and debt titles

CASE 2.1:

<u>Equities without voting rights.</u>

- *E* issues equities for a share α of the value of the project/firm, $V(e)$

$\Rightarrow$*E* will hold a fraction (1- α) of the value of the firm, $V(e)$.

- *E* chooses his level of effort in order to solve:

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

- FOC is:

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

Be:

$\tilde{e}$ = solution to FOC

- For:

$$e = \tilde{e}$$

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

- It is easy to show that:

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

Proof:

- By the equilibrium condition of the CASE 1 :

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

- We get that *E*'s choice of effort when his personal wealth is sufficient to finance the project is such that:

$$V'(\hat{e}) / C'(\hat{e}) = 1$$

- Instead, in case of equity without the right to vote, *E*'s choice of effort is such that:

$$V'(\tilde{e}) / C'(\tilde{e}) = 1 / 1 - \alpha \qquad (2)$$

- Since:

$$\alpha < 1$$

$$\Rightarrow \ (1/1-\alpha) > 1$$

- Hence, it must be:

$$V'(\tilde{e})/C'(\tilde{e}) > V'(\hat{e})/C'(\hat{e})$$

In equation (2):

- the numerator is decreasing in *e*
- the denominator is increasing in *e*

$\Rightarrow$The ratio $V'(\tilde{e})/C'(\tilde{e})$ is decreasing in *e* (to have higher ratio, *e* must decrease)

- Hence, to respect the condition:

$$V'(\tilde{e})/C'(\tilde{e}) > V'(\hat{e})/C'(\hat{e}) = 1$$

- IT MUST BE:

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

Thus,

$\Rightarrow$the ex-post efficiency of *E*'s effort is not achieved

=> $V(\tilde{e}) < V(\hat{e}) = V(e^*)$

Why??

When a project is financed by equities, *E* reduces his effort and also the value of the project decreases.

NOTE:

the reduction of *E*' effort has implications also in terms of ex-ante efficiency:

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

In fact:

- The creditors (the principal) 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 inefficiencies

CASE 2.2:

- ***E* finances the project by the emission of debt titles.**
- *E* commits to pay to those who have signed the debt titles, the amount:

$$D(1+r)$$

where:

D = debt

r = interest rate

In this case, *E*'s level ofe effort is the solution to the following maximizing problem:

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

That is the level of effort e^D for which:

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

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

- Hence:
- $e^D=e^*$

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

And what about **ex-ante efficiency**?

Since now we have assumed that *E* chooses just the level of effort.

Other assumptions:

- *E* chooses also the kind of investment project. Investment projects are heterogeneous in terms of expected returns and risk.
- 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

- Since E is risk neutral, he always chooses the project with the highest expected returns.
- The cost of the riskiness is entirely upon the holders of debt titles.
- The probability that the creditors will be repaid is lower, the higher the expected return of the project, that is *E*'s expected benefit.

$\Rightarrow$creditors will be reluctant to underwrite debt titles

And

$\Rightarrow$ efficient projects may not be funded.

In summary:

- It is better to finance a project through equities when the contribution of *E* to the value of the firm is small, that is *V'*(*e*) is small
- Instead, the use of debt is better when the contribution of the entrepreneur is relevant and projects are almost homogeneous in terms of risk.

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

- Unless it is assumed that, in these firms, $V'(e) \approx 0$

  these firms would not be consistent with adequate incentives for entrepreneurial talent.

  Yet they make profits!

  How can this happen?

1. That depends on the magnitude of the fraction α of the value of the firm $V(e)$ hold by the shareholders.

   The higher α, the less the ratio of $V(e)$ that will be hold by the entrepreneur, the less his incentive to deliver high level of effort.

   MOREOVER:

2. Even if α is high, it is possible to elaborate remuneration schemes that incentive the (entrepreneur) managers' effort, linking their wage to the economic results of the firm.

ADVERSE SELECTION AND CAPITAL STRUCTURE

Myers, S. and N. Majluf (1984)

- *E*'s level of information about investment projects is greater than the investors' level of information.
- The quality of the good (investment project) exchanged is better (or exclusively) known by *E*

asymmetric information => adverse selection

Myers and Majluf explain the choice of financial structure in a situation characterized by adverse selection

Be *E*:

- Either the manager of a diffuse shareholding firm
- Or a shareholder manager of the firm

- *E* wants to fund a project whose startup cost is *k*.
- The firm has its own funds *w* and assets that constitute the firm itself.

Be:

- $w < k \rightarrow$ to undertake the project *E* must turn to the financial market

- $eq = k - w \rightarrow$ the value of the equity shares that must be issued to undertake the project.

***t* = 0**

- Both *E* and the creditors only know the probability distribution of:

  A = the value of the assets held by the firm

- and of:

  B = the net present value of the investment project

$t = 1$

- *E* and *E* only observes the realization of the stochastic variables *A* and *B*:

  a and *b*

- By assumption:

$$a \geq 0$$

and

$$b \geq 0$$

***t* = 1**

the investors (creditors) observe only the choice of *E*:

- about the start up of the project (yes or no!), and hence:
- about the value of the equity shares issued:

$$eq = \max[k - w, 0]$$

Be:

- P = the market value of the existing equity shares (already issued by the firm for other than the specific investment project) if E has decided not to invest :

  → *when* eq=0

Be:

- P' = the market value of the existing equity shares if E has decided to invest:

  → *when* eq>0

t = 2

- also the investors observe the realizations of *A* and *B*, that is *a* and *b*

Assume now that:

- *E* chooses not to issue equity shares (and therefore not to invest).

  In this case, the firm is owned by its current (existing, OLD) shareholders, who hold a value:

$$V^{\circ} = a + w$$ → value of the firm without investment

Instead, if we assume that:

- *E* decides to issue equity shares to finance the project (and therefore to invest), the value of the firm is equal to:

$$V = a + w + b + eq$$ → value of the firm with investment

Myers and Majluf assume that old shareholders do not buy new equity shares and then if *P'* is the market value of the equity shares held by the old shareholders, they will hold a share equal to:

$$P'/(P'+eq)$$

of the value achieved by the firm after the emission of new equity shares and therefore, the value of the firm that the old shareholders hold is:

$$V^O = \frac{P'}{P'+eq}(a+w+b+eq)$$

- New shareholders hold a value of the firm equal to:

$$V^N = \frac{eq}{P' + eq}(a + w + b + eq)$$

- Myers and Majluf assume that *E* is acting in order to maximize the utility of old shareholders.

- Since maybe E himself is an old shareholder!!!

HENCE:

E will issue new equity shares if and only if the value of the firm held by old shareholders after the investment is greater (or at least equal) than the value of the firm before the investment:

That is: $\left[P' / \left(P' + eq\right)\right]\left(a + w + b + eq\right) \geq a + w$

$$b \geq -eq + \left(eq / P'\right)\left(a + w\right) \quad (1)$$

→ *a* and *b* have to go in the same direction.

Be:

- *M'* the set of pairs (*a,b*) that satisfy inequality (1);

and

- *M* the set of pairs (*a,b*) that do not satisfy inequality (1).

- For each pair: $(a,b) \in M'$

E issues new equity shares and the investment project is undertaken;

- For each pair: $(a,b) \in M$

It is not in the interests of old shareholders the emission of new equity shares and then the investment project is not undertaken.

It is important to note that in this second case also projects with positive net present value are not undertaken.

- **But when does *E* decide not to invest?**
  *E'*s decision depends on the realization of the stochastic variables, that is on *a* and *b*:
- the greater the realization of *A* (*a* = value of assets) observed by *E*, the greater must be the realization of *B* (*b* = net present value of the investment)
- recall that from the above inequality *a* and *b* must go in the same direction!

The reason is the following:

- the emission of new equity shares that (recall) are not purchased by the old shareholders
- implies the allocation of the value of the assets (a) between old and new shareholders and therefore a reduction of the value in the hands of the old shareholders;
- to counterbalance this "loss", the realization of B must be very high.

- This rule of behavior has implications on the market evaluation of the equity shares issued by the firm.

$\Rightarrow$The emission of new equity shares is a "signal" that the realization of *A* is "small" compared to the realization of *B*

- and this leads to a consistent assessment of the firm.

In summary:

- investors know neither the value of the firm (*A*) nor the net present value of the investment (*B*), but just their probability distribution.
  Moreover, investors know *E*'s rule of conduct.

Therefore:

- They are able to form expectations about the value of the firm and of the investment project from the observation of *E's* behavior.

In particular:

- *E'*s decision not to issue equity shares signals that the return of the project is lower than the value of the assets that already make up the firm.

On the other hand,

- *E'*s decision to issue equity shares signals that the return of the project is high compared to the value of the assets.

Finally:

- Note that *E* doesn't undertake investment projects that have a positive net return (and that therefore would be efficient to implement), but not so high to satisfy the inequality (1)

$\Rightarrow$Myers and Majluf model suggests that the use of firm's own funds is better than the emission of equity shares to finance an investment project.

Pecking order theory of the capital structure

→ the firm that wants to undertake an investment project should use:

- First: its own capital;
- secondly: debt
- last: emission of equity shares.

- An appropriate incentive contract offered to *E* allows the achievement of the efficiency.

In fact,

- a contract in which *E*'s remuneration depends on the value of the project, would lead him to act not only to protect the interests of old shareholders.
- This would solve the problem of the "signal" linked to *E's* behavior and the resulting undervaluation of the firm.