



Capital Structure: the effect of **Costs of Financial Distress, Agency Problems, and Asymmetric Information**

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**LISBOA
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Outline

- So far we've seen that in the presence of taxes (corporate and personal) there is some advantage to using debt. But other factors limit the use of debt:
 1. **Financial Distress and Bankruptcy:**
 - Excess leverage can increase the probability of default, and bankruptcy, which is costly.
 2. **Agency Problems:**
 - The existence of debt can create conflicts of interest between shareholders and debt-holders, which reduce the value of the firm (Agency Costs of Debt).
 - On the other hand, debt can help disciplining managers when there is a conflict of interest between management and shareholders (Agency Benefits of Debt);
 3. **Asymmetric Information:**
 - In the presence of asymmetric information, the choice of capital structure can be used as a signal to the market, to try to get a fair valuation of the firm.

1. Financial Distress and Bankruptcy

- A firm that fails to make the required interest or repayment of principal payments on the debt is in **default**. In the extreme case, the debt holders take legal ownership of the firm's assets through a process called **bankruptcy**.
- In MM's perfect world bankruptcy can happen, but does not carry any specific loss – in that scenario, investors are equally unhappy whether the firm is levered and declares bankruptcy, or whether it is unlevered and the share price declines.
- **Example:** Armin Industries' project can either succeed or fail:

	Without Leverage		With Leverage	
	Success	Failure	Success	Failure
Debt value	—	—	100	80
Equity value	150	80	50	0
Total to all investors	150	80	150	80

- The decline in value is due to the failure of the project, not to the process of bankruptcy.

Costs of Bankruptcy and Financial Distress

- Unlike MM's world, in real life the **bankruptcy** process **and** even the suspicion of **financial distress** do produce a loss in the value of the firm. What are these **costs**?
- We can split these costs into:
 - **Direct Costs of Bankruptcy**: costs borne by the firm during the bankruptcy process, reducing firm value.
 - **Indirect Costs of Financial Distress**: costs borne by the firm due to high leverage and the anticipation of future problems of default – also reduce firm value.

Direct Costs of Bankruptcy

- The bankruptcy process is time-consuming, complex, and costly.
- **Outside experts are expensive:**
 - Legal and accounting experts;
 - Consultants;
 - Appraisers;
 - Auctioneers;
 - Investment bankers.
- E.g., Enron paid \$30 million per month on legal and accounting fees in bankruptcy (total >\$750m)
- Depending on the complexity and size of the business, direct costs of bankruptcy can amount to 10% of the pre-bankruptcy value of the assets (on average 3-4%).



Indirect Costs of Financial Distress

- Even if the firm hasn't filed for bankruptcy, if the debt levels seem to be too high, losses do happen:
 - Loss of Customers;
 - Loss of Suppliers;
 - Loss of Employees;
 - Loss of Receivables;
 - Fire Sale of Assets;
 - Inefficient Liquidation;
 - Costs to Creditors.
- These costs should not exceed the cost of renegotiating with the creditors.
- But many of these costs are incurred even prior to bankruptcy.
- **Indirect financial distress costs are hard to measure, and vary from industry to industry, from firm to firm.**
- There is evidence that they can amount to 10%-20% of firm value.

Costs of Financial Distress and Firm Value

- Because financial distress and bankruptcy are costly, excess debt may be a problem.
- **Example:** Armin Industries will bear costs of 20 in case of default.

	Without Leverage		With Leverage	
	Success	Failure	Success	Failure
Debt value	—	—	100	60
Equity value	150	80	50	0
Total to all investors	150	80	150	60

- The value of the firm is lower with leverage:

$$E(\text{Unlevered Equity}) = \frac{1}{2}(150 + 80) = 115$$

$$V^U = 115$$

$$E(\text{Debt}) = \frac{1}{2}(100 + 60) = 80$$

$$E(\text{Levered Equity}) = \frac{1}{2}(50 + 0) = 25$$

$$V^L = 105$$

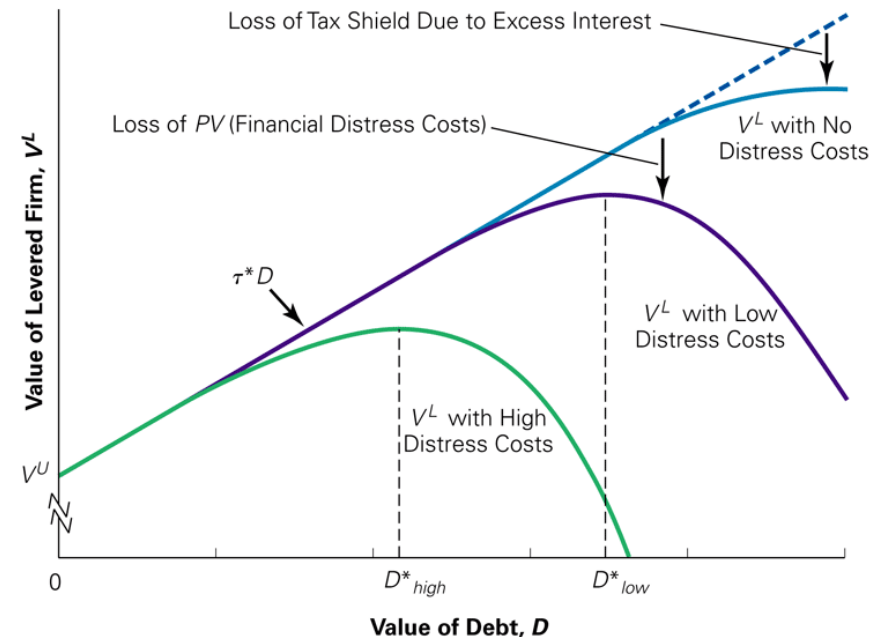


Optimal Capital Structure in the presence of taxes and financial distress costs: The Trade-Off Theory

- When choosing the capital structure, managers must balance the benefits of debt (taxes) against the costs of debt (financial distress).
- An adaptation of **MMI** would tell us:

$$V^L = V^U + PV(\text{Interest Tax Shield}) - PV(\text{Financial Distress Costs})$$

- **Firms should choose more Debt as long as the incremental Tax shield is higher than the additional costs of financial distress.**
- The size of the Distress Costs varies from industry to industry and from firm to firm.



2. Agency Problems

- Conflicts of interest between different stakeholders in the firm are another factor that may influence the choice of capital structure.
- We will see two different types of agency problems:
 - Conflicts between shareholders and debt holders, which lower the value of the firm when debt is high (**Agency Costs of Debt**);
 - Conflicts between managers and shareholders, in which case debt may be used to discipline management (**Agency Benefits of Debt**).

Agency Costs of Debt

- When a firm has leverage, a conflict of interest exists if investment decisions have different consequences for the value of equity and for the value of debt.
- These conflicts are more likely to occur when the risk of financial distress is high (there is high debt).
- We will look at two types of investment strategies that represent agency costs of debt:
 - Excessive Risk-Taking and Asset Substitution;
 - Debt Overhang and Under-investment.
 - Firms may also try to Cash Out...

Agency Costs of Debt: Excessive Risk-Taking and Asset Substitution

- When the firm is **highly levered** and financial distress is very likely, managers (**shareholders**) **prefer risky investments**, in which they gamble the total value of the firm, and hurt debt holders.
 - However, **ex ante**, **debt holders may anticipate** this type of behavior, and ask for higher rates and protection. So, **shareholders pay the price** of these strategies when they get high levels of debt.
- Example:** Baxter has a loan of \$1 million due at the end of the year. If it follows its old strategy, the value at the end of the year is \$900,000 with certainty. A new strategy comes up: with a 50% chance the value can be either \$1,300,000 or \$300,000.

	Old Strategy	New Risky Strategy		
		Success	Failure	Expected
Value of assets	900	1300	300	800
Debt	900	1000	300	650
Equity	0	300	0	150

Expected
Value=900

Agency Costs of Debt: Debt Overhang and Under-Investment

- When a firm faces financial distress, managers may choose not to finance new, positive-NPV projects. This reduces the total value of the firm.
- **Example:** Suppose Baxter could try to raise \$100,000 by issuing new equity in order to invest in a new riskless project generating an end of year cash flow of \$150,000. This positive-NPV project will not be chosen.

	Without New Project	With New Project
Existing assets	900	900
New project		150
Total firm value	900	1050
Debt	900	1000
Equity	0	50

From equityholders' point of view, $NPV = -100,000 + 50,000 < 0$

Agency Costs of Debt and Firm Value

- High levels of debt cause these agency costs and, therefore, a reduction in firm value.
- Firms can do several things to mitigate the agency costs of debt. Examples are:
 - Choose short-term debt (to give fewer opportunities to profit at the debt holders' expense);
 - Covenants that place restrictions on the actions that the firm can take.

Agency Benefits of Leverage

- Due to the **separation of ownership and control**, **managers** may be **entrenched** in their positions.
- Because managers may have their own agendas, **conflicts of interest between managers and shareholders** are bound to happen.
- In the presence of these agency problems, using **Debt** may give incentives for managers to run the firm more efficiently.

Agency Benefits of Leverage

- We can find the Agency Benefits of Debt in the following cases:
 - **Concentration of Ownership**
 - When a firm starts dispersing its equity, the incentives of the owner-manager change. Using debt financing avoids this dilution of equity.
 - **Reduction of Wasteful Investment**
 - If the firm is levered, there is more pressure on its management to perform, and less opportunities for empire building, and overspending on personal perks.
 - **Commitment**
 - A firm at the risk of entering financial distress may require stronger vigor and commitment from the management. May also become a fiercer competitor.



Optimal Capital Structure: The Trade-Off Theory with Taxes, Financial Distress Costs, and Agency Problems

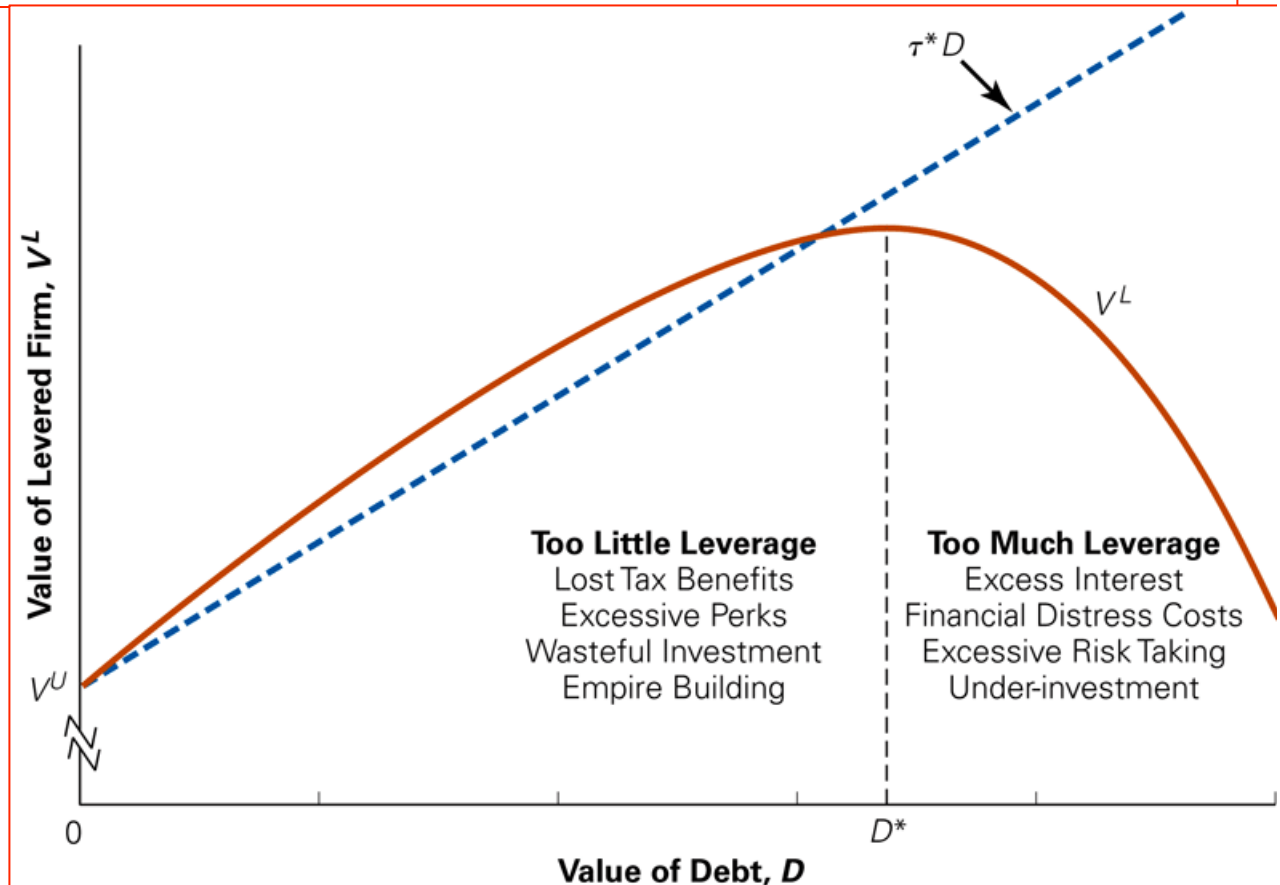
The value of the levered firm can now be shown to

$$V^L = V^U + PV(\text{Interest Tax Shield}) - PV(\text{Financial Distress Costs}) - PV(\text{Agency Costs of Debt}) + PV(\text{Agency Benefits of Debt})$$

Firms need to balance each of the relevant factors: taxes, financial distress costs, agency costs and benefits.

Low-growth, mature firms often fall into the high-debt category.

R&D-intensive firms typically maintain low levels of debt.



3. Asymmetric Information

- **Managers' information** about the firm and its future cash flows **is likely to be superior** to that of outside investors – there is **asymmetric information between managers and investors**.
- Managerial decisions – such as choice of capital structure – need to take this asymmetric information into account.
- Managers don't want to issue new securities if they are undervalued by outside investors!

Asymmetric Information: Leverage as a Credible Signal

- In the presence of asymmetric information, “Actions speak louder than words”:
 - To persuade investors that the announcements they make (based on expectations) are true, managers’ actions must be credible – i.e., a high price must be paid if found to be untrue.
 - By Leveraging the firm, the manager commits to large future debt payments – this can work as a signal of the manager’s optimistic expectations (signaling theory of debt).
 - **Example:** Suppose Beltran currently uses 100%-equity, and its market value at the end of the year will be either \$100 million or \$50 million. The manager believes success is certain, but investors give same probability to the two outcomes.
Leverage of \$55 million could work as a credible signal, since in the worst possible scenario the firm would be in default and face costs of financial distress.

Asymmetric Information: Issuing Equity and Adverse Selection

- When a firm sells new equity, asymmetric information is present much in the same way as when someone sells a second hand car. There is adverse selection and the lemons principle:
 - When a seller has private information about the value of a good, buyers will discount the price they are willing to pay due to adverse selection.
- When a firm announces a new equity issue, investors wonder whether it is really because of new valuable investment opportunities or because of bad news...
 - The market is skeptical, and managers who really have good news, may refrain from issuing new equity.

Adverse Selection: Implications for Equity Issuance and Capital Structure

- The stock price declines on the announcement of an equity issue.
- The stock price tends to rise prior to the announcement of an equity issue.
- Firms tend to issue equity when information asymmetries are minimized, such as immediately after earnings announcements.
- Managers who perceive the firm's equity is underpriced, will prefer to fund investment using retained earnings, or debt, rather than equity. (**Pecking order theory**).

Capital Structure: the Bottom Line

- Many factors influence the choice of capital structure:
 - **Taxes** tend to favor using Debt financing, but
 - **Financial Distress Costs** limit the use of Debt, as well as the
 - **Agency Costs of Debt**.
 - But there other advantages to using Debt, in terms of motivating managers (**Agency Benefits of Debt**).
 - Finally, **Asymmetric Information in the form of Adverse Selection** makes it costly for current shareholders to issue new equity, giving a preference to retained earnings or debt as sources of funding.

