

MGST 451

Corporate Governance and Ethical Decision-Making

Lecture 15 – Winter 2019 L01-L03

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You may want to review chapter 19 of your FNCE317 textbook

1. The optimal level of debt

- Tax benefits of debt versus cost of financial distress

2. The agency costs of debt

- Shareholders possibly taking advantage of debtholders
- Debt overhang: reaching a dead end

3. The agency benefits of debt

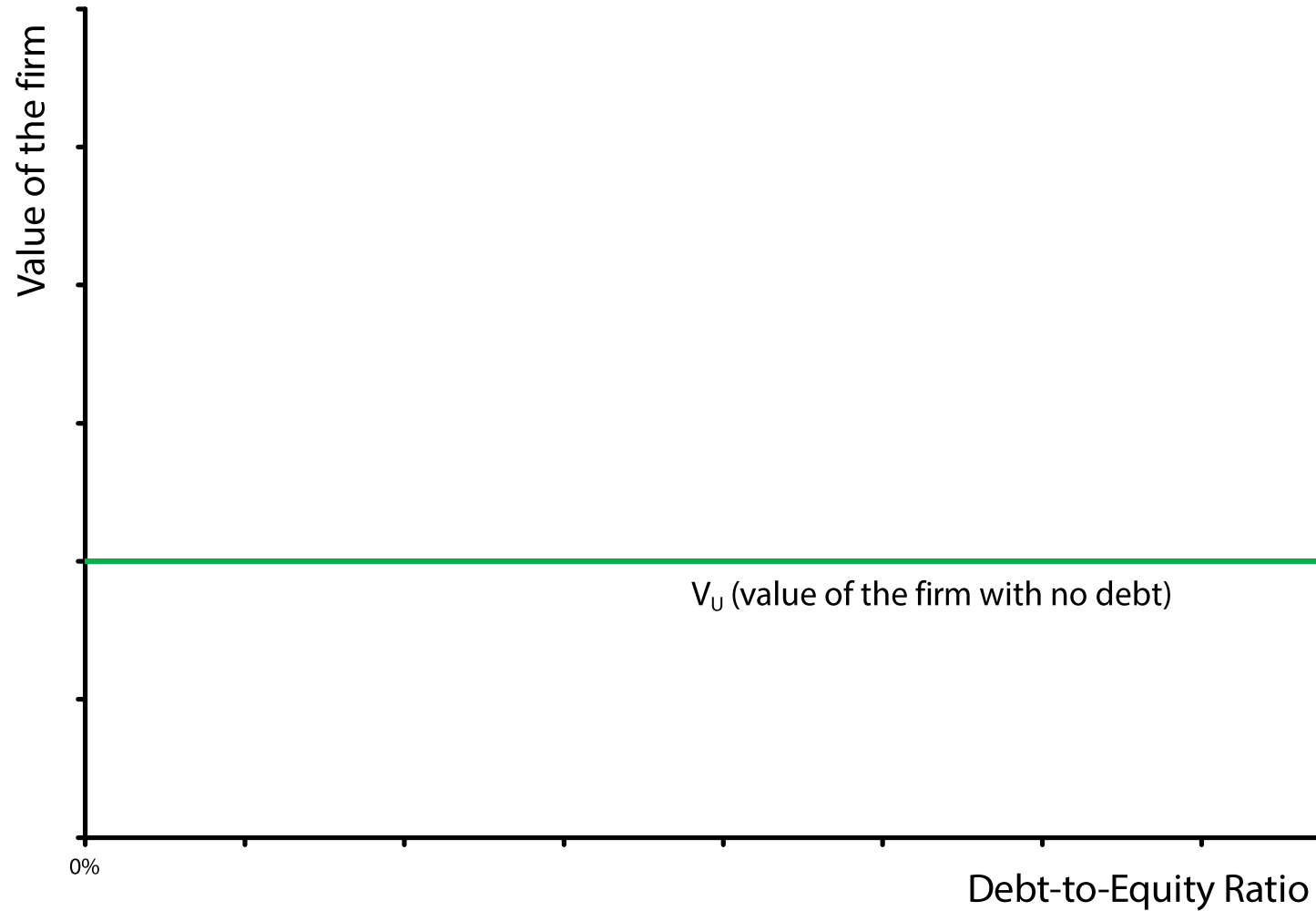
- Concentration of ownership
- Reduction in wasteful investment and debt discipline

4. Asymmetric information: signalling and adverse selection

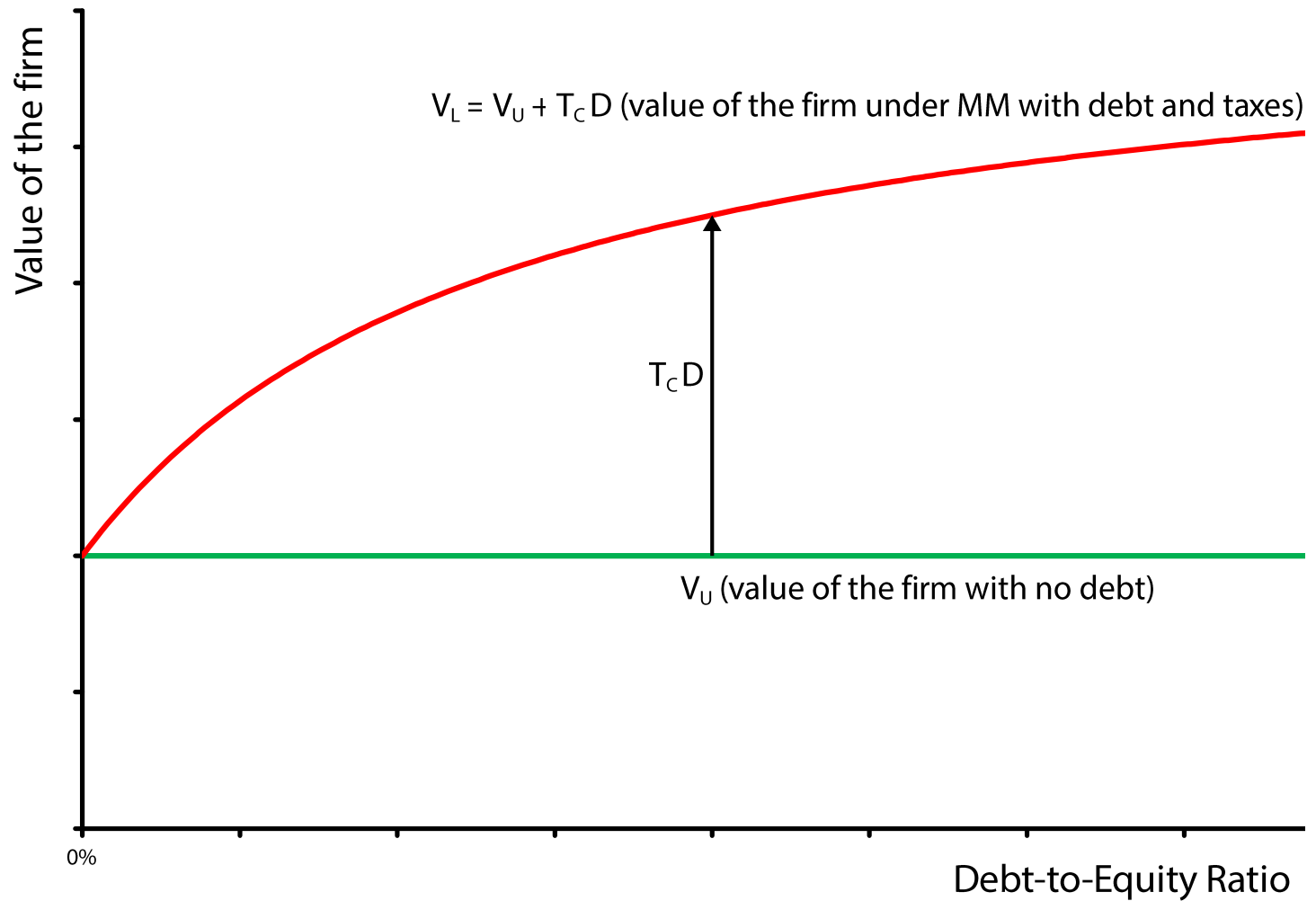
- Until now we have focused on the interrelationships between the Shareholders, the Board of Directors, and the Executives.
- We will now be looking into another type of stakeholder: the debt holders (i.e. the providers of debt capital to the firm).
- Firms can incur indebtedness in many different ways, but we will consider the typical case whereby the debtholders provide debt to the firm under the form of a bond or a fixed-term loan (fixed interest and bullet maturity).

- A firm can raise capital it needs from shareholders or from the debt markets (bonds, bank loans, etc.).
- Per Miller Modigliani (1958 & 1963) under some assumptions, the source of capital (i.e. shares or debt) is irrelevant.
- However, in most countries, interest on debt is an allowable expenses for tax purposes but it is not the case for dividends.
- Therefore, there is a built-in tax incentive to use debt rather than equity since debt is significantly cheaper than equity.
- It should cause firms to be financed with close to 100% debt, but this is not what is being observed because as you use more and more debt, the probability of financial distress (i.e. bankruptcy costs) increases.
- Optimal level of debt: the level that maximizes firm's value.

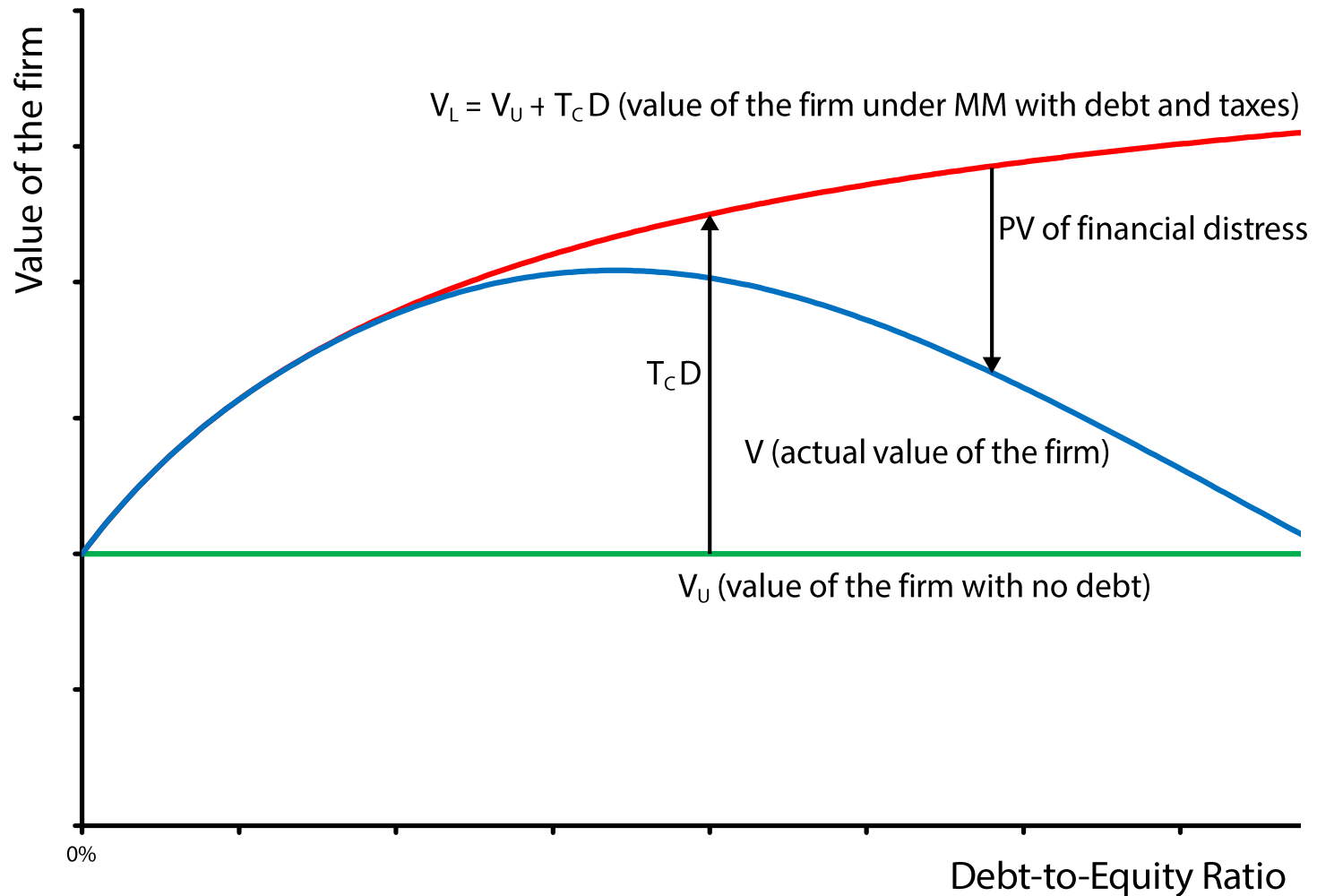
The optimal level of debt



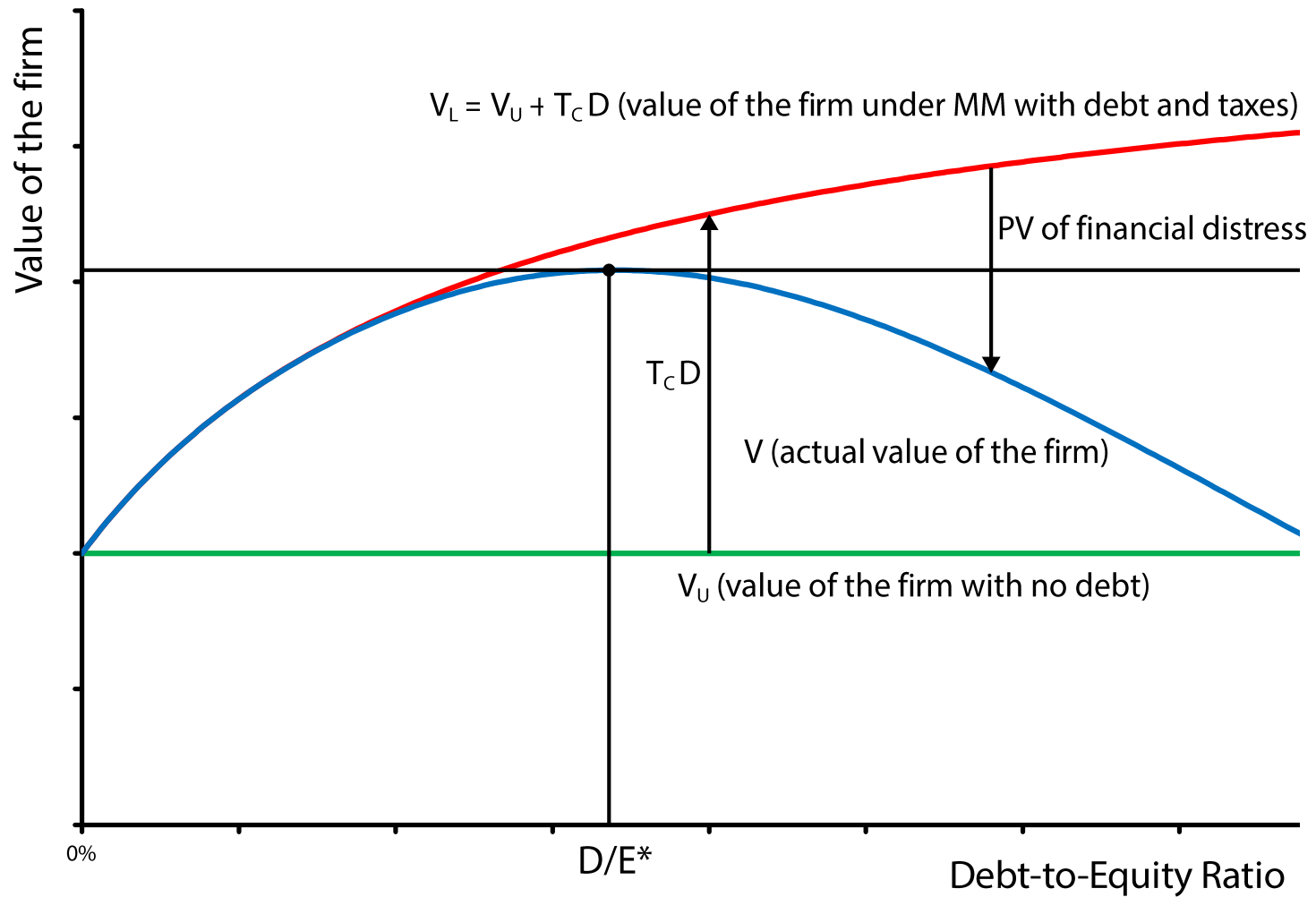
The optimal level of debt



The optimal level of debt



The optimal level of debt



- As a firm is facing financial distress, its owners-managers might choose risky projects at the expense of debtholders.
- Per below table, owners will end up the year with nothing.
- Owners implement a strategy with a 50%/50% chance of success/failure that simultaneously destroys value (-100) and reallocates it with a 50% chance to benefit its owners (+300) and a 50% chance to harm debtholders (-600).

	Do nothing	New risky strategy			Difference
		Success	Failure	Expected	
Value of firm's assets	900	1,300	300	800	-100
Debt	900	1,000	300	650	-250
Equity	0	300	0	150	+150
Total capital	900	1,300	300	800	-100

Debt overhang (Myers 1977)

- A debt burden so large that a firm cannot take on additional debt to finance its projects, even those that are profitable enough to reduce its indebtedness over time.
- Debt overhang serves to dissuade current investment, since all or most earnings from new projects would go to existing debt holders only, leaving little incentive for the firm to attempt to dig itself out of the hole.
- In addition, the firm's shareholders do not want to issue new stock because this forces shareholders to bear some of the losses that would have been borne by junior creditors.
- Thus, the firm refuses to fund projects with a positive NPV.

- An heavily indebted firm has a new project as follows:
 - Initial investment: \$100;
 - Risk-free one-year payoff: \$150;
 - Risk-free interest rate: 5%.

$$NPV = -\$100 + \frac{\$150}{1.05} = 42.9$$

$$IRR = \frac{\$150 - \$100}{\$100} = 50\%$$

- Since the NPV is positive and the IRR is greater than the risk adjusted hurdle rate, the firm should undertake the project.

- As the firm owes 1,000 to its debtholders (debt overhang), the project has to be financed by shareholders.
- However, if the shareholders fund the project for 100, they will only get 50 back per below table.
- Therefore, the firm will not undertake the project.

	Do nothing	With new project
Value of firm's existing assets	900	900
New project		150
Total firm value	900	1,050
Debt	900	1,000
Equity	0	50
Total capital	900	1,050

- At first sight one could think that the agency costs of debt are borne solely by the debtholders.
- However, the debtholders anticipate such costs and respond accordingly:
 - Adjust interest rate higher, increasing cost of debt for firm;
 - Curtail amount of debt provided to the firm;
 - Reduce term of debt (i.e. shorter maturities);
 - Require more restrictive covenants (e.g. limits to what firm can do, to what types of investments can be undertaken, what ratios have to be met, what dividends can be paid...);
 - Require more information disclosures.

Concentration of ownership

- Using debt mitigates the need for additional equity, allowing for more concentrated ownership of firms, incentivizing owners to monitor management and take action if required.

Reduction in wasteful investment (the free cash flow hypothesis)

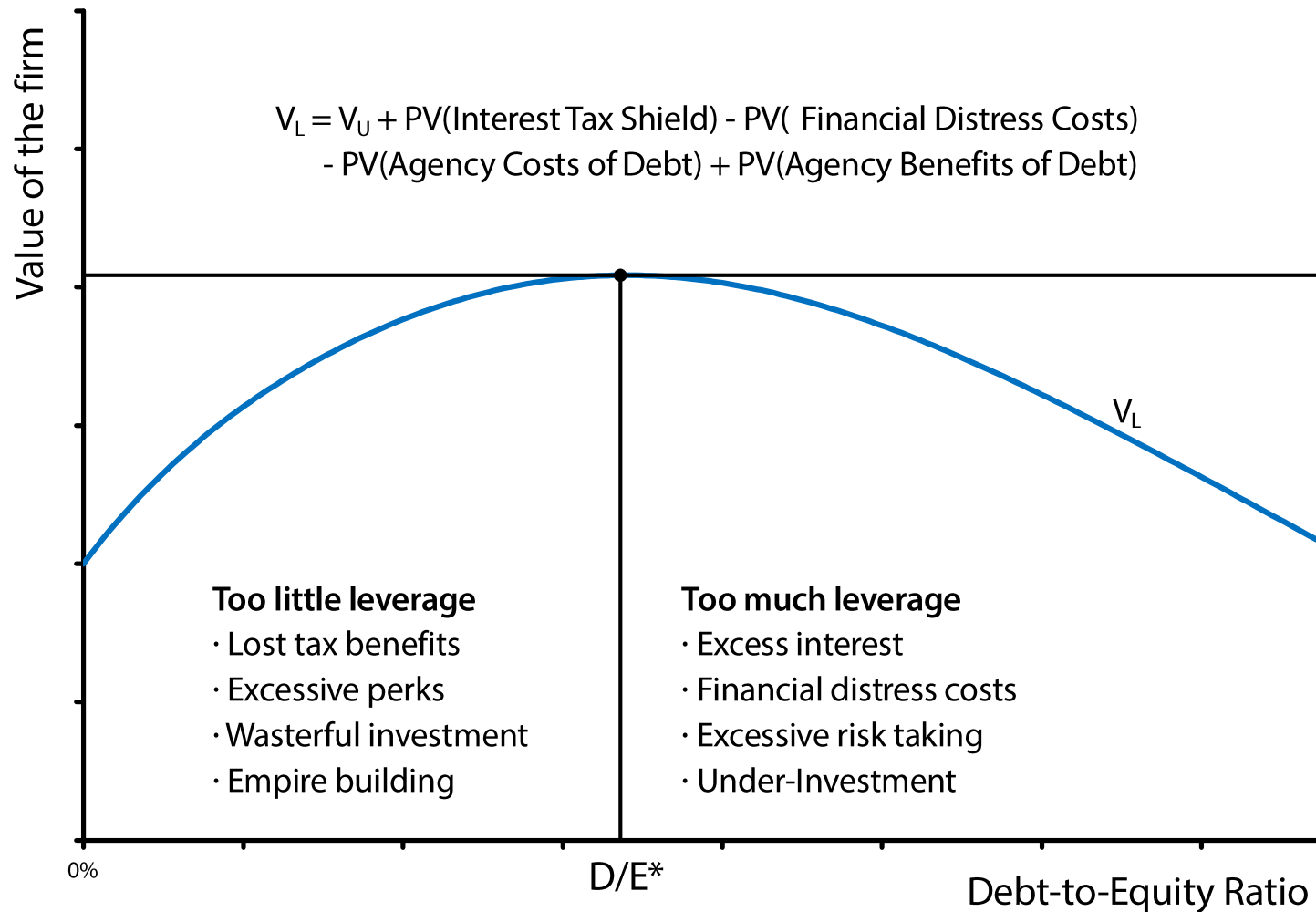
- For various reasons, like empire building and overconfidence, executives go ahead with large projects having marginal NPVs (or even negative NPVs), therefore destroying value.
- It often occurs at firms having large cash flows but not much positive NPV projects (i.e. too much money on you hands).
- Debt obligations under the form of interest payments and principal repayment reduces such free cash flows.

‘Debt discipline’

- If cash flows are tight as a result of using debt, executives will have an incentive to operate the firm efficiently.
- Debtholders will also spend some efforts in monitoring the firm and its executives, providing an additional layer of management oversight.
- As using debt induces a possibility of financial distress and that actual financial distress most often than not result in executives getting fired, it motivates executive to better manage financial resources to prevent financial distress.

Leverage and commitment

- Need to keep competitive position to fend off/decrease the probability of financial distress.



- As executives' information about the firm is likely to be superior to both shareholders and debtholders, it gives rise to asymmetric information between management and investors.
- Investors aware of that might view information provided by management to be self-serving and not entirely credible.
- To overcome such built-in investor skepticism, management must take actions that investors understand management would be unwilling to take otherwise ('walk the talk').
- Credibility principle: "claims in one's self-interest are credible only if they are supported by actions that would be too costly to take if the claim were untrue".
- Using leverage as a way to signal good information to investors is referred to as the 'signalling theory of debt'.

- Assume a firm has some good news (like a new large NPV positive project), but is not at liberty to divulge any specific news about the project to its shareholders.
- One way to credibly communicate this positive information is to commit the firm to large future debt payments.
- If the information is true, the firm will have no trouble making the debt payments.
- Thus a firm can use leverage as a way to convince investors that it does have information that the firm will grow, even if it cannot provide verifiable details about the sources of growth.

- 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”. See Akerlof (1970)

Adverse selection

- Desire to sell good by owner signals low quality good, leading buyers to offer low price and owners of high-quality goods to be reluctant to sell a low price (e.g. selection of cars sold in used-car market is expected to be worse than average).

Equity offerings

- A firm owner’s desire to sell equity may lead investors to question how good an investment opportunity it really is.
- If sold below true value, it is a cost for current shareholders.

Implications for equity issuance

- The stock price declines on the announcement of an equity issue, as investors interpret this as a signal that the equity may be overpriced.
- On average, stock prices tends to rise prior to the announcement of an equity issue, as managers wait for the equity to be overpriced.
- Equity tend to be issued when information asymmetries are minimized (e.g. shortly after earning announcements).

Implications for capital structure

- If management views equity as underpriced, investment will be funded using retained earnings and debt rather than by issuing equity.

- As CEO of a start-up you can choose between two mutually exclusive projects, keeping in mind that you have to \$2,500 payment to bondholders due at the end of the year. The two projects have the same β , but different volatilities.

Economy	Probability	Payoff of the low volatility project	Payoff of the high volatility project
Bad	0.5	\$2,500	\$2,100
Good	0.5	\$2,700	\$2,800

- What is the expected value of the firm per each project?

Low vol project: $0.5 \times \$2,500 + 0.5 \times \$2,700 = \$2,600$

High vol project: $0.5 \times \$2,100 + 0.5 \times \$2,800 = \$2,450$

$$\text{Value of equity} = \sum_{i=1}^n p_i (\text{Firm value}_i - \text{Debt}_i)^+$$

- What is the expected value of the equity for the low volatility project?

$$0.5 \times (\$2,500 - \$2,500)^+ + 0.5 \times (\$2,700 - \$2,500)^+ = \$100$$

- What is the expected value of the equity for the high volatility project?

$$0.5 \times (\$2,100 - \$2,500)^+ + 0.5 \times (\$2,800 - \$2,500)^+ = \$150$$

- The shareholders prefer the high-volatility project since it maximizes the expected value of the company's equity.

$$\text{Value of debt} = \sum_{i=1}^n p_i \times \max(\text{Firm value}_i, \text{Debt}_i)$$

- What is the expected value of the debt for the low volatility project?

$$0.5 \times \$2,500 + 0.5 \times \$2,500 = \$2,500 \text{ (no loss)}$$

- What is the expected value of the debt for the high volatility project?

$$0.5 \times \$2,100 + 0.5 \times \$2,500 = \$2,300 \text{ (exp. loss of \$200)}$$

- The debtholders prefer the low-volatility project since it cannot result in a loss for them.

- Shareholders believe the shares of your firm are either worth \$14.50 or \$12.50 with equal probability, so the stock price is \$13.50 and there are 100 million shares outstanding.
- The firm need to raise \$500 millions for a new production facility, but the present value of the distress costs of borrowing \$500 million exceed the tax benefits by \$20 million.
- Borrowing has a cost of \$0.20 per share ($20/100$) and shareholders might interpret the signal as the shares being undervalued, therefore the share price would rise to \$14.50.
- Issuing shares might be interpreted by shareholders as the shares being overvalued, therefore the share price would decline to \$12.50.