



Financial Distress, Managerial Incentives, and Information

Outline

- The Costs of Bankruptcy and Financial Distress
- Financial Distress Costs and Firm Value
- Optimal Capital Structure: The Tradeoff Theory
- Exploiting Debt Holders: The Agency Costs of Leverage
- Motivating Managers: The Agency Benefits of Leverage

Default and Bankruptcy in a Perfect Market

- Financial Distress
 - When a firm has difficulty meeting its debt obligations
- Default
 - When a firm fails to make the required interest or principal payments on its debt, or violates a debt covenant
- An important consequence of leverage is the risk of bankruptcy.
 - Equity financing does not carry this risk

Default and Bankruptcy in a Perfect Market

| | 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 |

Default and Bankruptcy in a Perfect Market

- With perfect capital markets, Modigliani-Miller (MM) Proposition I applies: The total value to all investors does not depend on the firm's capital structure.
- With perfect capital markets, the risk of bankruptcy is not a disadvantage of debt, rather bankruptcy shifts the ownership of the firm from equity holders to debt holders without changing the total value available to all investors.



The Costs of Bankruptcy and Financial Distress

- In reality, bankruptcy is rarely simple and straightforward. It is often a long and complicated process that imposes both direct and indirect costs on the firm and its investors.

The Bankruptcy Code

- The U.S. bankruptcy code was created so that creditors are treated fairly and the value of the assets is not needlessly destroyed.
 - U.S. firms can file for two forms of bankruptcy protection: Chapter 7 or Chapter 11.

The Bankruptcy Code

- Chapter 7 Liquidation
 - A trustee is appointed to oversee the liquidation of the firm's assets through an auction. The proceeds from the liquidation are used to pay the firm's creditors, and the firm ceases to exist.

The Bankruptcy Code

- Chapter 11 Reorganization
 - With Chapter 11, all pending collection attempts are automatically suspended, and the firm's existing management is given the opportunity to propose a reorganization plan.
 - While developing the plan, management continues to operate the business.

The Bankruptcy Code

- Chapter 11 Reorganization
 - Creditors may receive cash payments and/or new debt or equity securities of the firm.
 - The value of the cash and securities is typically less than the amount each creditor is owed, but more than the creditors would receive if the firm were shut down immediately and liquidated.
 - The creditors must vote to accept the plan.
 - If an acceptable plan is not put forth, the court may ultimately force a Chapter 7 liquidation.

Direct Costs of Bankruptcy

- The bankruptcy process is complex, time-consuming, and costly.
 - Costly outside experts for legal and professional advice are often hired by the firm to assist with the bankruptcy process.
 - The average direct costs of bankruptcy are approximately 3% to 4% of the pre-bankruptcy market value of total assets.

Indirect Costs of Financial Distress

- While the indirect costs are often much larger than the direct costs of bankruptcy.
 - Loss of Customers
 - Loss of Suppliers
 - Loss of Employees
 - Fire Sale of Assets
- It is estimated that the potential loss due to financial distress is 10% to 20% of firm value

TABLE 16.2**Value of Debt and Equity with
and without Leverage (\$ million)**

| | 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 |

Who Pays for Financial Distress Costs?

- If the new product fails, equity holders lose their investment in the firm and will not care about bankruptcy costs.
- However, debt holders recognize that if the new product fails and the firm defaults, they will not be able to get the full value of the assets.
 - As a result, they will pay less for the debt initially

Who Pays for Financial Distress Costs?

- *When securities are fairly priced, the original shareholders of a firm pay the present value of the costs associated with bankruptcy and financial distress.*

Optimal Capital Structure: The Tradeoff Theory

- Tradeoff Theory
 - The firm picks its capital structure by trading off the benefits of the tax shield from debt against the costs of financial distress and agency costs.

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

Determinants of Financial Distress Costs

1. The probability of financial distress.

- Increases with the amount of a firm's liabilities (relative to its assets).
- Volatility of cash flows

2. The magnitude of the costs after a firm is in distress.

- Costs will vary by industry
 - Technology firms VS Real estate firms

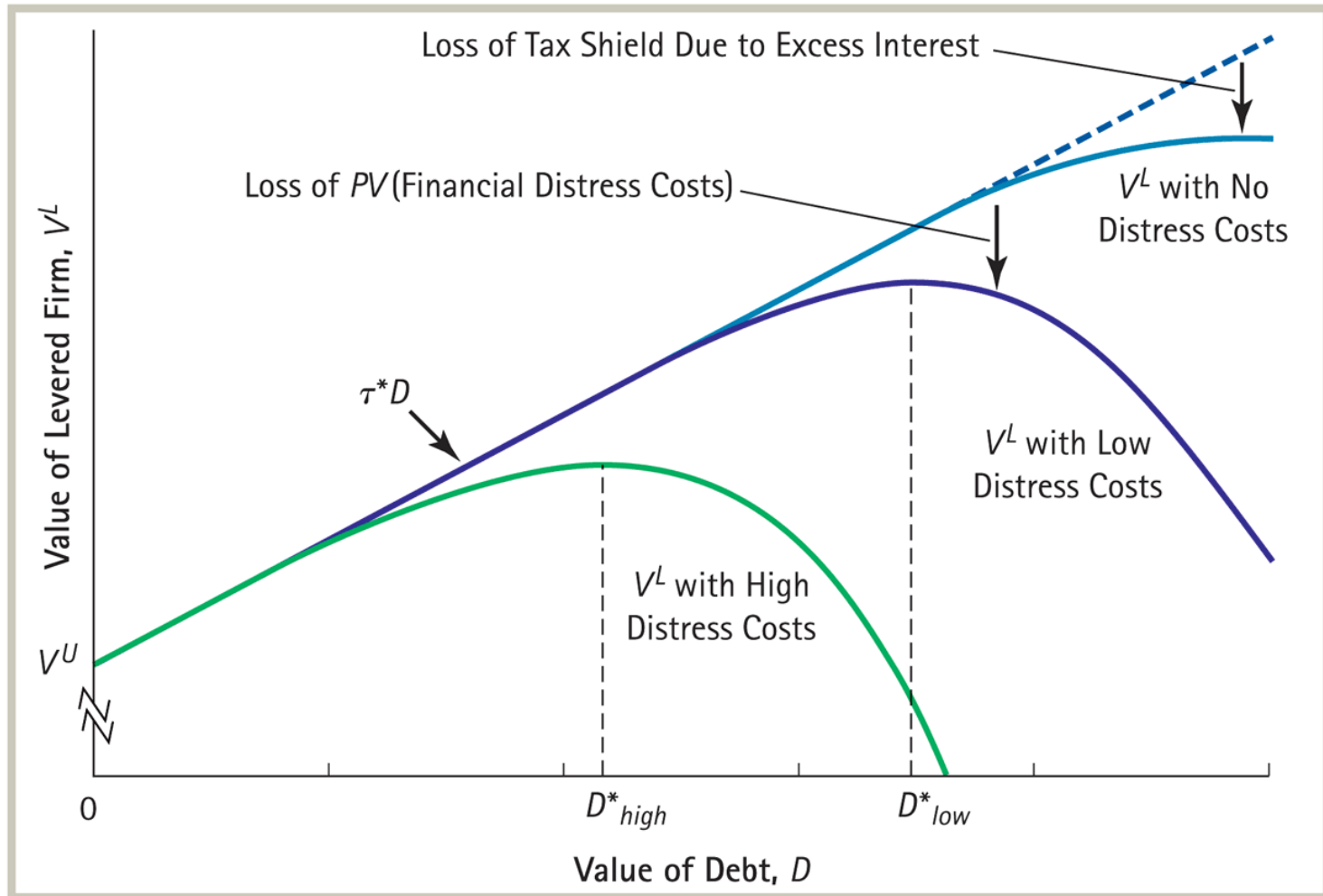
Optimal Leverage

- The tradeoff theory states that firms should increase their leverage until it reaches the level for which the firm value is maximized.
 - At this point, the tax savings that result from increasing leverage are perfectly offset by the increased probability of incurring the costs of financial distress.

Optimal Leverage

- The tradeoff theory can help explain
 - Why firms choose debt levels that are too low to fully exploit the interest tax shield (due to the presence of financial distress costs)
 - Differences in the use of leverage across industries (due to differences in the magnitude of financial distress costs and the volatility of cash flows)

Optimal Leverage



Choosing an optimal debt level

Example: Greenleaf Industries is considering adding leverage to its capital structure. Greenleaf's managers believe they can add as much as \$35 million in debt and exploit the benefits of the tax shield (for which they estimate $=15\%$). However, they also recognize that higher debt increases the risk of financial distress. Based on simulations of the firm's future cash flows, the CFO has made the following estimates (in millions of dollars):

| Debt | 0 | 10 | 20 | 25 | 30 | 35 |
|-------------|------|------|------|------|------|------|
| PV (利息税盾) | 0.00 | 1.50 | 3.00 | 3.75 | 4.50 | 5.25 |
| PV (财务困境成本) | 0.00 | 0.00 | 0.38 | 1.62 | 4.00 | 6.38 |

What is the optimal debt choice for Greenleaf?

| Debt | 0 | 10 | 20 | 25 | 30 | 35 |
|-------------|------|------|------|------|------|-------|
| Net Benefit | 0.00 | 1.50 | 2.62 | 2.13 | 0.50 | -1.13 |

Exploiting Debt Holders: The Agency Costs of Leverage

- Agency Costs
 - Costs that arise when there are conflicts of interest between the firm's stakeholders
 - When a firm has leverage, managers may make decisions that benefit shareholders but harm the firm's creditors and lower the total value of the firm.

Exploiting Debt Holders: The Agency Costs of Leverage

- Consider Baxter, Inc., which is facing financial distress.
 - Baxter has a loan of \$1 million due at the end of the year.
 - Without a change in its strategy, the market value of its assets will be only \$900,000 at that time, and Baxter will default on its debt.

TABLE 16.3**Outcomes for Baxter's Debt and Equity
Under Each Strategy (\$ thousand)**

| | 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 |

Over-investment

- Over-investment Problem
 - When a firm faces financial distress, shareholders can gain at the expense of debt holders by taking a negative-NPV project, if it is sufficiently risky, even though a negative-NPV project destroys value for the firm overall.
 - Anticipating this bad behavior, security holders will pay less for the firm initially.

Under-investment

- Now assume Baxter does not pursue the risky strategy but instead the firm is considering an investment opportunity that requires an initial investment of \$100,000 and will generate a risk-free return of 50%.

TABLE 16.4**Outcomes for Baxter's Debt and Equity with
and without the New Project (\$ thousand)**

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

Under-investment

- If the current risk-free rate is 5%, this investment clearly has a positive NPV.
 - What if Baxter does not have the cash on hand to make the investment?
 - Could Baxter raise \$100,000 in new equity to make the investment?
 - The debt holders receive most of the benefit, thus this project is a negative-NPV investment opportunity for equity holders, even though it offers a positive NPV for the firm.

Under-investment

- *When a firm faces financial distress, it may choose not to finance new, positive-NPV projects.*

Agency Costs of Leverage

- Leverage can encourage managers and shareholders to act in ways that reduce firm value.
 - It appears that the equity holders benefit at the expense of the debt holders.
 - However, ultimately, it is the shareholders of the firm who bear these agency costs.
- Agency costs of debt represent another cost of increasing the firm's leverage that will affect the firm's optimal capital structure choice.

Debt Maturity and Covenants

- The magnitude of agency costs often depends on the maturity of debt.
 - Agency costs are highest for long-term debt and smallest for short-term debt.

Debt Maturity and Covenants

- Debt Covenants
 - Conditions of making a loan in which creditors place restrictions on actions that a firm can take
- Covenants may help to reduce agency costs, however, because covenants hinder management flexibility, they have the potential to prevent investment in positive NPV opportunities and can have costs of their own.

Motivating Managers: The Agency Benefits of Leverage

- Management Entrenchment（管理者壁垒效应）
- Entrenchment may allow managers to run the firm in their own best interests, rather than in the best interests of the shareholders.

Motivating Managers: The Agency Benefits of Leverage

- Managers may engage in *empire building*.
 - Managers often prefer to run larger firms rather than smaller ones, so they will take on investments that increase the size, but not necessarily the profitability, of the firm.
 - Managers of large firms tend to earn higher salaries, and they may also have more prestige and garner greater publicity than managers of small firms.

Motivating Managers: The Agency Benefits of Leverage

- Managers may over-invest because they are overconfident.
 - Even when managers attempt to act in shareholders' interests, they may make mistakes.
 - Managers tend to be bullish on the firm's prospects and may believe that new opportunities are better than they actually are.

Motivating Managers: The Agency Benefits of Leverage

- Free Cash Flow Hypothesis
 - The view that wasteful spending is more likely to occur when firms have high levels of cash flow in excess of what is needed after making all positive-NPV investments and payments to debt holders

Motivating Managers: The Agency Benefits of Leverage

- When cash is tight, managers will be motivated to run the firm as efficiently as possible.
 - According to the free cash flow hypothesis, leverage increases firm value because it commits the firm to making future interest payments, thereby reducing excess cash flows and wasteful investment by managers.



Motivating Managers: The Agency Benefits of Leverage

- Leverage can reduce the degree of managerial entrenchment because managers are more likely to be fired when a firm faces financial distress.
 - Managers who are less entrenched may be more concerned about their performance and less likely to engage in wasteful investment.



Motivating Managers: The Agency Benefits of Leverage

- In addition, when the firm is highly levered, creditors themselves will closely monitor the actions of managers, providing an additional layer of management oversight.

Trade-off Theory

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

The Optimal Debt Level

- R&D-Intensive Firms
 - Firms with high R&D costs and future growth opportunities typically maintain low debt levels.
 - These firms tend to have low current free cash flows and risky business strategies.

The Optimal Debt Level

- Low-Growth, Mature Firms
 - Mature, low-growth firms with stable cash flows and tangible assets often carry a high-debt load.
 - These firms tend to have high free cash flows with few good investment opportunities.



Asymmetric Information and Capital Structure

- Leverage as a Credible Signal
- Issuing Equity and Adverse Selection
- Pecking Order Hypothesis

Leverage as a Credible Signal

- Assume a firm has a large new profitable project, but cannot discuss the project due to competitive reasons.
 - 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.
 - If the information is false, the firm will have trouble paying its creditors and will experience financial distress. This distress will be costly for the firm.

Leverage as a Credible Signal

- Signaling Theory of Debt
 - The use of leverage as a way to signal information to investors
 - 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.

Issuing Equity and Adverse Selection

- Adverse Selection（逆向选择）
 - The idea that when the buyers and sellers have different information, the average quality of assets in the market will differ from the average quality overall
- Lemons Principle（柠檬原理）
 - 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.

Issuing Equity and Adverse Selection

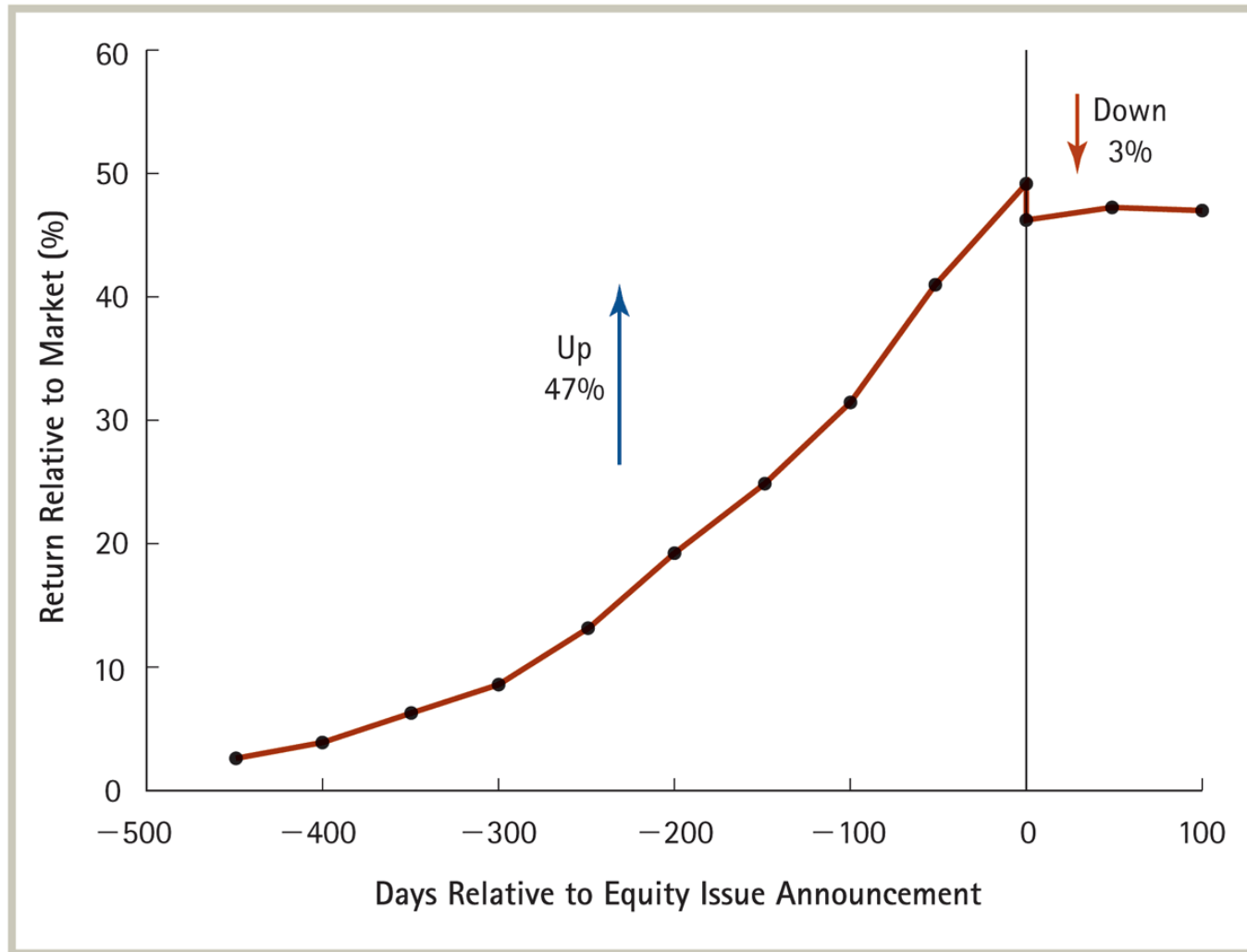
- This same principle can be applied to the market for equity.
 - Suppose the owner of a start-up company offers to sell you 70% of his stake in the firm. He states that he is selling only because he wants to diversify. You suspect the owner may be eager to sell such a large stake because he may be trying to cash out before negative information about the firm becomes public.

Issuing Equity and Adverse Selection

- The lemons problem creates a cost for firms that need to raise capital from investors to fund new investments.
 - If they try to issue equity, investors will discount the price they are willing to pay to reflect the possibility that managers have bad news.

Issuing Equity and Adverse Selection

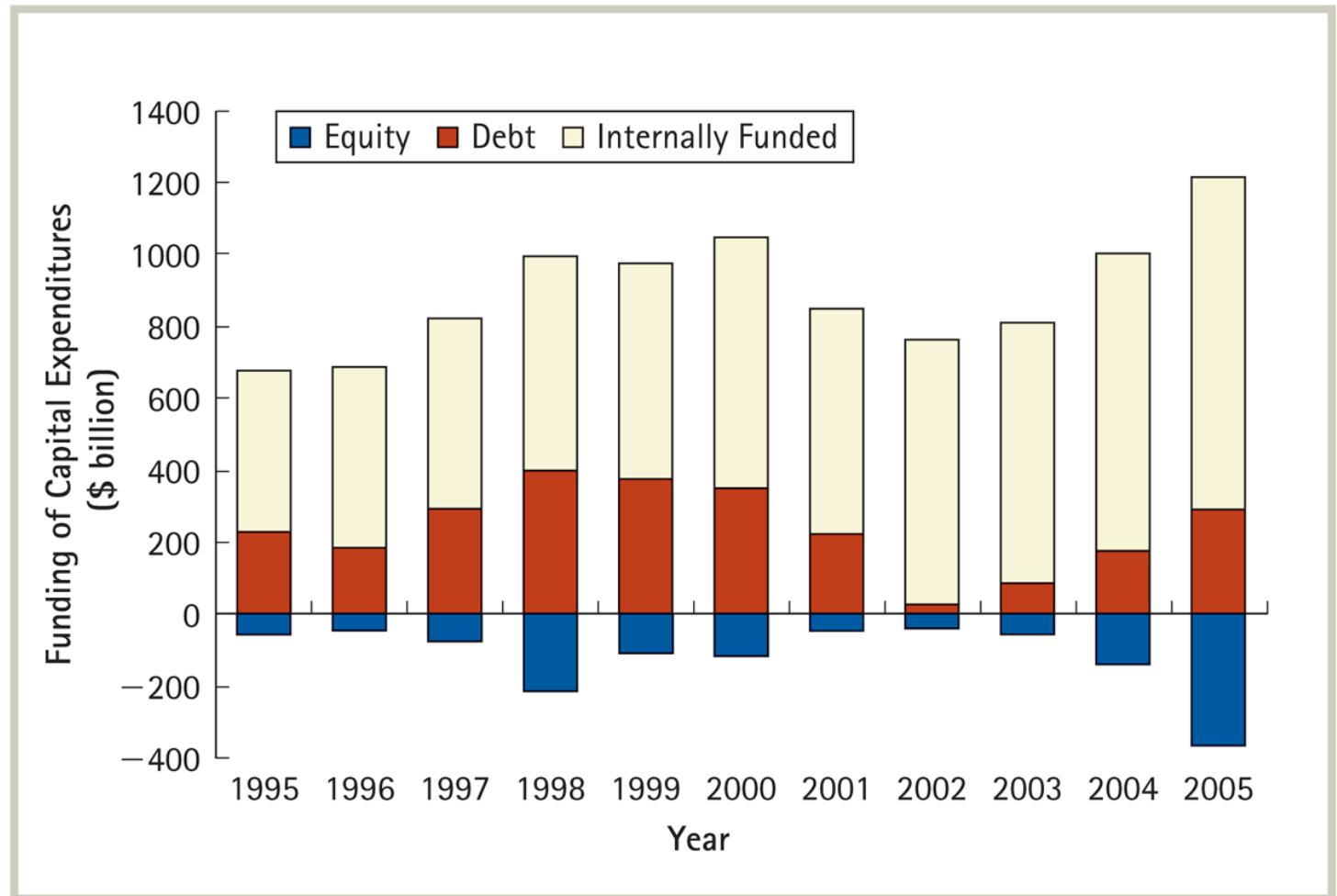
- Therefore, managers who know their prospects are good (and whose securities will have a high value) will not sell new equity.
- Only those managers who know their firms have poor prospects (and whose securities will have low value) are willing to sell new equity.



Pecking Order Theory

- Pecking Order Hypothesis（排序假说）
 - The idea that managers will prefer to fund investments by first using retained earnings, then debt, and equity only as a last resort

Aggregate Sources of Funding for Capital Expenditures, U.S. Corporations





Summary

- MM Proposition
- The Tradeoff Theory
- Pecking Order Hypothesis