Capital Structure: Part 2

For 9.220, Term 1, 2002/03
02_Lecture20.ppt
Student Version

Outline

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2. Theories of Capital Structure
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   b) Agency Cost of Equity (Shirking and Perquisites)
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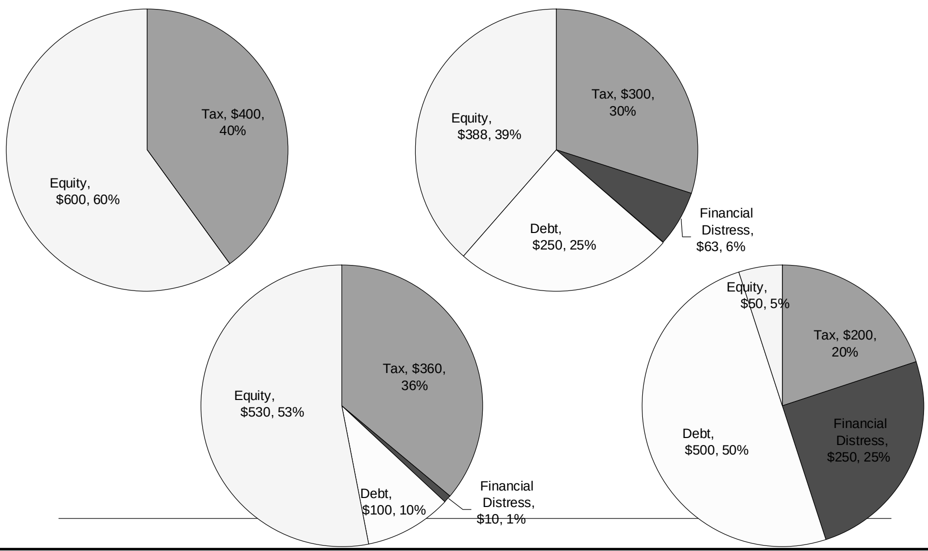
Introduction

- So far we have examined capital structure without and with corporate taxes. Our conclusions have been that capital structure does not matter to the value of the firm (no-tax case) or the optimal capital structure is 100% debt.
- In this section we shall examine other factors that affect the optimal capital structure.
- The end result is an intermediate capital structure that depends on firm-specific characteristics.

Expected Financial Distress Costs

- Consider again our pie description of the firm. Let the pie represent the PV of all potential cash flows that the firm will generate
- I.e., the pie is the potential value of the firm. However, parts of the pie are eaten by taxes, and now expected financial distress costs.
- Expected financial distress costs increase as the use of debt financing increases. Debtholders are aware of this and insist their debt contracts are written accordingly.
- Therefore the lost value due to expected financial distress costs is borne by the shareholders as lost equity value.

Capital Structure with Corporate Taxes and Costs of Financial Distress,



The effect of financial distress costs on the firm value

- As the debt level increases, the value of the expected tax shields from debt increases; however so does the value lost due to the expected financial distress costs.
- At some point, the marginal benefit from interest tax shields is just offset by the marginal cost of more expected financial distress costs.
- This leads to a limit on the optimal amount of debt in the firm's capital structure.

Aside on financial distress costs: what are they?

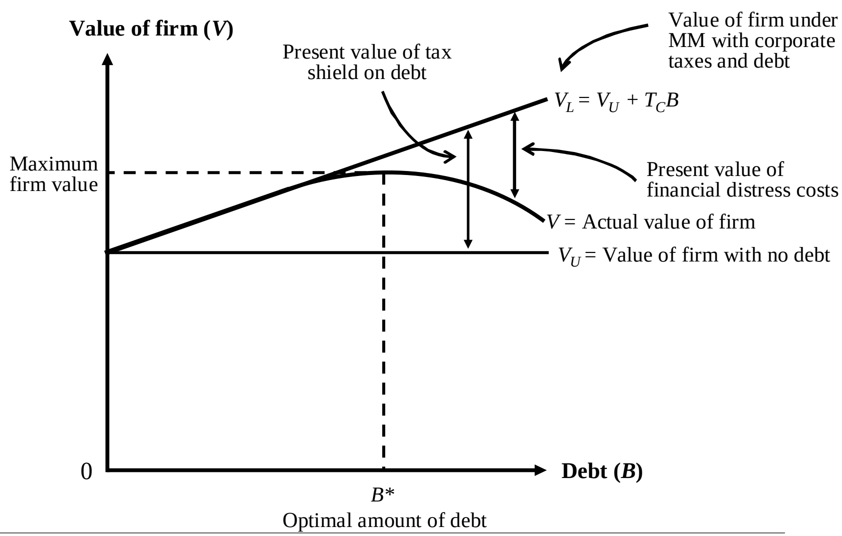
- Direct costs – legal and admin costs
- Indirect costs
  - Losses of customers, suppliers, good employees, etc.
  - Agency costs of debt
    - Incentive to take large risks (even if assets are redeployed to negative NPV projects)
      - Consider equity value as a call option on the firm's assets.
    - Incentive to milk the property
    - Incentive toward underinvestment

Value of the firm with financial distress costs

$V_L = V_U + T_C \bullet B - PV_{\text{expected financial distress costs}}$

- The value of the levered firm is reduced by the present value of the expected financial distress costs.

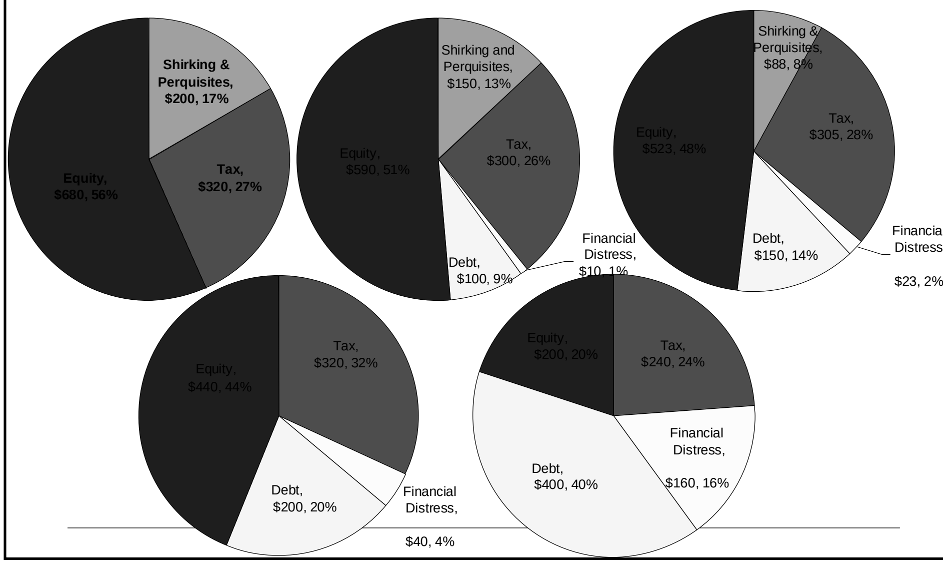
Integration of Tax Effects and Financial Distress Costs



Agency Costs of Equity

- Jensen, 1986, "Agency costs of free cash flow…" *American Economic Review*.
- The more discretionary cash flow management controls, the more it will be tempted to spend money on perquisites or to shirk in its duties.
- Higher debt levels reduce discretionary cash flows controlled by management, and therefore reduce the waste caused by management shirking or spending on perquisites. Thus higher debt levels add to firm value.

Capital Structure with Corporate Tax, Financial Distress, and Agency Costs of Equity



Value of the firm with agency costs of equity (or agency costs of free cash flow)

$V_L = V_U + T_C \bullet B - PV_{\text{expected financial distress costs}} + PV_{\text{savings of shirking and perquisites costs}}$

- The value of the levered firm is reduced by the present value of the expected financial distress costs.
- However, now it is increased as debt increases because of the savings of the agency costs of equity.
  - Save costs related to excessive perquisites or shirking of management.

Pecking Order Theory

- Another theory on the use of debt and equity is based on the fact that it is more difficult to determine the value of equity compared to debt.
- Because management knows more about the true value of the firm, investors will interpret an equity issue to signal management's assessment that the firm's equity value must be overvalued.
- Debt has contractual payments, thus there is less of an over-valued signal when debt is issued. In fact, debt can signal that management is confident in its firm and believes servicing the debt will not be a problem.
- Result: markets react very negatively to additional equity issues, less negatively to additional debt issues, and are happiest with financing from retained earnings.

Pecking Order Theory

- The Pecking Order Theory thus states that managers will finance first with retained earnings, then debt, and finally additional equity issues.

Miller Model: Both Corporate and Personal Taxes

- Merton Miller, 1977, *Journal of Finance*, “Debt and Taxes”
- Miller argued that the corporate tax advantage of debt financing may be offset by the personal tax disadvantage of receiving debt interest payments.
  - At the personal or investor level, interest income is taxed at a higher rate than equity income (capital gains or dividends).
  - Because of the personal tax disadvantage of interest income, the before tax return on debt must be higher to compensate for the personal taxes. Thus, the corporate tax advantage of debt financing may be partially or wholly offset by the higher return required to compensate for the higher personal tax on debt income.

Equilibrium debt and equity amounts

- In equilibrium, there will be a marginal firm and a marginal investor.
  - For the marginal firm, the corporate tax advantage of debt will just be offset by the higher before tax rate required for its debt.
  - For the marginal investor, the after-personal-tax return on equal risk debt and equity will be equal.
- This will define an optimal economy-wide capital structure.
- For firm’s with lower effective corporate tax rates (after considering other tax shields), they do best by avoiding debt financing.
- For high-tax investors, there may be indifference between debt and equity investments (of the same risk); however for low-tax investors, the preference shifts to debt securities.

Personal Taxes: The Miller Model

- The Miller Model (that ignores financial distress and agency costs) shows that the value of a levered firm can be expressed in terms of an unlevered firm as:

$$V_L = V_U + \left[1 - \frac{(1-T_C)\times(1-T_S)}{1-T_B}\right]\times B$$

Where:

T_S = personal tax rate on equity income

T_B = personal tax rate on bond income

T_C = corporate tax rate

Effects of capital structure given personal and corporate taxes

$$V_L = V_U + \left[1 - \frac{(1-T_C)\times(1-T_S)}{1-T_B}\right]\times B$$

- The higher are personal taxes on debt income compared to corporate taxes or personal taxes on equity income, the more equity financing will be preferred and the less debt financing is preferred.

Integration of all effects on capital structure

$$V_L = V_U + \left[1 - \frac{(1-T_C)\times(1-T_S)}{1-T_B}\right]\times B$$

$$+ \mathrm{PV}_{\text{Savings of Agency Costs of Debt}}$$

$$- \mathrm{PV}_{\text{Expected financial Distress Costs}}$$

Exercise

- Analyze an example that has different costs and benefits related to debt financing.
- What is the optimal capital structure?
- What is the value of the firm under the optimal capital structure?
- What is the value of the firm’s debt and its equity under the optimal capital structure?

Summary and Conclusions

- Optimal capital structure depends on many factors
  - Personal and corporate taxes
  - Potential costs of financial distress
    - Including agency costs of debt
  - Agency costs of equity
  - Degree of information asymmetries
- These factors vary from firm to firm depending on the type of business, the consistency of profitability, the tangibility of assets, and the degree to which long-term relationships are important with customers, suppliers, and employees.