Capital Structure I
Corporate Finance and Incentives

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Payout policy

Companies can pay out cash to their shareholders in two ways

- dividend
- buy back outstanding shares

Miller & Modigliani dividend irrelevancy theorem (1961)

- Miller & Modigliani (1961) showed that whether earnings are paid out through dividends or share repurchases has no effect given the following assumptions apply:
  - No tax considerations nor transaction costs
  - Investment, financing and operating policies are held fixed
- Granted that the assumptions above hold, the investors can undo the way in which the payout was handled

Does the theory hold

- Difference in tax treatment
- Informational content of dividends vs. share repurchases
  - Dividends: A firm reporting good earnings and paying a generous dividend is putting its money where its mouth is
  - Share repurchase: More one-off event. Signaling that you, the management, believe the stock is "cheap"

General points on payout policy

- In the absence of taxes, transaction costs and the signaling effect of paying dividends
  - Dividend payouts will increase or decrease the value of the company depending on whether or not there are NPV investments which could be funded with the retained earnings
- In general, companies should opt for share repurchases rather than dividends due to the preferential tax treatment of capital gains by tax-paying investors

Capital structure

- The firm's mix of debt and equity financing is called capital structure
- The job of the financial manager is to maximize the value of the firm by choosing the optimal combination of securities
- The proportion of the total assets of the firm financed through debt is known as financial leverage or gearing

Leverage ratios of various companies

Exhibit IV.2: Financial Ratios of Selected U.S. Corporation, 1993

Company Name	Debt / Debt + Mkt Equity	Debt / Total Book Assets	EBITDA / Interest
AT&T	20%	29%	16.36
Boeing	15	13	14.37
Boston Edison	49	42	3.49
John Deere	40	37	2.47
Delta Air Lines	53	32	1.08
Disney	9	20	14.09
General Motors	61	37	2.98
Hewlett-Packard	13	17	21.67
McDonalds	15	31	7.18
3M	6	12	59.70
Philip Morris	27	35	6.72
Raytheon	9	12	37.88
Safeway Stores	55	53	3.06
Texaco	27	26	4.70
Wal-Mart	14	36	7.54

# Modigliani-Miller theorem (1958 & 1961)

- First to introduce a model on the optimal capital structure
- Somewhat surprising result:
  - M&M proposition I: The capital structure of a company has no effect on its value
  - No matter how you slice a pie, the size of the pie doesn't change

Modigliani-Miller theorem (1958 & 1961) - assumptions

- Assumptions of the model
  - Perfect capital markets
  - No taxes and no transaction costs
  - Bankruptcy exists but is costless
    - Ownership is simply transferred from shareholders to debtholders in the event of default

- Proof:
  - Based on a no arbitrage argument (refer to the numerical example in G&T)
  - Idea: Investors can undo the capital structure themselves and are therefore unwilling to pay a premium for leveraged companies

Modigliani and Miller

- Proposition I:
    - Financial leverage has no effect on shareholders' wealth
- Proposition II:
    - The expected rate of return on the common stock of a levered firm increases in proportion to the debt-equity ratio (D/E)
- How do these two propositions link
    - Any increase in expected return is exactly offset by an increase in risk and therefore the shareholders' required rate of return

Cost of capital
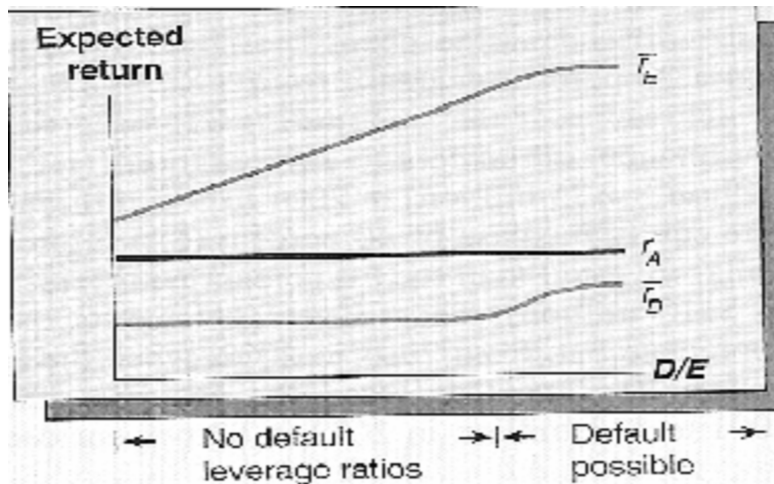
Relaxing the assumptions - corporate taxes

- Same as before, however, the company must pay a tax of T_c on its profits
    - Remember: corporate interest payments are a tax-deductible expense
- Earnings Before Interest and Tax: $\widetilde{X}$
- Payoff to investors of the company:
    - Unlevered company

$$\widetilde{X}\,(1 - T_c)$$

    - Levered company

$$\overbrace{\underbrace{\left(\widetilde{X} - r_D D\right)}_{\text{Taxable income}} (1 - T_c)}^{\text{Shareholders}} + \overbrace{r_D D}^{\text{Debt holders}}$$

$$= \quad \widetilde{X}\,(1 - T_c) + r_D D T_c$$

Implications of corporate taxes

The value of the company is increasing in the amount of debt

- Adapted proposition I: value of firm = value of all-equity-financed firm + PV(tax shield)

Companies should increase their leverage until one of two things happen:

1. They pay no tax
2. They are completely debt financed

Contradicts what we see in practice, hence, something appears to be wrong

- Personal taxes
- Inability to use tax shield
- Bankruptcy costs

Including both corporate and personal taxes

- It is no longer the firm's objective to minimize corporate taxes $\rightarrow$ they should try to minimize the present value of all taxes paid on corporate income (incl. personal taxes paid by bondholders and stockholders)

Or

- Maximize after (total) tax income

Tax gain of leverage

$$T_g = 1 - \left[\frac{(1 - T_c)(1 - T_E)}{1 - T_D} \right]$$

- If $T_c = T_D = T_E = 0$ then $T_g = 0 \rightarrow$ the original model where taxes are irrelevant
- If $T_E = T_D \rightarrow T_g = T_c$ so the tax advantage is determined solely by the corporate tax rate
- If $T_g > 0$ the company will prefer to be completely debt financed. In the opposite case, equity financing will be preferred.

Capital structure when taxable earnings are low

- So far, we have assumed the firm can always utilize their interest tax shield.
  - This may not be the case.
  - Companies with low current earnings and/or high non-debt tax shields (R&D expenses, depreciation deductions)
    - Start up firms
    - General Motors (see 3. quarter 2007 earnings announcement)