Capital Structure: the effect of Personal Taxes (T_E , T_i)

Gestão Financeira II

Undergraduate Courses

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LISBOA SCHOOL OF ECONOMICS & MANAGEMENT

SINCE 1911

Personal Taxes

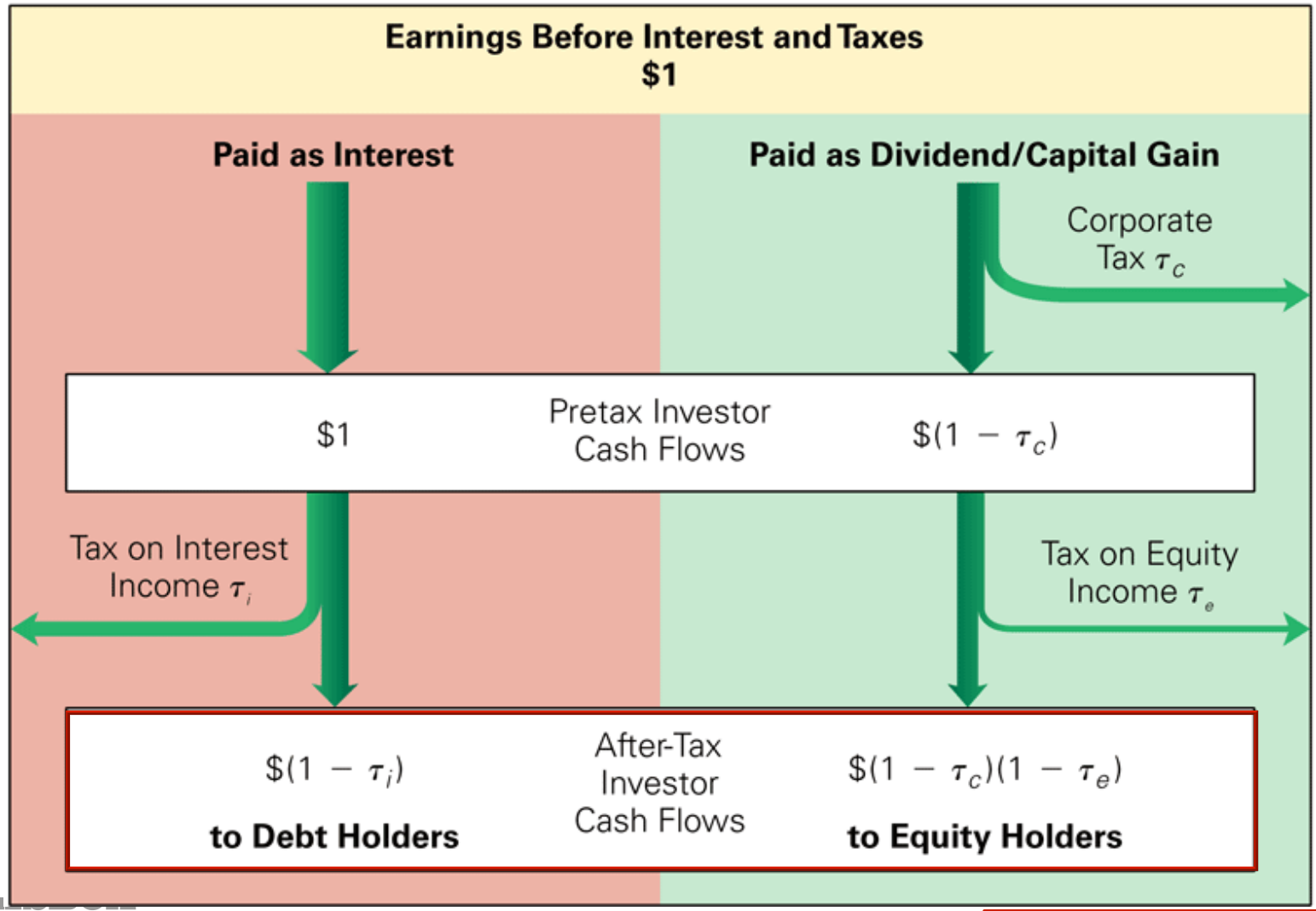
- The cash flows to investors are typically taxed twice. Once at the corporate level and then investors are taxed again when they receive their interest or dividend payment or realize their capital gain.

- For individuals:
  - Interest payments received from debt are taxed as income.
  - Equity investors also must pay taxes on dividends and capital gains.
- Personal taxes reduce the cash flows to investors and can offset some of the corporate tax benefits of leverage.

Tax Benefit of Using Debt: Interest Tax Shield

- The actual interest tax shield depends on both corporate **and personal** taxes that are paid.
- To determine the true tax benefit of leverage, the combined effect of both corporate and personal taxes needs to be evaluated.

After-Tax Investor Cash Flows from a $1 EBIT



Including Personal Taxes in the Interest Tax Shield

- Therefore, in terms of after-tax cash flows, debt is more favorable than equity as long as:

$$\$1\times(1-\tau_i) > \$1\times(1-\tau_C)(1-\tau_E)$$

- We could think of an annual tax shield from using debt, compared to equity, after corporate and personal taxes as:

$$\left[(1-\tau_i)-(1-\tau_C)(1-\tau_E)\right]\times \text{Interest}$$

Including Personal Taxes in the Interest Tax Shield

- If we are to consider a perpetual level of Debt and a fixed annual interest payment, we would get the present value of the Interest Tax Shield as:

$$PV(\text{Interest Tax Shield}) = \frac{\left[(1-\tau_i)-(1-\tau_C)(1-\tau_E)\right]\times r_D D}{r_D(1-\tau_i)}$$

- Finally, the Effective Tax Advantage of Debt can be seen as:

$$\tau^* = 1 - \frac{(1-\tau_C)(1-\tau_E)}{(1-\tau_i)}$$

Interpreting the Effective Tax Advantage of Debt

$$\tau^* = 1 - \frac{(1-\tau_C)(1-\tau_E)}{(1-\tau_i)}$$

- Intuitivelly:
  - If there are no personal taxes ($T_i=T_E=0$), or simply if the personal tax treatment is the same for equity and debt ($T_i=T_E$), the advantage of debt is the same as when only T_C were considered: $T^*=T_C$
  - If equity income is less heavily taxed than interest ($T_E<T_i$) – as is usually the case – then the tax benefit of using debt is reduced. Could even be negative!

Valuing the Interest Tax Shield with Permanent Debt

- To keep things simple we will consider only the case of Permanent Debt in the capital structure.
- Following MM's analysis and incorporating this additional imperfection – personal taxes – we would adapt proposition I to state:

$$V^L = V^U + \tau^* D$$

- Note: If we were to use the WACC method the r_{WACC} rate would look the same, but r_E and r_D would be adjusted to compensate investors for their personal taxes.

Effective Tax Advantage of Debt: Example

- Consider the tax rates (for the highest income companies and

Year	Corporate Tax Rate†	Personal Tax Rates*			
		Interest Income	Average Rate on Equity Income	Dividends	Capital Gains
1971–1978	48%	70%	53%	70%	35%
1979–1981	46%	70%	49%	70%	28%
1982–1986	46%	50%	35%	50%	20%
1987	40%	39%	33%	39%	28%
1988–1990	34%	28%	28%	28%	28%
1991–1992	34%	31%	30%	31%	28%
1993–1996	35%	40%	34%	40%	28%
1997–2000	35%	40%	30%	40%	20%
2001–2002	35%	39%	30%	39%	20%
2003–2012	35%	35%	15%	15%	15%

*Interest income is taxed as ordinary income. Until 2003, dividends were also taxed as ordinary income. The average tax rate on equity income is an average of dividend and capital gain tax rates (consistent with a 50% dividend payout ratio and annual realization of capital gains), where the capital gain tax rate is the long-term rate applicable to assets held more than one year.

- Compare the Effective Tax advantage of Debt in 1980 and 1990:

$$\tau^*_{1980} = 1 - \frac{(1-0.46)(1-0.49)}{1-0.7} = 0.082$$

$$\tau^*_{1990} = 1 - \frac{(1-0.34)(1-0.28)}{1-0.28} = 0.34$$

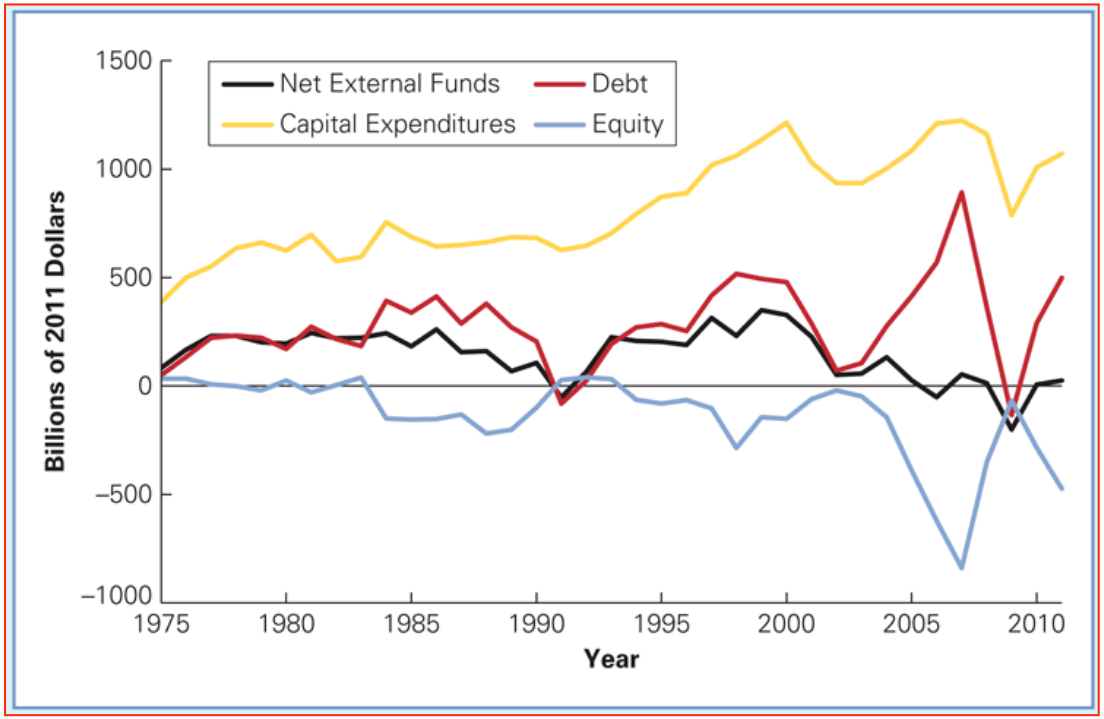
Further Comments

- The effective personal tax rate on equity income, T_E (especially for capital gains) is hard to determine, because the rate is only applied when the investor sells the share.
- Some investors are exempt from paying personal taxes (e.g., some retirement savings accounts or pension funds.)
- All we've seen so far applies only to firms that are paying corporate taxes. If a firm's EBIT is already negative, paying interest will not make the firm pay less taxes... (it's *as if Tc=0*).
  - In this case there is actually a tax disadvantge from excess interest payments:

$$\tau^* = 1 - \frac{(1-0)(1-\tau_E)}{(1-\tau_i)} = \frac{\tau_E - \tau_i}{1-\tau_i} < 0$$

Capital Structure in Practice

- Net External Financing and Capital Expenditures by U.S. Corporations, 1975–2011:



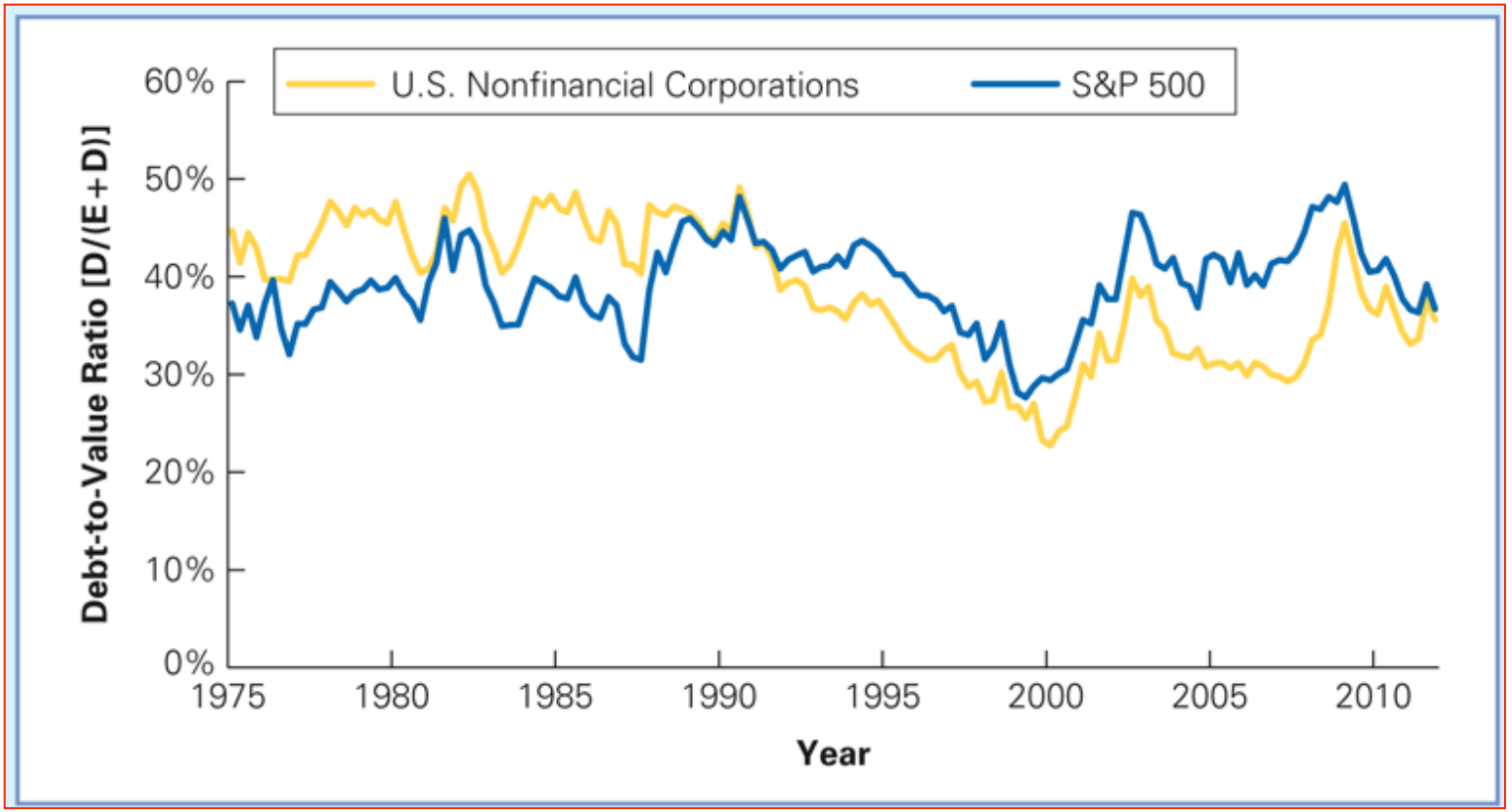
Source: Federal Reserve, Flow of Funds Accounts of the United States, 2012.

Capital Structure in Practice

- Do Firms Prefer Debt?
  - While firms seem to prefer debt when raising external funds, not all investment is externally funded.
  - Most investment and growth is supported by internally generated funds.
    - Even though firms have not issued new equity, the market value of equity has risen over time as firms have grown. For the average firm, the result is that debt as a fraction of firm value has varied in a range from 30–45%.

Capital Structure in Practice

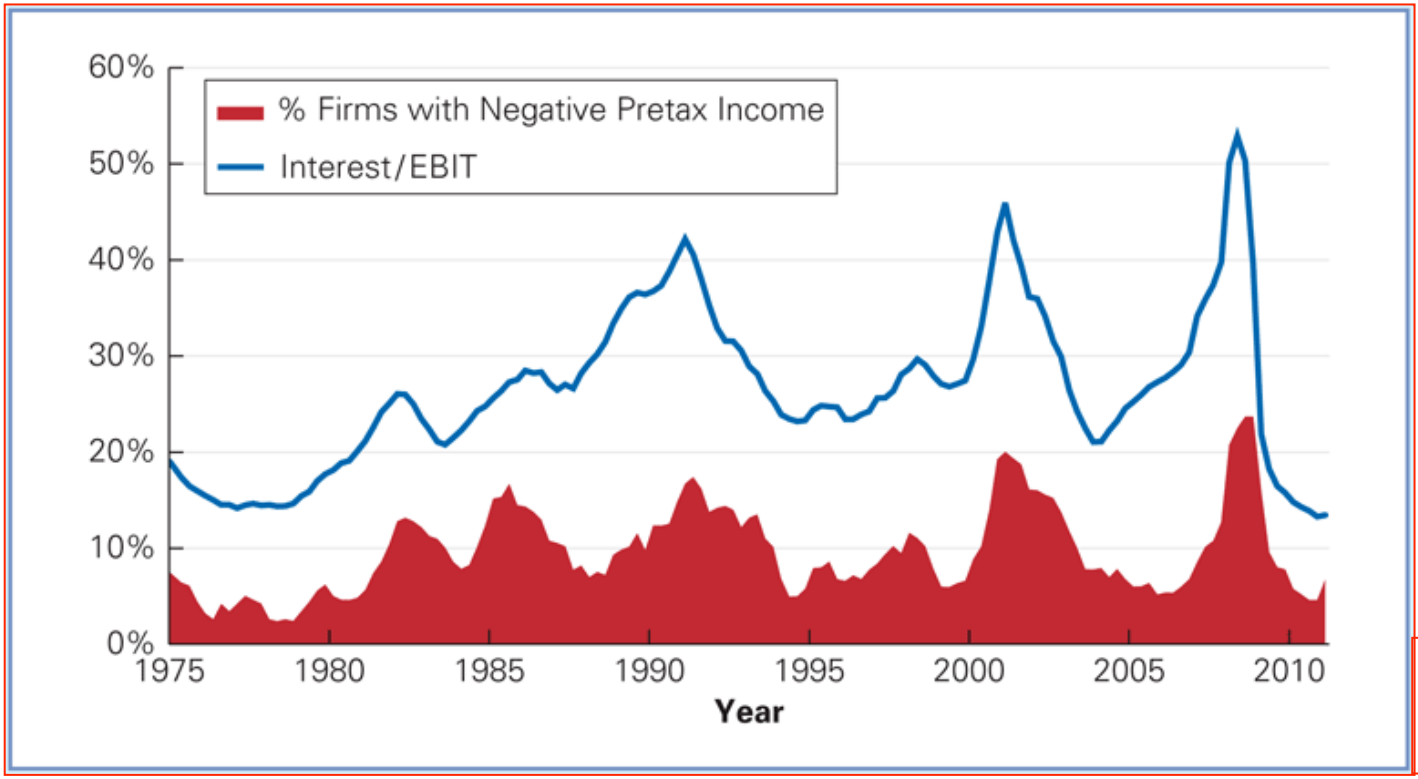
- Debt-to-Value Ratio [*D* / (*E* + *D*)] of U.S. Firms, 1975–2011



Source: Compustat and Federal Reserve, Flow of Funds Accounts of the United States, 2012.

Capital Structure in Practice

- Interest Payments as a Percentage of EBIT and Percentage of Firms with Negative Pretax Income, S&P 500 1975–2011:



Source: Compustat.

Capital Structure in Practice

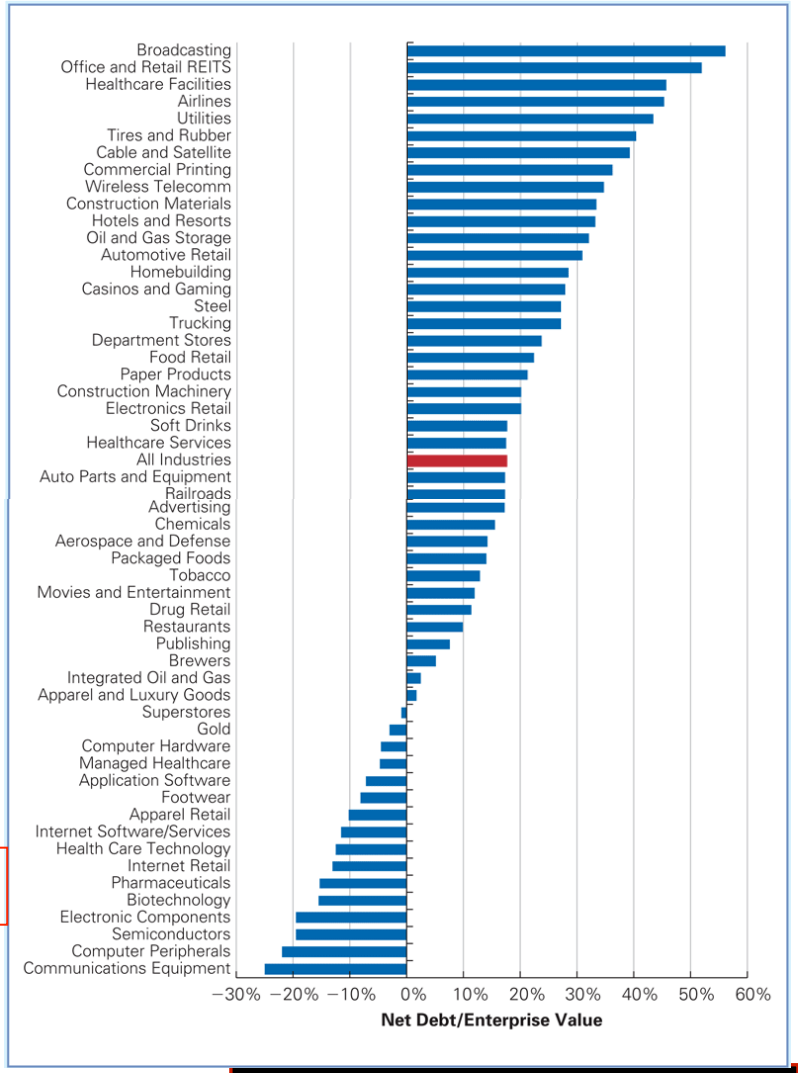
- The, perhaps low, levels of leverage (form a tax perspective) are found in different parts of the world.

Country	$D/(E+D)$	Net of Cash $D/(E+D)$	Interest/EBIT	τ_c	τ^*
United States	28%	23%	41%	34.0%	34.0%
Japan	29%	17%	41%	37.5%	31.5%
Germany	23%	15%	31%	50.0%	3.3%
France	41%	28%	38%	37.0%	7.8%
Italy	46%	36%	55%	36.0%	18.6%
United Kingdom	19%	11%	21%	35.0%	24.2%
Canada	35%	32%	65%	38.0%	28.9%

Source: R. Rajan and L. Zingales, "What Do We Know About Capital Structure? Some Evidence from International Data," *Journal of Finance* 50 (1995): 1421–1460. Data is for median firms and top marginal tax rates.

Capital Structure in Practice

- The use of debt varies greatly by industry.
- Typically, firms in growth industries like biotechnology or high technology carry very little debt, while airlines, automakers, utilities, and financial firms have high leverage ratios.
- So? Capital Structure can't only be explained by Taxes…



Source: Capital IQ, 2012.

Capital Structure in Practice

- What to conclude?
  - That Taxes overall tend to give an advantage to the use of Debt;
  - But firms are cautious in using very high levels of debt. Why?
  - Because there are more factors – besides taxes – that are important to determine the capital structure. Which factors?
  - For instance, higher debt increases the probability of bankruptcy, and bankruptcy can be costly.