

Capital structure and solvency

9

Lecture

Lecture 9: Agenda

Capital structure and solvency analysis

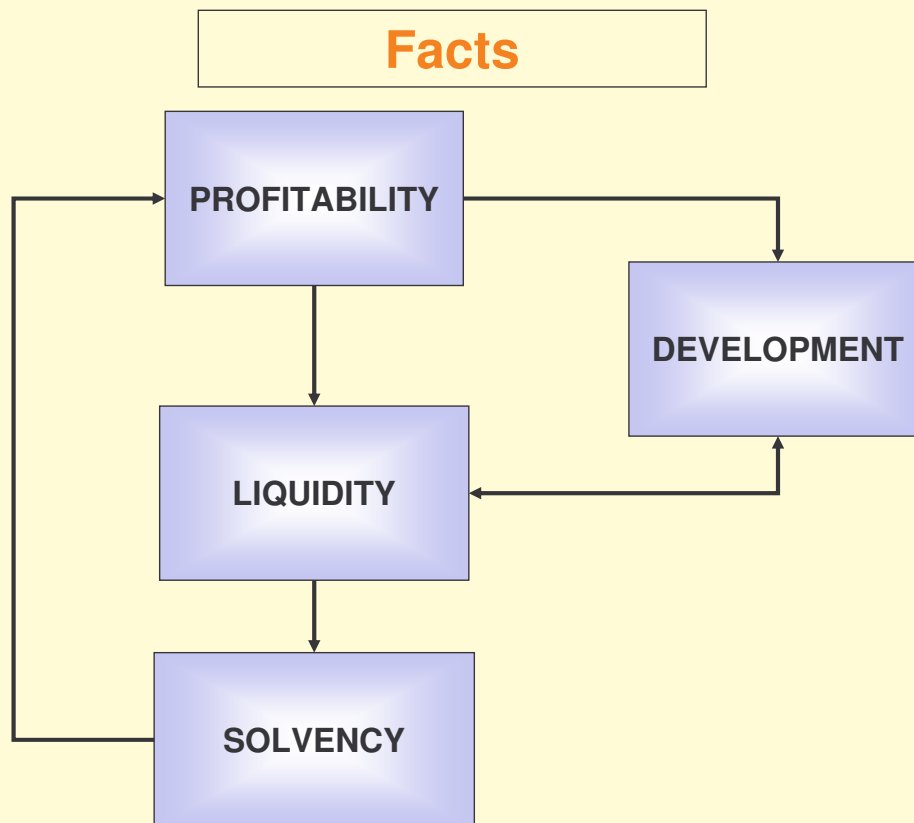
Basics of Solvency

Capital structure
Motivation for debt
Financial leverage

Capital composition And Solvency

Common-size statement
Capital structure measures
Interpretation of measures
Asset-based Solvency measures
Introduction to earning coverage

Basic of Solvency



Basic of Solvency

Facts

Solvency – refers to a company’s long-run financial viability and its ability to cover long-term obligations

Capital structure -- financing sources and their attributes

Earning power — recurring ability to generate cash from operations

Loan *covenants* – protection against insolvency and financial distress; they define conditions of *default* at a level to allow the opportunity to collect on a loan before severe distress

Basic of Solvency

Capital Structure

Equity financing

- Risk capital of a company
- Uncertain and unspecified return
- Lack of any repayment pattern
- Contributes to a company's stability and solvency

Debt financing

- Must be repaid with interest
- Specified repayment pattern

When the proportion of debt financing is higher, the higher are the resulting fixed charges and repayment commitments

Basic of Solvency

Motivation for Debt

From a shareholder's perspective, debt financing is *less expensive* than equity financing because:

1. Financial Leverage--Interest on most debt is fixed, and provided interest is less than the return earned from debt financing, the excess return goes to equity investors
2. Tax Deductibility of Interest--Interest is a tax-deductible expense whereas dividends are not

Basic of Solvency

Financial Leverage

Leverage -- use of debt to increase net income

Leverage:

- Magnifies both managerial success (profits) and failure (losses)
- Increases risks
- Limits flexibility in pursuing opportunities
- Decreases creditors' protection against loss

Companies with leverage are said to be **trading on the equity** — when a company is using equity financing to obtain debt financing in a desire to reap returns above the cost of debt.

Basic of Solvency

Financial Leverage - Illustration

Trading on the Equity—Returns for Different Earnings Levels (\$ thousands)

	Financing Sources			Return on						
	Assets	Debt	Equity	Income before Interest and Taxes	10 Percent Debt Interest	Taxes*	Net Income	Net Income + [Interest (1 - Tax Rate)]	Assets†	Equity‡
Year 1:										
Risky, Inc.	\$1,000,000	\$400,000	\$600,000	\$200,000	\$40,000	\$64,000	\$96,000	\$120,000	12.0%	16.0%
Safety, Inc.	1,000,000		1,000,000	200,000		80,000	120,000	120,000	12.0	12.0
Year 2:										
Risky, Inc.	1,000,000	400,000	600,000	100,000	40,000	24,000	36,000	60,000	6.0	6.0
Safety, Inc.	1,000,000		1,000,000	100,000		40,000	60,000	60,000	6.0	6.0
Year 3:										
Risky, Inc.	1,000,000	400,000	600,000	50,000	40,000	4,000	6,000	30,000	3.0	1.0
Safety, Inc.	1,000,000		1,000,000	50,000		20,000	30,000	30,000	3.0	3.0

* Tax rate is 40 percent.

† Return on assets = Net income + Interest (1 - 0.40)/Assets.

‡ Return on equity = Net income/Shareholders' equity.

Basic of Solvency

Financial Leverage- Illustrating Tax Deductibility of Interest

Consider two companies' results for Year 2:

<u>Year 2 Financials</u>	<u>Risky, Inc. Safety, Inc.</u>	
Income before interest and taxes	\$ 100,000	\$ 100,000
Interest (10% of \$400,000)	40,000	—
Income before taxes	\$ 60,000	\$ 100,000
Taxes (40%)	24,000	40,000
Net income	\$ 36,000	\$ 60,000
Add back interest paid to bondholder	40,000	—
Total return to security holders (debt and equity)	\$ 76,000	60,000

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Financial Leverage

Financial Leverage Ratio

$$\frac{\text{Total assets}}{\text{Common equity capital}}$$

Greater the proportion of financing from equity vs. debt
→ lower the financial leverage ratio

Note: Financial leverage ratio is a component of the disaggregated return on equity:

$$ROCE = \text{Adjusted profit margin} \times \text{Asset turnover} \times \text{Leverage}$$

Basic of Solvency

Adjustments for Capital Structure - Liabilities

Effect of Converting Operating Leases to Capital Leases on Key Ratios

Financial Ratio	Before	After
Current Ratio	1.08	1.01
Total Debt to equity	1.66	2.96
Long-term debt to equity	0.17	1.38
Return on common equity	21.7%	21.4%
Return on assets	8.16%	5.39%

Capital Structure and Solvency

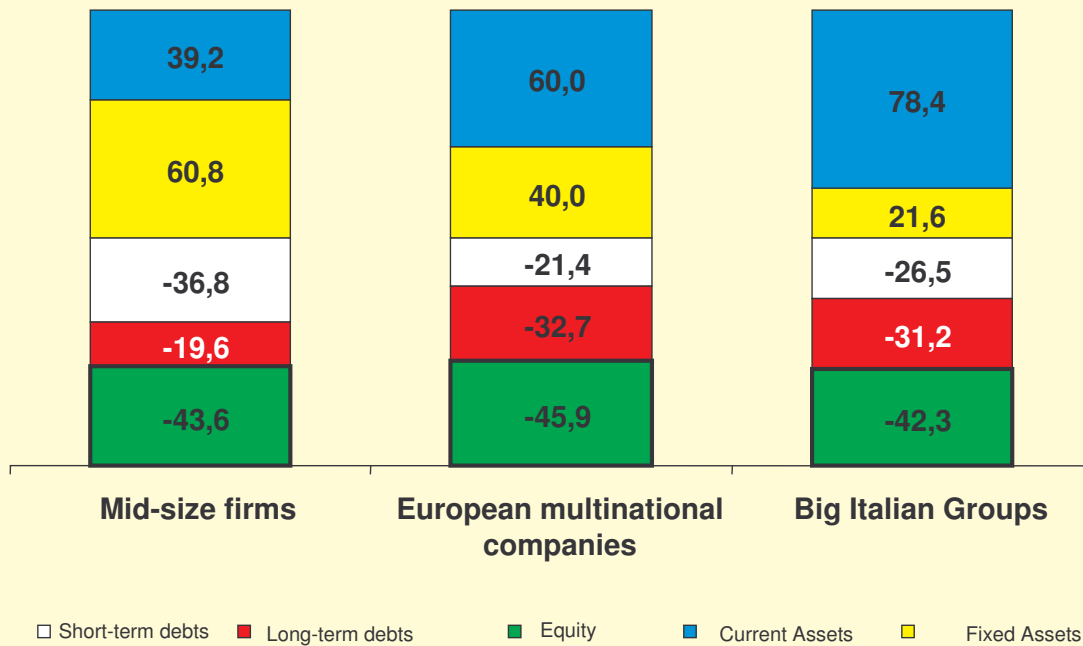
Common-Size Statements

Capital structure composition analysis

- Performed by constructing a common -size statement of liabilities and equity
- Reveals relative magnitude of financing sources
- Allows direct comparisons across different companies
- Two Variations—(1) Use ratios, and (2) Exclude current liabilities

Capital Structure and Solvency

Capital Structure % of Tangible Invested Capital



Source: Mediobanca, 2002

Capital Structure and Solvency

Capital Structure Measures

Total Debt to Total Capital (also called **total debt ratio**)

$$\frac{\text{Total debt}}{\text{Total capital}}$$

Capital Structure and Solvency

Capital Structure Measures

Total Debt to Equity Capital

$$\frac{\text{Total debt}}{\text{Shareholders' equity}}$$

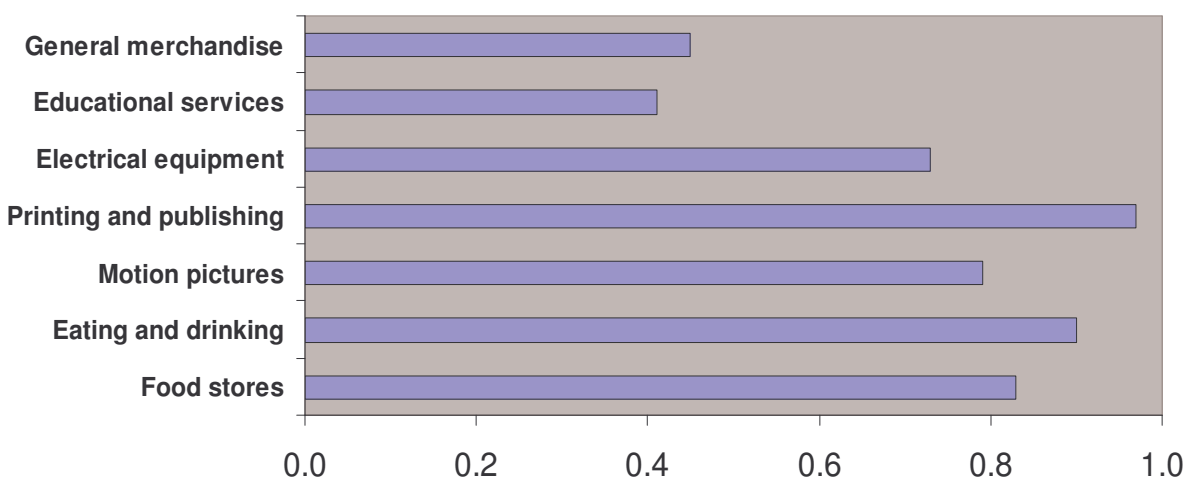
Reciprocal measure of this ratio—**Equity Capital to Total Debt**

$$\frac{\text{Shareholders' equity}}{\text{Total debt}}$$

Capital Structure and Solvency

Capital Structure Measures

Total Debt to Equity



Source: Dun & Bradstreet

Ratio

Capital Structure and Solvency

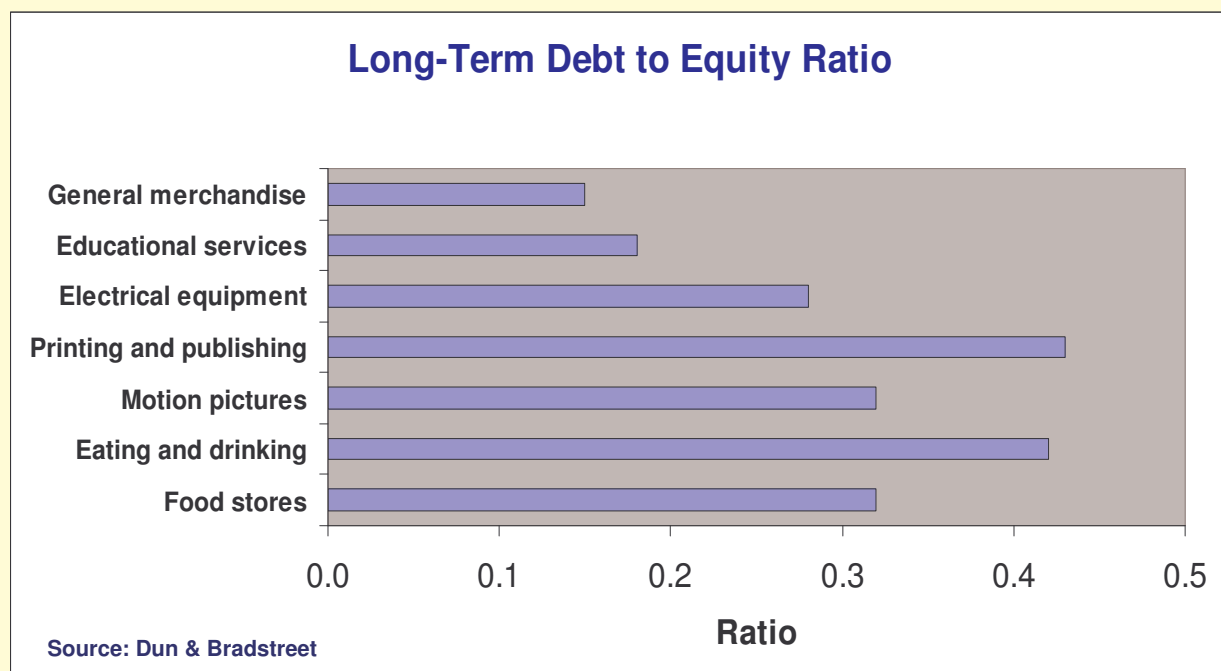
Capital Structure Measures

Long -Term Debt to Equity Capital (also called Debt to Equity)

$$\frac{\text{Long-term debt}}{\text{Shareholders' equity}}$$

Capital Structure and Solvency

Capital Structure Measures



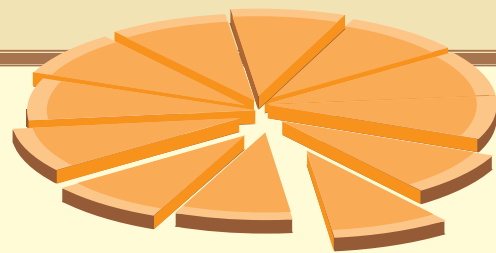
Capital Structure and Solvency

Capital Structure Measures

Short-Term Debt to Total Debt

$$\frac{\text{Short term debt}}{\text{Total debt}}$$

important indicator of enterprise reliance on short-term (primarily bank) financing



Capital Structure and Solvency

Interpretation of Capital Structure Measures

Common-size and ratio analyses of capital structure mainly reflect capital structure risk

Capital structure measures serve as screening devices

Extended analysis focuses financial condition, results of operations, and future prospects

Prior to long-term solvency analysis, we perform liquidity analysis to be satisfied about near-term survival

Additional analyses include examination of

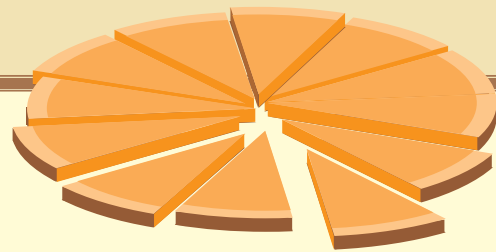
- Debt maturities (amount and timing)
- Interest costs
- Risk-bearing factors (earnings persistence, industry performance, and asset composition)

Capital Structure and Solvency

Asset-Based Measures of Solvency

Asset Composition Analysis

- Tool in assessing the risk exposure of a capital structure
- Typically evaluated using common-size statements



Capital Structure and Solvency

Asset-Based Measures of Solvency

Asset Coverage

- Assets provide protection to creditors--earning power and liquidation value
- Base for additional financing
- Useful ratios include:
 - **Fixed assets to equity capital**
 - **Net tangible assets to long-term debt**
 - **Total liabilities to net tangible assets**

Earning Coverage

Earnings to Fixed Charges

Earning coverage measures focus on the relation between debt-related fixed charges and a company's earning available to meet these charges

Earnings to fixed charges *ratio*

$$\frac{\text{Earnings available for fixed charges}}{\text{Fixed charges}}$$

Earning Coverage

Earnings to Fixed Charges

$$\frac{\begin{aligned} & (a) \text{ Pre-tax income from continuing operations } plus (b) \text{ Interest expense } plus \\ & (c) \text{ Amortization of debt expense and discount or premium } plus (d) \text{ Interest portion} \\ & \text{ of operating rental expenses } plus (e) \text{ Tax-adjusted preferred stock dividend requirements} \\ & \text{ of majority-owned subsidiaries } plus (f) \text{ Amount of previously capitalized interest} \\ & \text{ amortized in the period } minus (g) \text{ Undistributed income of less than 50-percent-owned subsidiaries or affiliates} \end{aligned}}{\begin{aligned} & (b) \text{ Total interest incurred } plus (c) \text{ Amortization of debt expense and discount or} \\ & \text{ premium } plus (d) \text{ Interest portion of operating rental expenses } plus (e) \text{ Tax-adjusted} \\ & \text{ preferred stock dividend requirements of majority-owned subsidiaries} \end{aligned}}$$

- (a) Pre-tax income before discontinued operations, extraordinary items, and cumulative effects of accounting changes.
- (b) Interest incurred less interest capitalized.
- (c) Usually included in interest expense.
- (d) *Financing leases* are capitalized so the interest implicit in these is already included in interest expense. However, the interest portion of *long-term operating leases* is included on the assumption many long-term operating leases narrowly miss the capital lease criteria, but have many characteristics of a financing transaction.
- (e) Excludes all items eliminated in consolidation. The dividend amount is increased to pre-tax earnings required to pay for it. Computed as [Preferred stock dividend requirements]/[1-Income tax rate]. The income tax rate is computed as [Actual income tax provision]/[Income before income taxes, extraordinary items, and cumulative effect of accounting changes].
- (f) Applies to nonutility companies. This amount is not often disclosed.
- (g) Minority interest in income of majority-owned subsidiaries having fixed charges can be included in income.
- (h) Included whether expensed or capitalized.

For ease of presentation, two items (provisions) are left out of the ratio above:

1. Losses of majority-owned subsidiaries should be considered in *full* when computing earnings.
2. Losses on investments in less than 50-percent-owned subsidiaries accounted for by the equity method should not be included in earnings *unless* the company guarantees subsidiaries' debts.

Earning Coverage

Times Interest Earned

Times interest earned ratio

$$\frac{\text{Income} + \text{Tax expense} + \text{Interest expense}}{\text{Interest expense}}$$

Earning Coverage

Interpreting Earnings Coverage

- Earnings-coverage measures provide insight into the ability of a company to meet its fixed charges
- High correlation between earnings-coverage measures and default rate on debt
- Earnings variability and persistence is important
- Use earnings *before* discontinued operations, extraordinary items, and cumulative effects of accounting changes for single year analysis — but, include them in computing the *average* coverage ratio over several years

Earning Coverage

Capital Structure Risk and Return

- A company can increase risks (and potential returns) of equity holders by increasing leverage
- Substitution of debt for equity yields a riskier capital structure
- Relation between risk and return in a capital structure exists
- Only personal analysis can reflect one's unique risk and return expectations



Predicting Financial Distress

Altman Z-Score

$$Z = 0.717X_1 + 0.847X_2 + 3.107X_3 + 0.420X_4 + 0.998X_5$$

X_1 = Working capital/Total assets

X_2 = Retained earnings/Total assets

X_3 = Earnings before interest and taxes/Total assets

X_4 = Shareholders' equity/Total liabilities

X_5 = Sales/Total assets

$Z < 1.20$ implies a high probability of bankruptcy

$Z > 2.90$ implies a low probability of bankruptcy

$1.20 < Z < 2.90$ implies an ambiguous area