Capital structure and solvency

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
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.

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### Financial Leverage - Illustration

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Company</th>
<th>Assets</th>
<th>Debt</th>
<th>Income before Interest and Taxes</th>
<th>10 Percent Debt Interest</th>
<th>Taxes*</th>
<th>Net Income</th>
<th>Net Income + [Interest (1 - Tax Rate)]</th>
<th>Return on Assets</th>
<th>Return on Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Risky, Inc.</td>
<td>$1,000,000</td>
<td>$400,000</td>
<td>$600,000</td>
<td>$200,000</td>
<td>$40,000</td>
<td>$64,000</td>
<td>$96,000</td>
<td>$120,000</td>
<td>12.0%</td>
</tr>
<tr>
<td></td>
<td>Safety, Inc.</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>200,000</td>
<td>80,000</td>
<td>120,000</td>
<td>12.0</td>
<td>12.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Risky, Inc.</td>
<td>1,000,000</td>
<td>400,000</td>
<td>600,000</td>
<td>100,000</td>
<td>40,000</td>
<td>24,000</td>
<td>36,000</td>
<td>60,000</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>Safety, Inc.</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>100,000</td>
<td>40,000</td>
<td>60,000</td>
<td>6.0</td>
<td>6.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Risky, Inc.</td>
<td>1,000,000</td>
<td>400,000</td>
<td>600,000</td>
<td>50,000</td>
<td>40,000</td>
<td>4,000</td>
<td>6,000</td>
<td>30,000</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Safety, Inc.</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>50,000</td>
<td>20,000</td>
<td>30,000</td>
<td>3.0</td>
<td>3.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Tax rate is 40 percent.
† Return on assets = Net income + Interest (1 – 0.40)/Assets.
‡ Return on equity = Net income/Shareholders’ equity.
Consider two companies’ results for Year 2:

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

Financial Leverage

**Financial Leverage Ratio**

\[
\text{Financial Leverage Ratio} = \frac{\text{Total assets}}{\text{Common equity capital}}
\]

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:

\[
ROCE = \text{Adjusted profit margin} \times \text{Asset turnover} \times \text{Leverage}
\]
Effect of Converting Operating Leases to Capital Leases on Key Ratios

<table>
<thead>
<tr>
<th>Financial Ratio</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Ratio</td>
<td>1.08</td>
<td>1.01</td>
</tr>
<tr>
<td>Total Debt to equity</td>
<td>1.66</td>
<td>2.96</td>
</tr>
<tr>
<td>Long-term debt to equity</td>
<td>0.17</td>
<td>1.38</td>
</tr>
<tr>
<td>Return on common equity</td>
<td>21.7%</td>
<td>21.4%</td>
</tr>
<tr>
<td>Return on assets</td>
<td>8.16%</td>
<td>5.39%</td>
</tr>
</tbody>
</table>

Adjustments for Capital Structure - Liabilities

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

<table>
<thead>
<tr>
<th></th>
<th>Mid-size firms</th>
<th>European multinational companies</th>
<th>Big Italian Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>39,2</td>
<td>60,0</td>
<td>78,4</td>
<td></td>
</tr>
<tr>
<td>60,8</td>
<td>40,0</td>
<td>21,6</td>
<td></td>
</tr>
<tr>
<td>-36,8</td>
<td>-21,4</td>
<td>-26,5</td>
<td></td>
</tr>
<tr>
<td>-19,6</td>
<td>-32,7</td>
<td>-31,2</td>
<td></td>
</tr>
<tr>
<td>-43,6</td>
<td>-45,9</td>
<td>-42,3</td>
<td></td>
</tr>
</tbody>
</table>

Source: Mediobanca, 2002

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**

\[
\frac{\text{Shareholders’ equity}}{\text{Total debt}}
\]

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**Total Debt to Equity**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>General merchandise</td>
<td>0.4</td>
</tr>
<tr>
<td>Educational services</td>
<td>0.4</td>
</tr>
<tr>
<td>Electrical equipment</td>
<td>0.7</td>
</tr>
<tr>
<td>Printing and publishing</td>
<td>0.9</td>
</tr>
<tr>
<td>Motion pictures</td>
<td>0.9</td>
</tr>
<tr>
<td>Eating and drinking</td>
<td>0.9</td>
</tr>
<tr>
<td>Food stores</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Source: Dun & Bradstreet
Capital Structure and Solvency

Capital Structure Measures

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

\[
\frac{\text{Long-term debt}}{\text{Shareholders’ equity}}
\]

Source: Dun & Bradstreet
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

**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)
Asset Composition Analysis
• Tool in assessing the risk exposure of a capital structure
• Typically evaluated using common-size statements

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
**Earnings Coverage**

**Earnings to Fixed Charges**

**Earnings 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**

\[
\frac{\text{Earnings available for fixed charges}}{\text{Fixed charges}}
\]

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

- (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.
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.
**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.

**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