

CHAPTER 2

Capital Structure and Debt Capacity

Balancing Operating / Business Risk and Financial Risk

A company's capital structure is comprised of a combination of debt and equity that is used to fund the assets on its balance sheet.

Example for the following discussion: XYZ Company

Assets

Short Term:

Cash	100
----Accounts Receivable	20
Inventory	20
Pre-Paid expenses	5
Total Short Term (Current)	145

Property	200
Equipment	100
Investments	50

Total Long Term Assets 350

Total Assets 495

Liabilities

Current Liabilities	60
Long Term Debt	0
Equity	435

The “right” capital structure for any company is a function of the nature of the assets being funded, the volatility of the company’s future cash flow, the availability of sources of capital, and the tolerance for risk by the owners and suppliers of capital.

A company can support a lot of debt if its cash flow is stable, and/or its assets are liquid. If the company’s future cash flow is subject to a lot of risk (high volatility) and its assets are relatively illiquid, it might have difficulty paying interest and principle at some future point, depending upon the amount of its debt, and the terms of repayment. Debt capacity issues for companies are not very different from that of individuals! It all hinges on the future of cash flow – volatile or stable.

If a borrower’s future cash flow is subject to a lot of risk, equity is the appropriate source of funding and will be the dominant part of the capital structure.

In order to boost their return on investment, equity owners have an incentive to use debt (leverage) to buy assets that will be used to produce revenue and profit. If the return on these assets is greater than the cost of debt, the benefit accrues to the owners of the company. While we expect owners to be prudent and not incur more debt than they can afford, sometimes they are overly aggressive, or just do not know how much debt can be safely incurred. It is the job of the credit analyst to answer this question – “what is the debt capacity of a company?”

Capital Structure and its Impact on Return on Equity (ROE)

Common Equity is the fundamental part of a company’s capital structure. It is the funds that belong to the owners. It has no date at which it must be returned (maturity) and no legal obligation to pay dividends. It is contributed when a company is formed, and builds as a company generates, and retains, profits.

The goal of the owners of equity is to generate a good return on their investment (Return on Equity, ROE). If a company does not produce an ROE that is greater than its “cost of capital” then it is destroying value for the owners of its equity. They’d be better off taking their money and investing it elsewhere. Of course, this is not a short term decision, and most equity owners would look to the future, estimate/forecast future returns, and try to judge the present value of the future returns, using their cost of capital as the discount rate. Hopefully it’s positive. Obviously this is highly subject to the evaluation of the risk associated with the forecast of future returns. If it’s not positive, the investors should take their money and invest it elsewhere where they can get a positive, risk adjusted, return on capital.

Return on Equity is a function of three variables – profit margin, asset turnover, and leverage. This is a simple analytic model that can explain the basic business model of any company. ROE is produced by some combination of these three variables – high margins, high asset turnover, high leverage, or some combination of all three. Since high leverage is only sustainable in companies that are very stable with predictable revenue, most companies have to focus on profit margins and asset turnover to produce an adequate ROE.

In the case of XYZ Company (above), the equity is 435. If the owners expect a return on their capital of 10% after tax (which is a relatively modest expectation), the company must be able to figure out how to generate 43.5 after tax from a balance sheet with total assets of 495. Assuming a tax rate of 35%, this is pre-tax profit of about 67.

How does a company produce 67 of pre-tax operating profit with a balance sheet of 495? It has to figure out how to generate enough revenue from its assets, at a sufficient profit margin, and with a degree of leverage that doesn't risk putting itself into bankruptcy.

Using the XYZ company balance sheet, we can look at a few ways to produce the desired return on equity of 10%.

As shown above, a 10% return on 435 of equity is 43.5.

Return on equity = net profit / average equity

In this case $ROE = 43.5 / 435 = 10\%$

Leverage is the ratio of total assets that are funded by equity. It also can be measured as the ratio of debt / equity, but for this example we'll stay with the ratio of total assets to equity. Leverage = assets / equity.

In this case, $Leverage = 495 / 435 = 1.138$ Total assets are equal to 1.138 times total equity. This would be considered to be very low leverage. This is the same as Equity is funding 88% of total assets (435/495).

If XYZ is in an industry that produces very low profit margins, such as retail grocery chains (supermarkets), the after tax profit margin would generally be about 2% (after tax). How much revenue is necessary to produce 43.5 of after tax profit at a 2% margin? It's 2175!

Or, $2175 \times .02 = 43.5$

If XYZ was in a business that had much higher profit margins, say 25%, it would only need revenue of 174 to produce its profit of 43.5.

Companies operate with different economic models, depending on the nature of their business and industry, the nature of their assets, the competitive situation and the economic environment.

If XYZ had revenue of 2175, a profit margin of 2% and Equity funding 88% of total assets, its ROE would be 10%.

This analytic model has been attributed to a Treasurer of the DuPont company, and is often referred to as the "DuPont" model. It is an algebraic equation that illustrates the relationship that ROE is a mathematical function of three variables – profit margin, asset productivity, and leverage.

Profit margin is equal to $Profit / Revenue = 43.5 / 2175 = .02 = 2.0 \%$

Asset turnover is defined as Revenue / Assets = 2175 / 495 = 4.39 Every unit of assets produces 4.39 units of revenue in a given period of time. This represents a highly productive balance sheet!

Leverage is often defined as debt / equity. In this model we use total assets / equity, which is the proportion of assets that are funded by equity, as opposed to the proportion of assets that are funded by debt.

$$\text{Leverage} = \text{assets} / \text{equity} = 495 / 435 = 1.138$$

The DuPont model uses basic algebra to prove that a company's **RETURN ON EQUITY (ROE)**, is absolutely a function of three key variables – **PROFIT MARGIN** (net profit / revenue), **ASSET TURNOVER** (revenue / assets), and **LEVERAGE** (assets / equity).

$$\text{Net Profit} / \text{Equity} = \text{Net Profit} / \text{Revenue} \times \text{Revenue} / \text{Assets} \times \text{Assets} / \text{Equity}$$

In the above formula, using basic algebra, “Assets” cancel out and “Revenue” cancels out, leaving Net Profit / Equity = Return on Equity!

In the case of XYZ, the leverage is 1.138 – assets of 495 and equity of 435. In order to produce an ROE of 10%, it must find some combination of asset turnover (revenue / assets) and profit margin (net profit / revenue), to achieve this.

XYZ company is actually modelled on a supermarket, with a low, but typical, profit margin of 2%. Using the DuPont formula, in order to produce an ROE of 10%, the asset turnover must be 4.394. In other words, the balance sheet of 495 must somehow produce total revenue of 2175!

$$\text{ROE (10\%)} = \text{leverage (1.138)} \times \text{asset turnover (4.394)} \\ \times \text{profit margin (2\%)}$$

$$\begin{array}{l} 10\% \quad = \quad 1.138 \quad \times \quad 4.394 \quad \times \quad .02 \\ \text{ROE} \quad = \quad \text{leverage} \quad \times \quad \text{Asset Turnover} \quad \times \quad \text{Profit Margin} \end{array}$$

If the XYZ company was in an industry where it was able to obtain a profit margin of 25%, not 2%, it would only need to produce revenue of 174 to produce the 43.5 of net profit necessary for a 10% return on equity.

$$\begin{array}{l} 10\% \quad = \quad 1.138 \quad \times \quad (174 / 495 = 0.352) \quad \times \quad .25 \\ \text{ROE} \quad = \quad \text{Leverage} \quad \times \quad \text{Asset Turnover} \quad \times \quad \text{Profit Margin} \end{array}$$

Is it possible that one company can operate with a profit margin of 2% and another with 25%? What are the factors that might allow this or cause this? This is what the credit analyst must understand in order to judge whether or not a company's business model is reasonable, especially relative to its capital structure.

The factors that cause different industries to operate with different combinations of profit margin, asset turnover and leverage are a function of the nature of the business and competition. Supermarkets operate with very low margins for a variety of reasons. First, they

are in a highly competitive industry. Competition severely restricts the ability to manage prices. Second, they sell merchandise that, by definition, has very high natural turnover. Things don't sit on the shelves very long in a well managed supermarket. Fixed assets (stores, fixtures, and equipment) represent a relatively small proportion of the total assets of a supermarket. Most of the assets will be in the form of inventory which should turn over very quickly.

The original idea for the discount department store (like Wal*Mart) is based on this concept. In order to obtain a certain Return on Equity, the owners created a lost cost environment and reduced prices, with the idea that they could sell a lot of merchandise with a given fixed cost. It worked! Low profit margin, but very high turnover, produced huge profits, even with little leverage.

A company with a very high profit margin will invariably possess a very significant competitive advantage. A software developer such as Microsoft might be an example. Most of its assets are equipment and facilities. Its revenue is the result of intellectual investment and the profit margins are a function of its very strong market position. Some have accused it of having almost a monopoly in certain of its products.

If a company finances its assets with all equity, its return on equity is determined solely by its profit margin and how much revenue it can produce from its balance sheet (asset turnover). If it adds debt to its balance sheet, Return on Equity is raised as equity funds less than 100% of the balance sheet assets.

The challenge for the owner (owners) of a company is to determine how much debt can be used to fund the balance sheet without incurring a high risk of bankruptcy or distress due to its inability to service the debt. In the example we've used here, increasing the leverage of XYZ would produce a very significant increase in return on equity.

For example, XYZ produced a 10% ROE with asset turnover of 4.394 profit margin of .02, and leverage of 1.138. Assets are 495 and equity is 435.

Leverage would be higher if the 495 of assets was funded with more debt and less equity. For example, let's reduce equity to 200, substituting it with 235 of debt. Total liabilities would then grow from 60 to 295, and Leverage would increase from 1.138 to 2.475. What is the impact of this on ROE?

If profit margins could be maintained at 2%, the substitution of debt for equity in the balance sheet (increased leverage), results in the ROE growing from 10% to 21.7%

$$21.75\% = 2.475 \times 4.394 \times .02$$

$$\text{ROE} = \text{Leverage} \times \text{Asset Turnover} \times \text{Profit Margin}$$

Of course, it would be more difficult to maintain the 2% profit margin now because the company has just increased one of its major components of expense – interest! But it's possible that management could figure out how to operate a bit more efficiently in order to make up for the increased interest expense. More than likely, profit margins would decrease by all or part of the increased interest expense, and ROE would not be 21.7%, but it would still be a lot higher than it was with much less leverage.

If the management of the company, or its owners, wanted to be very aggressive in terms of leverage, they could produce even a higher ROE. Let's reduce equity to 50, and the 495 of total assets was now funded with 445 of liabilities. We can calculate the amount by which increased interest would reduce operating profits.

In our first example, with low leverage, XYX the supermarket, had revenue of 2175 and pretax profit of 67. Assuming that most of the increased leverage was 9% interest bearing debt of 300 (some of the increased leverage could come from non-interest paying trade payables), the annual interest bill becomes 9% X 300, or 27. This reduces the pretax profit from 67 to 40, and the after tax profit (tax rate of 35%) to 26. The profit margin now becomes 26 / 2175 (total revenue) = 1.195%, down from 2.0% without debt.

But even though the profit margin is reduced, the extraordinary leverage creates an ROE of 52%!

$$52\% \text{ ROE} = 9.9 \text{ Leverage} \times 4.394 \text{ Asset Turnover} \times .01195 \text{ Profit Margin}$$

If companies could easily operate, and sustain, this amount of leverage, while producing either high turnover or high margins, they certainly would. It could be a formula for getting very rich! But they can't, for two major reasons.

First, if the business could sustain itself with this leverage, asset turnover, and profit margins, what would logically happen in a competitive environment with little barriers to entry? More competitors would rapidly show up in order to reap such huge returns. And, more competition would drive down profit margins, given the fact that a market can sustain only a certain amount of business. With lower margins, operating profits decrease, cash flow decreases, and this leads to the second reason why high leverage cannot usually be sustained – the bankruptcy risk of financial leverage.

The high interest payments from leverage directly reduce operating profit and margins. This might be fine if revenue, expenses, and operating profits before interest are stable. But in the real world, they are not, for a variety of reasons, competition being only one of them. If revenue should fall, or not grow in line with expenses, operating profit falls very rapidly, and the company is at risk of not being able to meet its interest payments from profits. When this happens, it has to rely on liquidity or the sale of assets to fund the negative profit. By substantially increasing leverage, and reducing the amount of equity that funds the balance sheet, its ability to maintain assets that can quickly be turned into cash, without impairing the business, is very limited. Assets produce revenue, and as assets are liquidated, revenue is usually reduced, as is cash flow. The substantial increase in leverage can severely reduce a company's financial flexibility.

The challenge of creating a company's capital structure is to use enough financial leverage (debt) to achieve an adequate return on equity, as in the models above, without creating too much risk of bankruptcy. The amount of financial leverage that a company can undertake is a function of the nature of its business risks, and the consequent impact on cash flow volatility. The ideal capital structure is one that produces a competitive return on equity, while matching financial risk and business risk.

Capital Structure and Risk

The design of a company's capital structure is not arbitrary. It must be created and maintained to achieve a return on equity that is high enough to attract capital. But it also must be appropriate for the nature of a company's business risk, usually identified as the volatility of its revenue and operating profit, and the resulting cash flow.

Almost every company and every industry has a capital structure that is a natural function of the risks of its business model. This "natural" capital structure is based upon the nature of the assets used to produce revenue and profits, the competitive and regulatory environment, the degree to which it is subject to the macro-economic environment, the labor environment, and the consequent stability of the company's business – revenue and expenses.

Companies that are subject to heavy competition and are highly vulnerable to macro-economic conditions generally cannot survive with a lot of debt – the operating cash flow is subject to a lot of variation (volatility). Companies that are well capitalized (a lot of equity relative to their business risk) can sustain long periods of low or negative cash flow. Companies that are poorly capitalized (too much debt relative to their business risk) cannot sustain long periods of low cash flow before they are forced into bankruptcy by their creditors.

Companies whose assets are highly liquid and have stable value can maintain a lot of leverage. Banks are an example of this. Companies with illiquid assets, but which have very stable revenue and operating costs can also sustain a lot of leverage. Regulated utility companies are an example.

For the past thirty years, private equity firms and investors have been creating huge amounts of wealth (and destroying some as well) through the acquisition of companies using large amounts of debt. The debt is used to buy-out existing owners – public and / or private. In the United States, there was a large boom of these "leverage buy outs" in the 1980's, and again from 2002 through the present. The trend declined during the US recession of the early 1990's, amid a lot of bankruptcies of some of the buy-out deals created in the 1980's.

Many of the deals that didn't work, and ended up in bankruptcy, were the result of adding a lot of debt to the balance sheet (leverage) of companies that could not sustain it, due to high levels of operating risk. Very few bankers or investors ever set out to do a deal that is bound to fail. They never show a business model and cash flow forecast that doesn't work! Projected cash flow will always be shown to be sufficient to reduce debt levels and leverage over time, either from cash flow or from the sale of assets. Usually, projections for increased cash flow are from expected increased operating efficiency and cost reductions.

When these deals don't work out as planned, and the creditors force a bankruptcy, it is often the result of one or both of two factors. Of course one is a general decline in the macro-economic environment (the external factors) that was not anticipated. The other, and the one that is most egregious, is the lack of understanding of the nature of the risks facing the company, and the consequent volatility of its cash flow due to operating and competitive factors. Unfortunately, a lot of smart investors and bankers make this mistake, and continue to do so. One of the key jobs of a credit analyst is to understand which types of business can sustain leverage, and which cannot. This is the concept of the "natural" capital structure.

We will pursue this idea in the next parts of this course. But, here are a couple of examples.

What are the operating risk characteristics of companies in the following industries? What is the degree of volatility of their operating cash flow in a stable economic environment?

Supermarket?

Retail Apparel Department Store Chain?

Software Developer?

Pharmaceutical Manufacturer ?

Supermarket chains have been the subject of a lot of leverage buyouts by private equity investors, and many of them have been successful. The reason is that these businesses have a relatively small degree of revenue and expense volatility. They sell commodity products with relatively stable fixed costs. There is very little inventory risk (the risk that something won't sell at its posted price). When these companies do fail, it's usually do to over-expansion (building new stores that don't produce the anticipated revenue), labor disputes, or extraordinary events, such as a major fire.

Retail apparel chains have also been subject to a lot of buyouts. Most of them failed. Standard and Poor's once wrote a report (after some of the failures) that stated "a highly leverage apparel retailer is a contradiction in terms". There are so many things that can wrong in the business, that high financial leverage adds a huge bankruptcy risk. Merchandise risk is just one of these risks. Moreover, a highly competitive apparel merchandiser needs to have tremendous financial flexibility. They need to move with trends – including buying fresh merchandise and marking down stale merchandise. The investment bankers that structured these deals didn't seem to understand these basic risks.

Are pharmaceutical manufacturing or software development risky businesses? Based on historic knowledge of some very successful companies in these industries, one might be tempted to say "no". But they share a common characteristic that make their business and operating risks very high. Both industries require huge investments in research and development to produce products. The success rate might be relatively low, and the time to develop saleable products can be very long. These industries require a lot of "patient" capital for their business model to work – equity as the dominant part of their capital structure.

The next chapter will review how financial analysis is utilized to assess business risk and capital structure.