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"It has been my experience that competency in mathematics, both in numerical manipulations and in understanding its conceptual foundations, enhances a person's ability to handle the more ambiguous and qualitative relationships that dominate our day-to-day financial decision-making"

Alan Greenspan – Former Chairman, US Federal Reserve

Capital Structure – How Healthy Is Your Business?

05/07/2010 – News Release 10.07

What is the optimal level of debt to carry on your balance sheet? It's a common question and one that all business managers should consider regularly.

The capital structure of all businesses is made up of two components, Debt and Equity. This can be expressed as a simple equation: $V = D + E$, where 'V' equals the total capital position of the company.

A common tool used to assess a business's capital structure is the Debt to Equity ratio, which is simply the market value of debt divided by the value of equity. The ratio result is the level of debt expressed as a percentage against the level of equity in a firm. What does this mean?

In isolation this ratio is meaningless and without context and further analysis it really tells us nothing of the financial health of a business.

The focus should really be around the question, "what happens to the value of the firm as we add more and more debt?" To answer this question we really need to examine what happens to the cost of capital and cost of equity as we increase the proportion of debt to the business's balance sheet.

This is a complex field of managerial finance and there has been extensive research conducted by theorists and academics in the field of capital structure. There are two main views on the subject; the Traditional View and the Neoclassical View.

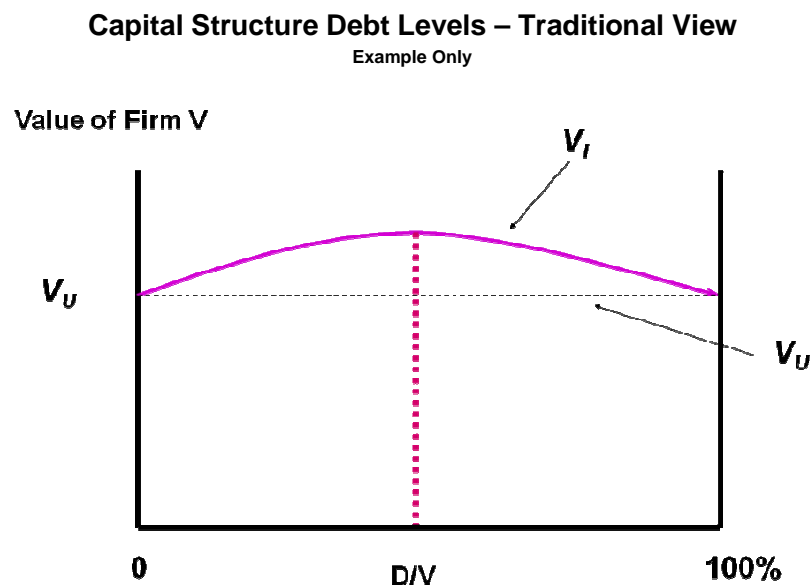
Traditional View

The traditional view suggests that there is an optimal capital structure that will ultimately maximise the value of the firm to its shareholders. This can be achieved by reducing the cost of capital by using moderate levels of debt. This view states however, that there is a point at which the level of debt will begin to force the cost of capital to rise and have a negative impact on the firm's value.

In the traditional model of gearing, shareholders are deemed unlikely to respond adversely (if at all) to minor increases of gearing so long as the prospects for default look remote. The point at which shareholders become concerned about increased financial risk and debt holders believe the probability of default is increasing, is the point at which the cost of capital increases.

In the diagram below, the horizontal axis represents the level of debt in the firm and the vertical axis is the value of the firm.

V_U represents an un-leveraged firm, whereas V_L is the value of a business that is using debt. The dotted vertical line is the point at which the capital structure of the leveraged firm is at its optimal point; this is because the cost of capital is at its lowest point. Any debt level on the right side of the dotted line results in the value of the firm decreasing due to concerns about financial distress.



Determining the cost of capital and the optimal capital structure is a difficult and complex proposition for most companies, but is essential in order to maximise the value of the business to its owners.

Neoclassical View

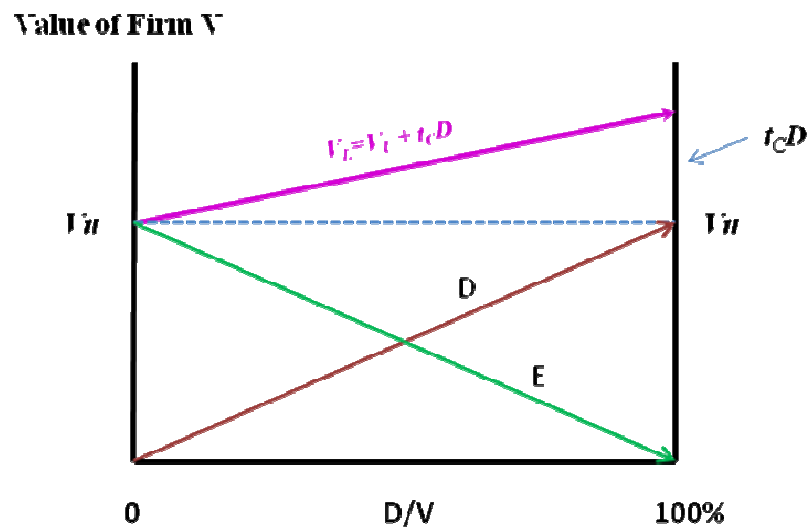
In 1958, Franco Modigliani and Merton Miller published their research in the field of capital structure, for which they each received the Nobel Prize in Economics, many years following their work.

Under proposition 2 of Modigliani & Miller's research, they suggested that; "The cost of capital of levered equity is equal to the cost of capital of unlevered equity plus a premium that is proportional to the market value debt-equity ratio."

This notion is illustrated in the diagram below.

Capital Structure Debt Levels – Neoclassical View

Example Only



Because the interest on debt is tax deductible, as the firm introduces debt to the capital structure, the amount of corporate tax payable to the government falls. The gain to the value of the firm is shown by;

$$G = t_c D.$$

Where: t_c = corporate tax rate
 D = value of debt.

In the very simple example below, we find that firms with exactly the same operating income have different market values due to differences in their respective capital structures.

Firm U represents an Un-levered company and Firm L has debt in the form of bonds.

Capital Structure with Corporate Income Tax:

	Firm U	Firm L
Net operating income (EBIT)	\$1,000	\$1,000
Less: Interest payments to debt holders (i)	----	\$100
Income before taxes	\$1,000	\$900
Less: Corporate Tax (T=30%)	\$300	\$270
Income available to shareholders (dividends) (D)	\$700	\$630
Total income available to all security holders (i+D)	\$700	\$730
Required rate of return of debt (kd)	-----	5%
Market value of debt (Value of Bond=i/kd)	-----	\$2,000
Required rate of return (Value of Equity=D/ke)	10%	11.25%
Market value of equity (Equity=D/ke)	\$7,000	\$5,600
Market value of firm (Value of Equity + Value of Debt)	\$7,000	\$7,600

The increase in value is attributed to a reduction in the cost of capital to Firm L, due to the introduction of debt in its capital structure, which has a much lower required rate of return. Although the required rate of return increases for equity, the inclusion of debt reduces the overall weighted average cost of capital (WACC).

As you probably concluded, under Modigliani & Miller's model, the optimal level of debt is 100%. However in practice this suggestion is ludicrous. The reason for this is due to the prospect of financial distress.

The likelihood of a firm defaulting on interest or principal payments on their debt increases as the level of debt increases. This is the main risk associated with excess levels of gearing. Equity finance does not carry this risk. While equity holders hope to receive dividends, the firm is not legally obligated to pay dividends.

The optimal capital structure therefore, is one that suits each firm's individual circumstances. Capital structures vary between industry sectors and should be constantly reviewed by management to ensure that debt levels are at levels which maximise the value of the business.

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