Capital structure: professional management guidance

Robert Stretcher and Steve Johnson
Department of General Business and Finance, College of Business Administration, Sam Houston State University, Huntsville, Texas, USA

Abstract

Purpose – Capital structure decisions rely on a complex array of theoretical foundations and practical considerations. At the managerial level, it is impractical to base decisions purely on theory. While one can develop a perception of an optimal capital structure, the decision is often obscured by practical limitations to the theoretical base. In order to be useful to practicing managers, policies and decision techniques need to be efficiently accomplished and based on available information. This paper seeks to provide that practical framework.

Design/methodology/approach – This paper recounts the simple theoretical base for capital structure, highlights some of the problems encountered when applying the theory to reality, and suggests a framework for practical managerial decisions about capital structure. This exposition is especially useful in undergraduate business curricula, in particular for finance majors considering professional management as a career.

Findings – While application of traditional capital structure theory is often impractical, numerous tools are available for use by professional managers to make informed decisions about capital structure.

Practical implications – The conclusions from this paper provide a framework for current and prospective professional managers for making appropriate capital structure decisions in their management careers.

Social implications – Proper managerial techniques and considerations for leverage and capital structure can potentially benefit society through more prudent use of debt, based on the variety of measures presented in this paper.

Originality/value – Topics discussed in this paper have been in development since the 1950s. The contribution of this paper is the creation of a framework for understanding and applying these topics, for pedagogical and management training purposes.

Keywords Capital structure, Corporate finances, Leverage

Paper type Research paper

1. Introduction

Capital structure decisions rely on a complex array of theoretical foundations and practical considerations. At the managerial level, it is impractical to base decisions purely on theory. While one can develop a perception of an optimal capital structure, the decision is often obscured by practical limitations to the theoretical base. In order to be useful to practicing managers, policies and decision techniques need to be efficiently accomplished and based on available information. This paper provides that practical framework. We recount a simplified theoretical base for capital structure, highlight some of the problems encountered when applying the theory to reality, and suggest a framework for practical managerial decisions about capital structure.

JEL classification – G, G3

Managerial Finance
Vol. 37 No. 8, 2011
pp. 788-804

0307-4358
DOI 10.1108/03074351111146229

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2. Traditional capital structure theory

Capital structure theory was initially formed in a series of articles by Modigliani and Miller (1958, 1963). Under conditions identified by a long list of simplifying assumptions, they provided the foundation for an understanding of the differences between unlevered and levered firm values. Although many of the assumptions were unrealistic, the initial model served as a point of deviation as assumptions were relaxed. Most of the assumptions involved either tax structure or risk structure simplifications.

The typical capital structure theory exposition has become known since that time as a tradeoff theory. Tradeoff theory provides an exposition of the benefits of prudent debt use and the dangers of excessive debt use. The solution variable is the proportion of debt in the firm's capital structure, the debt ratio. Although the model has a high level of mathematical sophistication and complexity, a simplified result can be formed by observing two of the main features of the model.

The first feature to consider is that, since interest expense is tax deductible, then the more debt used by the firm, the more wealth created via lower tax payments. This is called a tax shield, which has an evident cash value to shareholders, a ready and apparent gain to leverage. As a firm uses more and more debt, the tax shield will become larger and larger, adding value to the firm. Graphically, this is shown in Figure 1. Figure 1 shows that the initial value of the firm is the value of the equity, since at zero debt, the firm is financed totally by equity. As debt is added to the capital structure (the debt ratio increases), the value of the firm rises proportionally because of the tax shelter benefit. In the graph, this is represented by the green upward sloping line.

The second feature is that risk increases as the firm adds debt to the capital structure. Debt would be very beneficial at low levels, since it is so much cheaper and provides the tax shield. But as large proportions of debt are taken on, the firm begins to be financially distressed by trying to meet interest payment obligations. The more debt the firm adds,

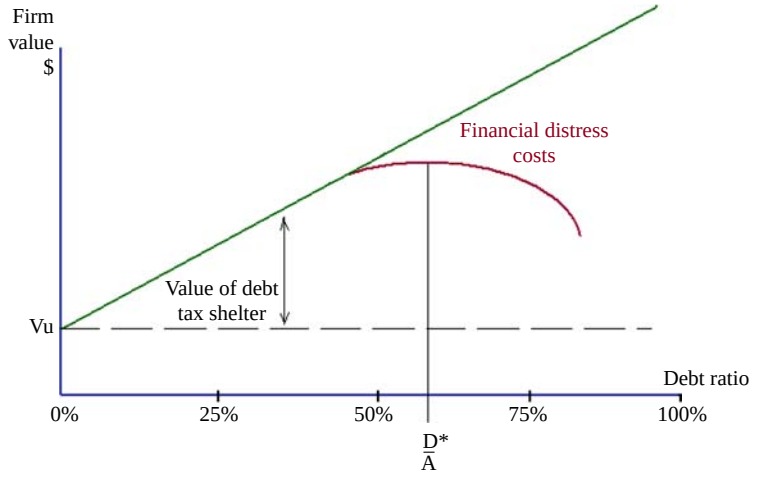

Figure 1.
Graph of firm value as debt ratio increases

the more financially distressed it becomes, less able to service interest expenses for extreme debt levels. Financial distress costs would include higher required returns from both creditors and shareholders, as well as costs directly involved with avoiding bankruptcy and costs associated with financial distress and bankruptcy. These costs, at some point, begin to offset the positive effects of the tax shield, and the value of the firm begins to level off, and then to decline. This is represented in the graph by the red line. Recognizing just two of the characteristics of debt use (tax shelter and financial distress), the idea of the capital structure decision begins to take shape.

The graph seems to suggest that there is some debt level that is optimal ($[D/A]^*$); that is, a debt level that will maximize the value of the firm (maximize shareholder wealth). Firms would want to use debt, up to the point where the value of the firm is maximized, the optimal capital structure (optimal debt ratio). This is what we would conclude to be a fully rational capital structure decision. Deviations away from this optimal point will result in a sub-optimal capital structure, and the firm would no longer be maximizing shareholder wealth.

Obtaining a debt ratio exactly equal to $(D/A)^*$ is optimal. Small deviations above and below the optimal proportion of debt, however, result in very little change in the value of the firm. Within a sufficiently small range above and below $(D/A)^*$, the value of the firm can be shown to be fairly constant (Figure 2). Accepting a debt ratio in this range would be a near-rational (not fully optimal) capital structure decision.

The idea of maximizing the value of the firm can also be perceived in terms of minimizing the firm's weighted average cost of capital (WACC). In capital cost arguments, investors are thought to require the least return when the firm has low-debt levels, since the firm will be less risky. Also, the cost of debt, for reasons discussed earlier, will be lower than the cost of equity. As the firm begins to add debt to its capital structure, the WACC falls because the firm is using more of the cheaper form of financing, debt. At some point, however, the WACC will begin to rise as both creditors and shareholders begin requiring ever-increasing returns as risk rises.

The WACC argument can be perceived graphically as well. At zero debt, the WACC is equal to the cost of equity. At 25 percent debt, the WACC is one-fourth of the way between K_D and K_E. At 50 percent debt, the WACC is halfway between K_D and K_E.

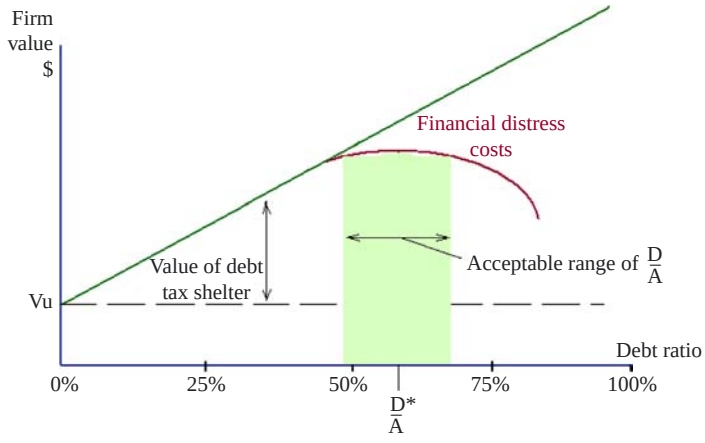

Figure 2.
Near rationality

At 75 percent debt, the WACC is three-fourth of the way between K_D and K_E (etc.). The resulting WACC curve suggests that a particular D/A ratio will minimize capital costs. This D/A ratio should correspond to the same one that maximizes the value of the firm in Figure 1, shown in Figure 3 above the WACC graph for illustration.

Another benefit of using debt in a firm's capital structure comes from agency theory. Managers' (agents') incentives may differ from shareholders' (owners') regarding the capital structure decision. Jensen and Meckling (1976) argue that managers have an incentive to misuse the firm's cash. For example, a manager may "pad" personal

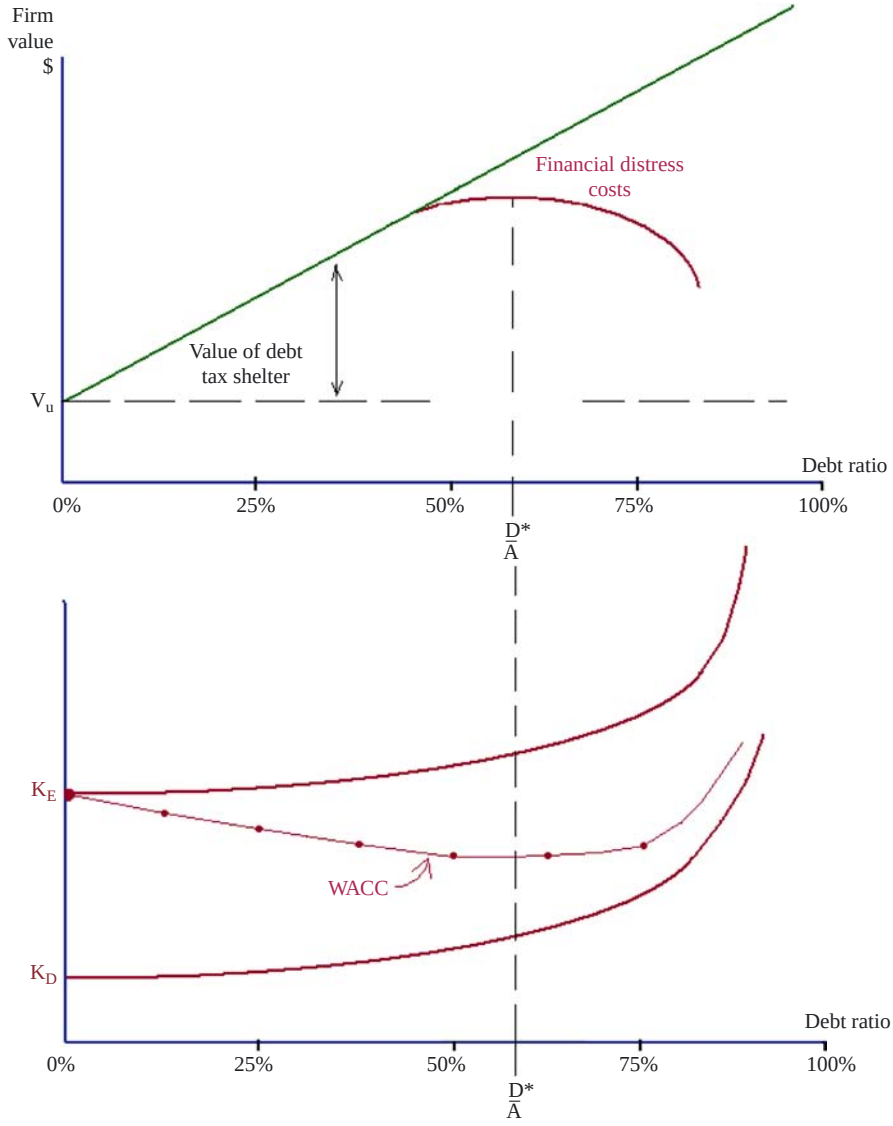

Figure 3.
Relating firm value and WACC

expense accounts. A less obvious misuse of funds may be to leave excessive amounts of cash in relatively safe investments rather than investing in riskier positive NPV projects. Jensen (1986) argues that a firm can use debt to reduce the conflict between the owner (shareholders) and agent (managers) over free cash flow. When a firm finances with debt, the firm is obligated to make periodic interest payments. This reduces the cash balance the firm holds, reducing the incentive to misuse the firms' cash.

This simplified summary of the tradeoff theory does not capture the complexities of the studies conducted in the finance literature, but it does represent an understanding that students may carry with them from their academic preparation in undergraduate business schools into their careers as professional managers.

Some business students are also exposed to the potential hierarchies in the raising of corporate funding (Myers and Majluf, 1984; Miller and Rock, 1985). These theories assert the firm's preference for internal versus external funding, and suggest an intermediate role for debt and convertible securities. Rather than presenting the notion of an optimal debt ratio as in the tradeoff theory, these assert that an optimal order of funding preference may exist, even though they do not directly address an optimal capital structure.

Information asymmetry arguments are often invoked when discussing the pecking order theory. A foundational work in information asymmetry is Akerlof (1970). Akerlof introduced the "lemons" argument that explains why used cars sell at a large discount to new cars. The seller of a used car typically has more information about the car than the buyer. The buyer usually only has information about the average performance of cars in the same class. The buyer expects the performance of a used car to be less than average, because the seller would not sell a superior car for the price of an average car. As a result, the prices of all used cars decline. Akerlof's "lemons" model can be applied to the capital structure decision. Harris and Raviv (1990) note that outside investors cannot clearly see the internal functioning of a publicly traded firm. Many decisions go unobserved by outside investors. Therefore, investors may look for external signs of value-increasing decisions. Since information regarding decisions that the firm makes regarding capital structure is publicly available, investors may use this information for firm valuation. Based on Akerlof's model, the only time that firms will issue new stock is when the stock is overpriced. Therefore, investors require a discount to buy new stock. Also, it follows that if the firm borrows money, investors will value the firm more highly, because it can be publicly observed that an entity (the lender) with superior knowledge about the firm believes that the firm can pay back an additional loan.

Hull (2007) models the gains to leverage as a difference of two terms, POS, which captures the tax shield and positive agency effects, and NEG, which captures the costs of bankruptcy. He begins with the Miller and Modigliani (1963) and Miller perpetuity equations and calculates the difference between the levered and unlevered value of a firm. He then rearranges this difference, writing it as a function of the return on levered equity. His model is the result that follows from this rearrangement. These effects are captured without explicitly assuming agency and bankruptcy costs, although these effects are implicit in the observed return on levered equity. Hull (2008) gives an example of how to teach these concepts by comparing predictions from the Miller and Modigliani (1963), Miller and Hull (2007) models. Hull (2010) extends Hull (2007) by including the effects of constant growth. By using an argument similar in spirit to Hull (2007), Hull (2010) demonstrates that managers of growth firms face different

debt-equity choices than managers of non-growth firms and that the combined decisions of plowback-payout and debt-equity together maximize firm value[1].

While teaching strategies have been forthcoming for augmenting a student's understanding of capital structure theory models and their extensions, no consistent guide has been forwarded that channels graduates through practical measures managers can take to grasp the point where the firm has borrowed effectively but not to the point of excessive risk. The following sections explore areas that could serve that purpose.

3. The *ceteris paribus* assumption

The *ceteris paribus* assumption provides theorists with the mathematical simplification necessary to draw conclusions about two related variables without considering the effects of other variables on either the dependent or the independent variable. Essentially, the theorist assumes that all other factors in a model are held constant, while the relationship between the independent and dependent variable is established under the *ceteris paribus* condition.

In the case of capital structure theory, the debt ratio is thought to have a distinct relationship with the value of the firm (or the WACC, depending on the model). With all other factors held constant, the firm value effect could be estimated by varying the debt ratio. The capital structure sections of even advanced managerial textbooks use hypothetical examples to illustrate the relationship between the debt ratio and firm value, operating profit, and earnings per share (EPS). Hypothetical examples are used because one cannot take a real company, invoke the *ceteris paribus* assumption, and see what happens as the debt ratio is changed.

For managers, there are at least two problems with the ceteris paribus assumption in practice. First, it is impossible to hold all other determinants of firm value constant while experimenting with the debt ratio. Second, even time may be a valid input variable for the model, and even if all other factors could be held constant, it may be impossible to vary the debt ratio of a single firm at a point in time.

Further attempting to model the relationship empirically would involve controlling for hundreds, perhaps thousands of independent variables that affect the stock value for a firm. It is also likely that numerous relationships between the independent variables exist, making an estimation of the debt ratio parameter difficult if not impossible.

4. What we know

A practicing manager's perspective is different from many conclusions that are drawn from empirical studies that form generalizations applicable to firms in general. First, the manager is responsible for their firm's performance, not the performance of all firms that may be in a researcher's sample. It is important for a manager to develop an in-depth perception of the role of capital structure in their particular firm. While generalizations may help a general understanding, it is the specific firm that determines the success or failure of that manager's actions. Second, risk in the capital structure theory context, from a diversified investor's viewpoint, is not risk that the manager's decisions influence. Among the determinants of the diversified investor's risk exposure (market return variance, the firm's earnings variance, and the correlation of those returns) only the variation in the specific firm's returns are under the direct influence of the manager. A manager's attention, therefore, should be drawn to what

causes their own firm's earnings variability. Some of these items are indeed decision points for management.

There are a few notions that can form the basis for a practical capital structure policy. A firm should, in general, use a positive level of debt for two reasons. First, lenders and bondholders are normally subjected to lower risk levels. This is because of their superordinate position in receiving income generated by the firm, and because creditors often protect their investment positions by securing secondary repayment sources (collateral) or by adopting restrictions or provisions in the indenture or loan contract. The resulting required return (yield) is typically lower for debt than for equity financing. Second, the borrowing firm enjoys a measurable benefit from the tax deductibility of interest expense on its debt. The resulting after-tax cost of debt for the firm is appreciably lower than the cost of equity financing. This encourages at least some use of debt.

Other factors discourage a firm's use of too much debt. The firm becomes riskier as it adds proportionally higher debt levels to its capital structure. The firm's ability to service the debt diminishes, and the fixed payment on debt creates greater variation in the firm's earnings stream. At higher levels of debt, the firm may experience additional costs associated with greater demands on management as the firm struggles to carry or refinance the debt burden, or even costs associated with financial distress and bankruptcy at debt ratios that are far above prudent levels.

It follows that a capital structure policy could be finessed out of these basic relationships if a system of indicators could be established that are based on easily obtainable information and do not require inordinately large amounts of time, effort, and expertise on the part of the manager.

5. Leverage multiples

The extent to which operating and financial leverage is applied by the firm can be measured by the effect of the portion of fixed cost used in each income statement segment and their effect on earnings variability. The degree of operating leverage (DOL) is measured as the percentage change in EBIT as a result of (divided by) the percentage change in sales. Mathematically, the DOL is calculated in a ratio:

$$DOL = \frac{\%\Delta EBIT}{\%\Delta Sales} \tag{5.1}$$

The greater the amount of fixed operating costs in the firm's production mix, the greater the DOL will be, because of the magnifying effect of the leverage.

The percentage changes from above can be used when two sequential income statements are available, and the sales level has changed over the period represented. In rare cases, however, only one set of financial statements may be available. The DOL can still be estimated using an estimation equation, shown in equation (5.2). The equation still captures the effect of using fixed operating costs, but it is just an estimation. It will often differ from the calculated DOL using percentage changes in sales and EBIT:

$$DOL = \frac{Sales - TVC}{Sales - TVC - FC} \tag{5.2}$$

The variability of operating profit, however, does not directly address variability (risk) in the common shareholder's share of earnings. It addresses only the effect of operating leverage on operating profit.

The firm's use of fixed financing costs is the other half of the story, and the part that aids managers in perceiving an appropriate capital structure. Because investors presumably react to an investment based on return and risk, EPS represents a better figure to focus on for the effect of risk on the shareholder. EPS variation captures the effects of both operating and financial leverage. The lower half of an income statement summarizes the firm's use of financial fixed costs. The degree of financial leverage (DFL) employed by the firm is measured as the percentage change in EPS as a result of a percentage change in EBIT. Mathematically, the DFL is also calculated in a ratio:

$$DFL = \frac{\%\Delta EPS}{\%\Delta EBIT} \tag{5.3}$$

The greater the amount of fixed financing costs in the firm's financing mix, the greater the DFL will be, because of the magnifying effect of the leverage. Again, there is a way to estimate the financial leverage effect if only one set of financial statements is available. The DFL estimation formula is:

$$DFL = \frac{EBIT}{EBIT - I} \tag{5.4}$$

The percentage change formula should be used when two sequential income statements are available, and the EBIT level has changed over the period represented. Equation (5.4) is only an estimate of the magnification effect from use of fixed financial costs (interest expense).

The combined effect of operating and financial leverage, degree of combined leverage, captures the percentage change in EPS as a result of a percentage change in sales. To combine the effects, simply multiply the DOL and the DFL together:

$$DCL = (DOL)(DFL) \tag{5.5}$$

Using the calculation formulas of DOL and DFL:

$$DCL = \left[\left(\frac{\%\Delta EBIT}{\%\Delta Sales} \right) \left(\frac{\%\Delta EPS}{\%\Delta EBIT} \right) \right] = \frac{\%\Delta EPS}{\%\Delta Sales} \tag{5.6}$$

Or, using the estimation formulas for DOL and DFL:

$$\begin{aligned} DCL &= \left[\left(\frac{Sales - TVC}{Sales - TVC - FC} \right) \left(\frac{EBIT}{EBIT - I} \right) \right] \\ &= \left[\left(\frac{Sales - TVC}{EBIT} \right) \left(\frac{EBIT}{EBIT - I} \right) \right] \\ &= \frac{Sales - TVC}{EBIT - I} \end{aligned} \tag{5.7}$$

The calculation of leverage multiples from income statement figures is relatively straightforward. The manager needs only two sets of financial statements in adjacent accounting periods, generally statements from two consecutive years. Using these

figures, the DOL, DFL, and DCL can be calculated (an example of leverage multiples appears in the Appendix for those unfamiliar with the basic application).

The degree of operating and financial leverage increases as higher levels of fixed costs are used in relation to variable costs. What if no fixed operating expenses were present, and no fixed financing expenses were present? Then the DOL would equal to 1.0 and the DFL would equal to 1.0. In other words, no magnification of earnings would take place. Whatever the percentage change in sales, EBIT and EPS would increase by the same percentage.

If fixed operating costs are present, though, the DOL will be a number greater than 1.0, and a magnification effect will result between changes in sales and resulting changes in EBIT. Similarly, use of fixed cost financing (debt, which involves interest expense) results in a DFL greater than 1.0, so changes in EBIT will result in magnified changes in net income or EPS. The combined effect can be substantial.

There is an upside and a downside to leverage multiples. If firms expect to have high sales levels, easily break even and easily pay all interest expenses, then excessive earnings can accrue to shareholders. The potential for very high returns is there if the firm is using high levels of fixed operating and fixed financing inputs. On the other hand, the downside is that low and falling sales levels will result in more severe decreases in earnings, or even magnify losses into even larger losses. Fixed costs are a mixed blessing; they can be beneficial as long as a firm can effectively pay all costs, but they create earnings variability risk when employed, the downside of which is experienced when sales and profits fall.

Leverage multiples represent an indicator of the potential earnings magnification effects (positive and negative) of the use of operational and financial leverage, and can yield valuable insight into the earnings variability risk associated with increasing debt in the firm's capital structure. It is interesting that capital market theory takes such a prominent place in managerial finance education. Among the inputs to the determination of the beta (variance of the market return, variance of the stock return, and the correlation of those returns), only one, the variation in the firm's return, is under direct influence of the manager. This is exactly the earnings variation targeted by leverage multiples, although many financial management textbooks and professors do not even cover leverage multiples.

6. Debt servicing multiples

The firm's ability to service debt (pay interest, or interest along with other fixed amounts such as leases and principal repayments) generally diminishes as the firm's debt levels rise. There may even exist some critical values where the firm may have to find means of servicing the debt other than from operating cash flow. For example, if the times interest earned drops below 1.0, the firm has insufficient EBIT to cover the interest expense, and must find an alternative source of repayment capability.

There are several indicators of the firm's ability to service debt and similar obligations:

Times interest earned (TIE). The number of times EBIT could have covered interest expense:

$$TIE = \frac{EBIT}{Interest \cdot Expense} \tag{6.1}$$

Fixed charge coverage (FCC). The number of times EBIT + Lease Expense could have covered interest expense and other fixed operating expenses:

$$FCC = \frac{EBIT + Lease.Pmts}{Interest \cdot Expense + Lease \cdot Pmts} \tag{6.2}$$

EBITDA coverage. The number of times interest expense could have been paid using available EBITDA (available cash from operations):

$$EBITDA\ \ Coverage = \frac{EBITDA}{Interest \cdot Expense} \tag{6.3}$$

Expanded EBITDA coverage (EEC). The number of times interest expense, principal repayments, and other fixed charges could have been paid using available EBITDA with principle repayments and fixed charges added back:

$$EEC = \frac{EBITDA + PRINCIPAL + FIXED.CHARGES}{INT.EXP. + PRINCIPAL + FIXED.CHARGES} \tag{6.4}$$

While it is not possible to identify and optimal capital structure by using these ratios, they do provide a set of indicators that can be calculated from the firm's accounting data. These ratios are also indicators of whether the firm's performance easily services the level of debt, or whether the firm is having difficulty. Creditors certainly adjust their decisions based on interest coverage ratios. As these coverage ratios fall to levels approaching 1.0 ×, the firm's ability to handle additional debt must come into question. At even lower levels, the firm must find some way to repay debt other than relying on the cash flow from the firm's performance. In this way, "financial distress" and associated costs have a primary indicator in coverage ratios.

7. Bankruptcy prediction model

In 1968, Edward Altman provided a multiple discriminant analysis (MDA) bankruptcy prediction model. The article was in response to a growing trend at the time for theorists and academic researchers to dismiss traditional ratio analysis, used by practitioners for decades to assess performance and indicate financial distress, in favor of a more sophisticated mathematical statistical framework (Altman, 1968).

The "Z-scores" that Altman developed have been used ever since as indicators of financial health or distress. He was quick to point out that:

> [...] the purpose of [a] loan, its maturity, the security involved, the deposit status of the applicant, and the particular characteristics of the bank are not explicitly considered in the model, [so] the MDA should probably not be used as the only means of credit evaluation (Altman, 1968, p. 607).

Similarly, a firm using the Z-score should not use it as the sole indicator of its own level of financial distress. However, just as Altman points out that the Z-score could be used as supplemental information, thus decreasing the cost of assessing loan applicants, the firm can also use it as an indicator for its own decisions about capital structure.

8. Real options and capital structure

The properties of the firm's investment opportunities can have an impact on capital budgeting decisions. If the real option properties of future investment opportunities are ignored, the firm's shareholders are likely to come into conflict with creditors. Intuitively, sufficiently increasing the volatility of the firm's expected returns can result in increased risk of bankruptcy. However, stockholders have a residual claim, so the costs associated with an increased risk of bankruptcy are borne by the debt holders. This shifting of risk from shareholders to creditors was investigated by Jensen and Meckling (1976).

Frequently, a firm's investments include a real option component. The firm's executives may choose to delay an investment, expand or reduce production, or otherwise strategically modify the details of a project in response to increased information or competitors' decisions. These real options have value (Brennan and Schwartz, 1985; McDonald and Siegel, 1986). By combining real options with the literature on the relationship between leverage and security pricing after investments have already been made (Merton, 1974; Leland, 1994), it is possible to investigate the interaction of investment and capital structure decisions (Sundaresan and Wang, 2007).

Real option properties of the firm's investments may have an effect on the creditors of the firm. Shareholders may influence management to exercise real options early, shifting significant portions of project risk onto creditors. In order to exercise the option, the firm must obtain financing. Some of the debt financing may be used for exercising the firm's real options early. Because it is difficult to write contracts restricting the investment choices of a firm, creditors may withhold debt financing, or at least charge higher rates. Thus, in order to reduce the possibility of a shareholder-creditor conflict, firms that hold significant growth options may choose to use less debt financing. As a result of the firm holding less debt, shareholders have less incentive to shift risk onto the creditors. There is evidence that firms with more real options do indeed finance with lower debt levels (Smith and Watts, 1992; Rajan and Zingales, 1995; Sundaresan and Wang, 2006).

Others have investigated the effect of real options on firm value by examining the effect of stronger equity holders' bargaining power. The firm's shareholders can vote to remove the top executive of the firm. Creditors have no voting power and must therefore rely on the courts' ability to uphold the terms of the debt contract. Sundaresan and Wang (2007) argue that firms with stronger equity holders' bargaining power have lower debt capacities. In their model, the value of the firm is increased by 29 percent when renegotiation of the firm's debt financing is allowed. However, as shareholders' bargaining power increases, this value decreases. Renegotiation allows the firm's creditors to recapture some of the real option value that the shareholders expropriate.

Based on the preceding argument, in firms with significant real options and high levels of debt, there is great potential for major shareholder/creditor conflicts and significant appropriation of wealth by shareholders from the firm's creditors. In order to ameliorate this problem, a manager may choose to use less debt early on, before these conflicts emerge. The argument has a compelling application for professional managers with advanced understanding about the way in which real options should influence their decisions: firms with significant real options should use less debt than firms with fewer real options.

9. Degree of product market competitiveness

Campello (2003) notes that much recent literature on capital structure involves the examination of the implications of financing decisions for competitors and consumers.

In this literature, a firm's financing choices influence firm conduct in product markets in addition to the conduct of competing firms, thereby influencing competitive outcomes. Chevalier and Scharfstein (1996) predict that firms that rely heavily on external debt financing are more likely to cut their investment in market share building in response to negative shocks. The competitive outcomes resulting from such actions depend on the financial structures of their industry rivals. Tesler (1966) and Bolton and Scharfstein (1990) stress that dependence on outside financing can hinder a firm's ability to fight competition, which in turn prompts financially unconstrained rivals to pursue predatory market strategies.

Campello (2003) empirically examined the argument that capital structure influences a firm's (as well as its rivals') incentives to compete in the product market. He looks at the differences in responses of firm sales-leverage sensitivity to macroeconomic shocks across low-debt and high-debt industries. The results obtained show that reliance on debt financing can significantly depress a firm's (relative to industry) sales growth in industries in which rivals are less leveraged as economic conditions worsen. In other words, debt financing lowers firm sales growth relative to industry in industries in which firms are relatively unlevered. This effect is only observed during recessions, but not during booms.

Debt could also be used to make a "strategic commitment" to more aggressive behavior in the product market (Brander and Lewis, 1986). This threat is credible because of the option-like payoffs associated with debt under limited liability.

Thus, in addition to being an important decision to make at the firm level, the capital structure decision may have an impact on the strategic position of the firm. In particular, research in this area supports the following recommendation: do not use significantly more debt than your competitors use if the industry is not debt intensive. Again, while a specific optimal debt level is not specified, managers can use yet another indicator to perceive whether their debt ratios are at an appropriate level.

10. The Brigham and Daves suggested managerial process

Brigham and Daves (2010, pp. 538-44) suggest a series of steps by which a manager might estimate an optimal capital structure. The process is heavily dependent upon the preciseness and correctness of estimates of the cost of debt at different debt ratios (given information in the first step in their suggested process).

This initial information is given in their hypothetical example, and simply presented as investment banker assertions, although the authors do suggest that analysis of industry conditions and prospects, appraisal of business risk, projections of pro-forma statements under each capital structure considered, consideration of financial market conditions, interest rates paid by other firms in the same industry, and the investment banker's own judgement are all considerations that go into the investment banker's estimation. The Hamada model (Hamada, 1969) is then used to estimate unlevered and levered betas, which in turn are used in the capital asset pricing model (CAPM) to estimate required returns on equity for the firm at each debt ratio considered. The WACC is then calculated for each debt ratio specified in the Hamada equation, and the shareholder wealth and stock price are estimated at the various debt ratios.

The process is helpful in showing the consistencies between the financial models used in the estimation process, and results in the same precise "optimal" debt ratio for either the firm value maximization or WACC minimization framework presented

graphically in Section 2. The authors do caution that there are assumptions made in the process, such as constancy of EBIT and FCF (free cash flow) at the various capital structures, and that the market value of equity in the presence of preferred equity would necessitate subtracting not only debt but also the value of preferred equity from total value. The process is also a series of estimations, and distortions at each level could easily distort the end result.

In fact, the presence of any complex security feature (preferred stock convertibility, warrants, debt restrictions, etc.) would be challenging to incorporate in a practical way. Our confidence in the optimal debt ratio resulting from the process described above may also be affected by our confidence levels concerning CAPM assumptions, statistical significance and parameter stationarity in the Hamada estimations, and our dependence on the analytical capability and judgemental prowess of the original cost of debt estimates (the key to the whole argument) that were provided by the firm's investment banker.

11. Financial managers' perspectives

In a survey in 2001, corporate financial officers were found to use firm risk (not project risk) as a criterion for evaluating projects. The executives' major concerns seemed to center on dilution, potential stock price appreciation, credit ratings and excess borrowing capacity rather than a preoccupation with the notion of an optimal capital structure (Graham and Harvey, 2001).

In 1986, Pinegar and Wilbricht surveyed *Fortune* 500 executives concerning their views about capital structure theories from the academic world (Pinegar and Wilbricht, 1989). The study found support for the existence of a funding hierarchy in managerial settings, but did not provide much hope that the tradeoff model had been effectively used in practice. Despite the lack of support for the tradeoff models, however, certain factors that affect the tradeoff notion were identified as items of importance: restrictive covenants, taxes, voting (corporate control), and the extent of tax shelters other than the tax shelter for interest expense. The paper underscores the challenges faced by practicing managers when faced with theoretical models of management from the academic world.

12. Conclusion

This paper reviews the theoretical foundations of capital structure, highlights some of the problems encountered when applying the theory to reality, and suggests a framework for practical managerial decisions about capital structure. This exposition is especially useful in undergraduate business curricula, in particular for finance majors considering professional management as a career.

We reiterated a simple theoretical exposition of typical capital structure theory coverage, recognizing the challenges of practical application given the *ceteris paribus* assumptions and the elusiveness of the precise optimal debt ratio. We summarized the concrete concepts that remained, and presented leverage multiples, debt servicing multiples and Z-scores as possible indicators that managers can use to perceive benefits and risks of debt use. We suggested considering the roles of the presence of real options and degree of product market competitiveness in influencing the capital structure decision, and presented the Brigham and Daves estimation process as a possible foundation for a capital structure decision. Suggestions here are not all inclusive – finance educators with management experience could likely provide insights from

their own management expertise. Other practical suggestions for managers may emerge in the future finance literature, more insights emerging as the work on capital structure continues.

We suggest that the use of indicators such as leverage multiples, debt-servicing mutiples and perhaps the Z-score are concrete and readily available data sources for use by practitioners. While indicators do not provide a precise optimal capital structure, they are practical and useful for manager perceptions of debt use. If these assertions could be adopted by educators at the undergraduate level and maybe even at the MBA level, perhaps our graduates could exhibit a greater preparation for the professional management arena.

Note

1. A complete and thorough review of tradeoff, pecking order, and other capital structure theories and corresponding empirical explorations may be found in detailed review papers by Parsons and Titman (2008) and Frydenberg (2004).

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Appendix. Leverage multiples example

The calculation of leverage multiples from income statement figures is relatively straightforward. The manager needs only two sets of financial statements in adjacent accounting periods, generally statements from two consecutive years. Using these figures, the DOL, DFL, and DCL can be calculated. In the unlikely event that only one set of statements is available for leverage analysis, the leverage estimates may be used. While estimation is not necessary in the example below (we do have two sets of statements here), the estimation process is shown below as well.

Leverage calculations

$$\%\ \text{change in sales} = 0.09810000$$

$$\%\ \text{change in EBIT} = 0.21379764$$

$$\%\ \text{change in EATCS} = 0.53945698$$

$$\text{DOL} = \frac{0.21379764}{0.09810000} = 2.179384698$$

$$\text{DFL} = \frac{0.53945698}{0.21379764} = 2.523212957$$

$$\text{DCL} = \frac{0.53945698}{0.09810000} = 5.49905$$

or:

$$\text{DCL} = \text{DOL}*\text{DFL} = 2.179384698*2.523212957 = 5.49905$$

Leverage estimations: (using estimation formulas)

$$\text{DOL} = \frac{\$9,453,765 - \$4,763,522 - \$1,298,746}{\$1,787,643} = 1.89718920$$

$$\text{DFL} = \frac{\$1,787,643}{\$1,787,643 - \$669,258} = 1.59841468$$

$$\text{DCL} = \frac{\$9,453,765 - \$4,763,522 - \$1,298,746}{\$1,787,643 - \$669,258} = 3.03249507$$

or:

$$\text{DCL} = \text{DOL}*\text{DFL} = 3.03249507$$

'000s'	2008 ($)	2009 ($)
Sales	9,453,765	10,381,179
Less COGS	4,763,522	5,180,208
Gross profit	4,690,243	5,200,971
Less other variable operating costs	1,298,746	1,428,251
Less depreciation expense	57,000	56,986
Less cash fixed operating costs	1,546,854	1,545,897
Operating profit (EBIT)	1,787,643	2,169,837
Less interest expense	669,258	668,925
Earnings before tax	1,118,385	1,500,912
Less tax expense	510,245	585,206
Net income tax	608,140	915,706
Less preferred dividend expense	38,000	38,000
Earnings available to common s/h (EATCS)	570,140	877,706
Less common dividend expense	56,230	56,984
Change in retained earnings	513,910	820,722

Table AI. Domingo Corrugated Products, Inc., income statement for the year ended December 31

About the authors

Robert Stretcher is an Associate Professor of Finance at Sam Houston State University. His teaching areas are corporate finance and financial institutions. He conducts research primarily in the areas of corporate and applied finance, financial education, and financial markets. Professor Stretcher earned a PhD from the University of Tennessee in 1995. Robert Stretcher is the corresponding author and can be contacted at: fin_rhs@shsu.edu

Steve Johnson is an Assistant Professor of Finance at Sam Houston State University. His teaching areas are corporate finance, entrepreneurial finance, international finance, investments, and derivatives. He conducts research primarily in the areas of corporate finance, financial education, international finance, derivatives, and financial markets. Professor Johnson earned a PhD from the University of Utah in 2002.