

# THE ROLE OF SHORT-TERM DEBT IN CAPITAL STRUCTURE

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**W**HILE ONE OF THE MOST STUDIED AREAS OF business decisions, firms' capital structure choices continue to be one of the least understood and empirically most difficult to quantify.<sup>1</sup> Since Miller (1977), researchers have attempted to determine the extent to which, if at all, taxes influence the level of corporate debt.<sup>2</sup> The purpose of this paper is to examine recent trends in corporate leverage, with particular attention to the composition of the debt used, with the hope of expanding some of the issues addressed in the literature.

This paper begins with an overview of the ways in which leverage has been measured in the empirical literature and the role taxes may play in determining debt maturities. It then presents calculations of recent trends in corporate leverage, with particular attention to the role of short-term debt. The calculations suggest that inferences about leverage are not invariant to the inclusion of short-term debt or to the denominator used to calculate the ratios. The paper ends with a discussion of the implications of the various debt definitions to empirical research, and of the changing role that taxes may play in affecting the composition of corporate borrowing.

## THE LONG AND SHORT OF IT

Capital structure studies attempt to explain cross-sectional variation in debt policy by regressing various explanatory variables on a measure of leverage, usually defined as debt divided by a size variable, such as the book value of assets or the market value of the firm. While not comprehensive, Table 1 shows the measures of debt used in some of the most widely cited or recent studies. Most noticeable in this table is that while all studies include long-term debt they vary in their inclusion of short-term borrowing. Bradley, Jarrell and Kim (1984), Givoly, Hayn, Ofer and Sarig (1992),

and Graham (1996), for example, use only long-term debt in their measures of leverage. Bowen, Daley and Huber (1982), and Chang, Higgins and Rhee (1992) include long-term and at least some component of short-term debt. Dhaliwal, Trezevant and Wang (1992), Trezevant (1992), Chang, Higgins and Rhee (1992), and Shih (1996) use the scaled interest expense of firms and would include interest paid on both long- and short-term debt.

The potential importance of short-term debt has been highlighted by Scholes and Wolfson (1988, p. 170) who argue that firms facing uncertainty in their tax status might prefer to use short-term debt when their tax rate is high. In this setting, short-term debt will be the least costly and easiest way to adjust debt levels temporarily to a firm's optimum, and avoids the potential cost of retiring outstanding debt in the future. The existence and extent of transactions costs are important here, and will be discussed in more detail below, as the absence of transaction costs will facilitate any tax-motivated change in debt.

Recent empirical work has not been unanimous in documenting this type of behavior. Guedes and Opler (1996) hypothesize that debt maturity will be positively related to the borrower's tax rate as longer term debt will yield higher current interest payments, but find empirical support for the opposite relationship. In contrast, Newberry and Novack (1999) find a positive relationship between tax rates and debt maturity in bond issuances, though they do not examine strictly short-term debt. In a complimentary paper, Harwood and Manzon (2000) estimate the effect of various factors on the share of total debt that is long term, defined as less than either three or five years. Consistent with Newberry and Novack, they find that the proportion of long-term debt is increasing in firms' marginal tax rates.

Another way to adjust the debt maturity structure is through early retirements. Manzon (1994) documents that firms retiring long-term debt were more likely to have lower tax rates and to retire debt that would generate a gain. This behavior is consistent with firms decreasing their debt as well as increasing income from discretionary sources when the tax benefits or costs are small.

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Table 1  
Definitions of Debt

<i>Debt Measure</i>	<i>Study</i>
Long-term	Bradley, Jarrell, and Kim (1984) Givoly, Hayn, Ofer, and Sarig (1992) Graham (1996)
Long-term and at least some component of short-term	Bowen, Daley, and Huber (1982) Chang, Higgins, and Rhee <sup>†</sup> (1992)
Scaled interest expense	Dhaliwal, Trezevant, and Wang (1992) Trezevant (1992) Chang, Higgins, and Rhee <sup>†</sup> (1992) Shih (1996)

<sup>†</sup>Chang, Higgins and Rhee use multiple measures of leverage.

A separate reason for including short-term borrowing in any measure of leverage is to capture fully the cash flow demands of debt service payments. While long-term debt will always generate an interest expense as interest is accrued, there will be no current period expenditure of cash to the extent the interest is paid later, for example, in the case of zero coupon bonds. In contrast, short-term debt, in addition to the current portion of long-term debt, will provide a better measure of a firm's need for cash as this debt will require payment in cash or the use of other current assets in the near future.

The results of all of these papers suggests a role, and potentially an important role, for short-term debt as part of the overall capital structure of a firm. Whether or not the amount of short-term debt is an economically significant part of total borrowing is an issue addressed in the next section.

#### EMPIRICAL SIGNIFICANCE OF SHORT-TERM DEBT

To examine the magnitude of short-term borrowing on measures of leverage, a panel of firms was constructed for the years 1979 to 1998. To be included in the sample, firms had to have continuous data for each of the following data items (Compustat data number in parentheses): total assets (6); long-term debt (9); current portion of long-term debt (44); mortgages, notes, and bonds payable in less than one year (206); common shares outstanding (25); and closing stock price (199). A total of 1,111 firms met these criteria.

Figure 1 provides a graph of the total amount as well as the components of debt of the sample firms. While total debt and both components are increasing over time (in real terms, as well, though not

shown), there is a noticeable jump during 1987-1988, when the total amount of short-term debt more than doubled. While most pronounced in 1988, the role of short-term debt did not diminish afterward, with more than one-third of the increase in total corporate debt between 1987 and 1998 due to short-term borrowing.

The observed increase in the short-term share of total corporate debt could be explained by two factors. First, since firms will tend to use more short-term financing when it is relatively less expensive, the increase in short-term debt in 1988 could be due to relative interest rates. To examine this possibility, the dotted line in Figure 2, scaled to the right axis, measures the difference between the ten-year Treasury borrowing rate and the six-month bill rate. While long-term rates were relatively high in 1988, they had increased more dramatically in earlier years, a period during which the share attributable to short-term borrowing increased only modestly. Further, when relative long-term rates increased again in the early 1990s, short-term borrowing did not repeat its dramatic rise.<sup>3</sup>

A second reason for the 1988 jump could be the 1987 market crash, which made marginal equity financing less attractive. The subsequent recovery of the equity markets, however, did not cause the relative shares of long- and short-term debt to change dramatically. This raises the question of the extent to which short-term debt is a substitute for equity as well as long-term debt.

Figures 3 and 4 present leverage ratios based on long-term debt and total debt, scaled by the book value of assets and the market value of equity, respectively. In the case of Figure 3, excluding short-term debt from the numerator yields a very

Figure 1: Corporate Debt

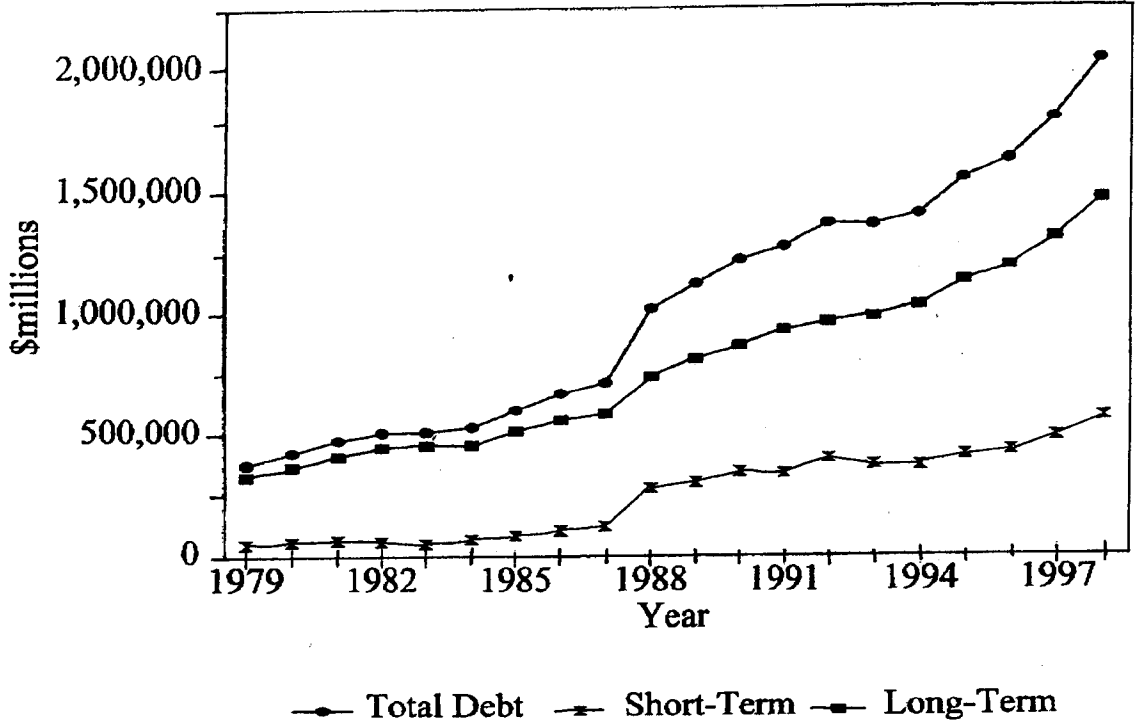


Figure 2: Composition of Debt

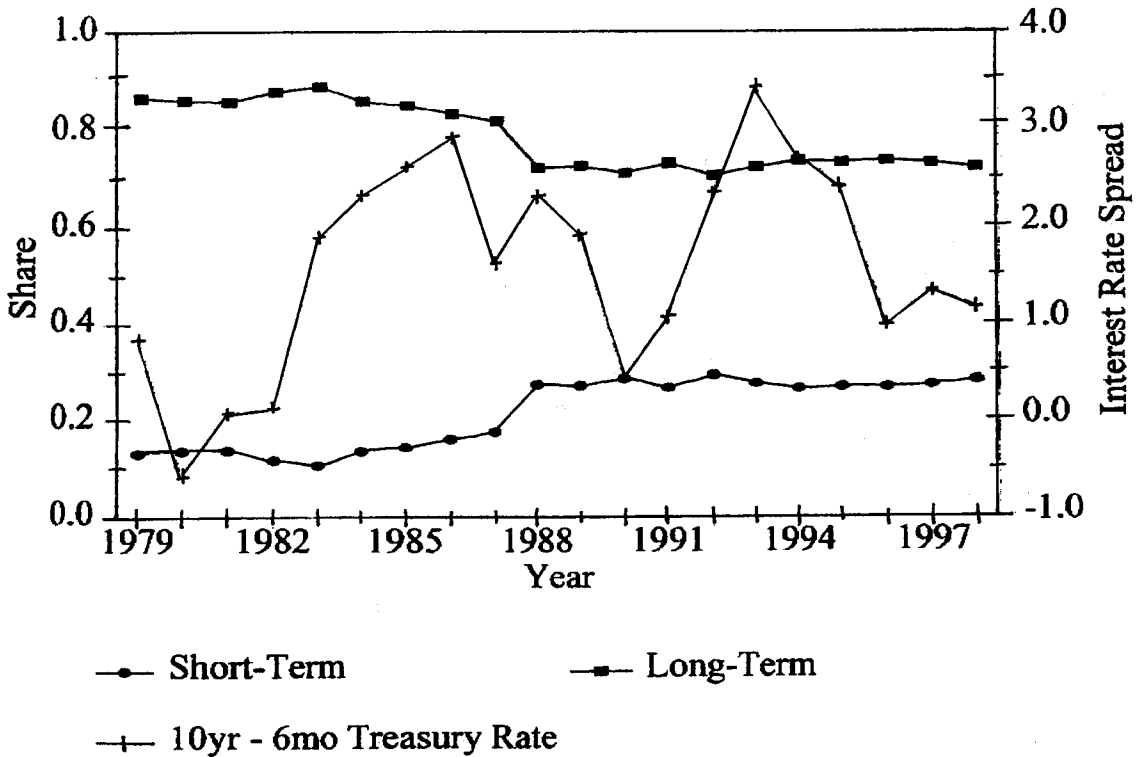


Figure 3: Debt to Asset Ratios

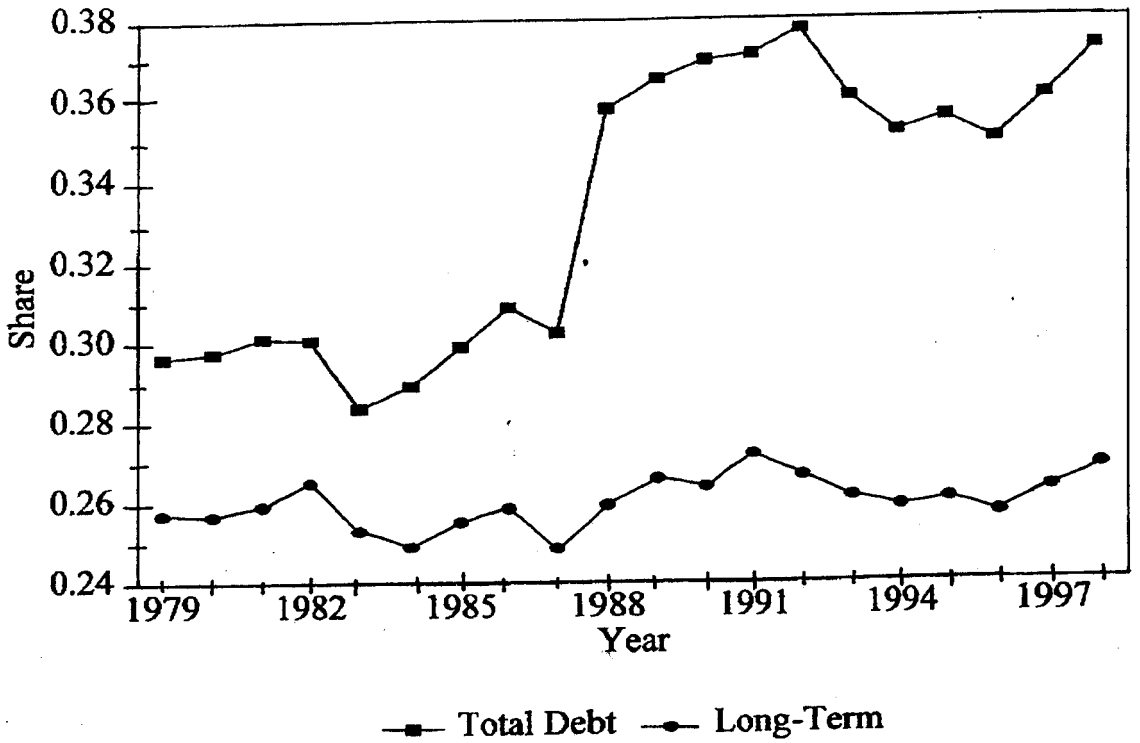
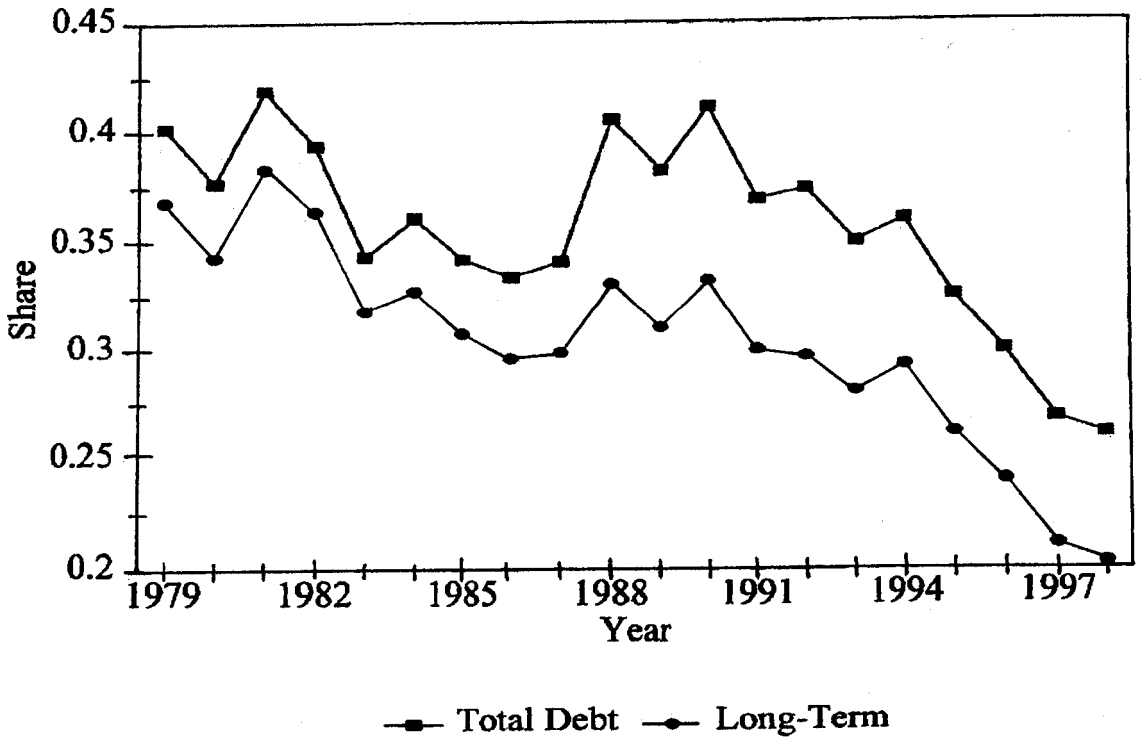


Figure 4: Debt to Market Ratios



different trend in leverage, particularly since 1987. While long-term debt to assets appears relatively constant over the period, the ratio of total debt to assets increased sharply in 1988 and continued to rise thereafter. In Figure 4, the effect of including short-term debt is equally striking in 1988, but muted thereafter as increases in market values have reduced this ratio over time.

#### WHY IS THIS OF INTEREST TO TAX POLICY RESEARCHERS?

The potential role of short-term debt in firms' capital structure decisions is clearly important if one is to estimate the full extent of taxpayer reactions to tax policy. An ill-defined measure of debt not only may lead to spurious relationships, if any are found at all, but, more importantly, the researcher will be unable to capture the full response of the firm. In the extreme case, if all adjustment is made through short-term borrowing, one may find no response at all of leverage to taxes because the entire response is in debt not captured in the leverage measure. An example of this is documented in Plesko (1998). In that paper, estimates of the anticipated changes in the marginal tax rate on interest deductions caused by the *Tax Reform Act of 1986* were regressed on measures of debt-to-asset ratios for approximately 35 industries over three years. In the reported regression results, the long-term debt-to-asset ratio was not estimated to be affected by the changes in the tax rate, though taxes were statistically significant factors in explaining changes in the total debt-to-asset ratio.

Since any change in capital structure will likely involve some costs, the relative costs of adjusting short- versus long-term debt should be examined to better estimate taxpayer responses. If short-term debt is less costly to adjust than long-term borrowing, or if the relative cost of issuing short-term debt has declined over time, any adjustment will likely be observed in short-term borrowing first, as posited by Scholes and Wolfson.

In the extreme case of no adjustment costs, incremental changes will be made only with respect to the current year's tax rate, rather than any expectation of future tax burdens, as changes in a firm's tax rate could be offset instantly through changes in short-term borrowing. In such a world, firms would be able to minimize the future stream of tax payments by incrementally minimizing each successive year's tax payments.

Regardless of the current empirical evidence on the role of the tax system, tax savings are only one of many factors influencing firm's decisions, and there remains more that is unknown than is known about the factors affecting capital structure decisions. One of the important contributions of research in tax responses is to obtain better estimates of the marginal costs and benefits of undertaking more or less of the activity in question, so that those costs can be weighed against other non-tax costs and benefits. In the case of leverage decisions, capital markets look well beyond the tax status of firms in examining their creditworthiness. Further, financial market innovations in the mechanisms for supplying both debt and equity will influence the extent, and manner, in which firms obtain capital. These innovations tend to advance faster than tax policy, potentially increasing firms' responses to tax considerations over time.

#### Notes

- <sup>1</sup> Graham (1996, p. 71) points out that empirical cross-sectional studies are able to explain only about 5 percent of the variation in leverage.
- <sup>2</sup> For reviews of the capital structure literature, see Masulis (1988), Modigliani (1988), Miller (1988), Harris and Raviv (1991), or Berens and Cuny (1995). Recent papers that provide discussions of later work are Graham (1996) and Shih (1996).
- <sup>3</sup> A univariate regression of the interest rate spread on the short-term share of corporate debt is not statistically significant.

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