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On the Existence of an Optimal Capital Structure: Theory and Evidence: Discussion

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## DISCUSSION

WAYNE H. MIKKELSON\*: The Bradley, Jarrell and Kim paper presents a single-period model of corporate capital structure for a firm with two classes of securities. Based on comparative statics and simulations of the model, three determinants of optimal capital structure are identified and empirically investigated in a cross-sectional examination of leverage ratios. The three determinants are: (1) costs of financial distress, (2) level of non-debt tax shields and (3) variability of firm value.

A linear ordinary least squares regression model is estimated to test empirical propositions drawn from the model and simulations. For a sample of 821 firms and using data drawn from the COMPUSTAT file, the ratio of the mean book value of long-term debt to the mean sum of market value of equity and book value of long-term debt for 1962–1981 is regressed on (1) the standard deviation of first differences in annual earnings divided by average value of total assets for 1962–81, (2) annual depreciation plus investment tax credits divided by annual earnings before interest, depreciation and taxes for 1962–81, and (3) annual advertising plus research and development expenses divided by annual net sales for 1971–1982. Regardless of whether the regression includes dummy variables for industry category, the coefficient on standard deviation of first differences in annual earnings is negative, the coefficient on the sum of depreciation and investment tax credits is positive and the coefficient on advertising and research

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expenses is negative. The  $t$ -statistic for each estimated coefficient is significant at the .01 level.

My main concern with the paper is what we can say based on these findings about the determinants of optimal capital structure that are implied by the model and simulations. In particular, the cross-sectional tests do not relate directly to the results of the simulations. For example, in most cases the simulation depicts a nonlinear relation between variability of firm value and optimal leverage ratio, but only a linear relation is estimated. In addition, it is difficult to draw any inferences about the model since either a positive or negative coefficient on the proxy for variability of firm value is consistent with the simulation results. Perhaps the most powerful implication of the simulations is that the slope of the relation between optimal leverage ratio and variability of firm value depends on the costs of financial distress ( $k$ ) and the amount of non-debt tax shields ( $\phi$ ). But no direct test of this implication is conducted. In addition, it is ambiguous, as noted by the authors, what effects or determinants depicted by the model are represented by a measure of advertising and research expenses or by a measure of depreciation and investment tax credits. For example, a measure of the relative amount of depreciation charges may characterize the composition of assets in place as well as the amount of noninterest tax deductions. Finally, there are strong implicit *ceteris paribus* assumptions that are necessary to interpret the results vis-a-vis the model and simulations of a firm's optimal leverage ratio. The model and simulations imply a time series examination of leverage ratios. Therefore, the findings are consistent with the possibility that the coefficient estimates for the cross-sectional regressions do not apply at the firm level. The coefficient estimates may be of a different sign or insignificant if a time series test is conducted on the capital structures of individual firms.

Another problem in interpretation is whether the model and simulations capture, other than in an ad hoc fashion, the costs of leverage-induced incentive problems, or agency costs of debt.<sup>1</sup> They include all agency costs in their notion of the "costs of financial distress" ( $k$ ). According to the model, "costs of financial distress" arise only when the firm defaults on the senior (debt) claims (see expressions (2) and (4)). Even though a positive probability of default is a necessary condition for the existing securityholders of the firm to incur agency costs of debt financing, it is unclear whether agency costs of debt depend on variability of firm value as depicted by the model. For example, the costs associated with asset substitution (shifting to a riskier investment policy) that are discussed by Smith and Warner (1979) may be lowest when at the time of issuance of debt the firm's investment policy maximizes the variability of firm value. The model does not appear to reflect this possibility. More important, however, is the implicit assumption of the model that the investment policy of the firm is fixed and independent of capital structure. This assumption removes the dependence between financing and investment policies that brings about conflicts of interest and potential costly contracting problems between classes of securityholders. Therefore, the model and simulations appear to capture only costs that are directly related to default and not necessarily all of the costs that

<sup>1</sup> Jensen and Meckling (1976) define and characterize the concept of agency costs of debt financing.

generally are classified as agency costs of debt financing. This is inconsistent with testable implication (1) that is stated in section II.

Finally, and on a more general level, it is important to bear in mind that the primary objective of research on corporate capital structure is to explain the various characteristics of firms' claims structures, of which one characteristic *may* be leverage ratio. This general objective can be overlooked easily because many models of optimal capital structure depict leverage ratio as the single characteristic that differentiates firms' claims structures. Therefore, an important potential problem with studies that examine only variation in traditional measures of leverage ratio is that they may miss the relevant variation in actual claims structures that is due to taxes, default-related costs, incentive-related and contracting costs and information asymmetries. A further complication is that it may be impossible for leverage ratios to be measured meaningfully given the complexity of many firms' claims structures, especially firms with various option-like claims and multiple classes of debt and equity claims. That is, the concept of financial leverage may be too simple or abstract to characterize firms' claims structures. Therefore, I question whether we can best uncover the determinants of capital structures or describe firms' claims structures by focusing on leverage ratios. Perhaps a fruitful extension of the research that concentrates on leverage ratios is to study alternative and more detailed characteristics of firms' claims structures.<sup>2</sup>

<sup>2</sup> Smith and Warner (1979) is a good example of such research.

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