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PREVIEW

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**The importance of bankruptcy costs in firms' capital structure decisions**

**Jensen, Gerald Reed, Ph.D.**

**The University of Nebraska - Lincoln, 1988**

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Ann Arbor, MI 48106**

PREVIEW

**THE IMPORTANCE OF BANKRUPTCY COSTS  
IN FIRMS' CAPITAL STRUCTURE DECISIONS**

by

**Gerald R. Jensen**

**A DISSERTATION**

**Presented to the Faculty of  
The Graduate College in the University of Nebraska  
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For the Degree of Doctor of Philosophy**

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**DECISIONS**

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PREVIEW

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THE IMPORTANCE OF BANKRUPTCY COSTS  
IN FIRMS' CAPITAL STRUCTURE DECISIONS

Gerald R. Jensen, Ph.D.

University of Nebraska, 1988

Adviser: Thomas S. Zorn

Several theories have been developed to explain a firm's capital structure decision. These theories attach varying degrees of importance to bankruptcy costs, ranging from the assumption that bankruptcy costs are insignificant to the assumption that bankruptcy costs, alone, limit a firm's use of debt.

While the significance of bankruptcy costs has been debated in theoretical analyses, the importance of bankruptcy costs to a firm's capital structure decision is ultimately an empirical question. There is little empirical evidence either supporting or refuting the claim that bankruptcy costs affect a firm's use of debt. The purpose of this analysis is to provide a clear description of what constitutes bankruptcy costs and then to test for the importance of these costs to a firm's choice of debt level. Specifically, this analysis tests for the significance of a group of variables to determine whether bankruptcy costs are insignificant, whether they are the only factor that limits a firm's debt usage, or whether they are only part of the reason firm's limit their use of debt.

Several authors have suggested that in imperfect markets a firm's financial decisions are likely to be interdependent. This analysis employs a three-stage least squares (3SLS) methodology to test for the factors that are significant in explaining firms' debt ratios. The



system equation estimation techniques, such as 3SLS, are standard in studies of changes in firms' financial ratios, however, this analysis is the first to apply this technique to a firm's long term financial decisions.

The findings of this analysis indicate that bankruptcy costs are neither insignificant nor are they the sole factors that determine a firm's debt ratio. The results support a more general theory of capital structure that considers bankruptcy costs in conjunction with other factors as the determinants of a firm's capital structure. Specifically, the Modified Pecking Order Theory explains many of the relationships observed in this analysis and warrants more consideration in future discussions of firms' capital structures.

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PREVIEW

## CHAPTER 1

### INTRODUCTION

There have been a number of alternative theories that have been developed to explain a firm's capital structure decision. However, Myers [52] indicates that we know very little about how firms actually choose their capital structures. He notes that the theories that have been developed do not seem to explain the actual financing behavior of firms. The reason for the discrepancies between the theories and the empirical evidence may, in part, be the result of problems with previously conducted empirical tests.

The purpose of this analysis is to test for the factors that are significant in explaining a firm's capital structure decision. A large part of the analysis is devoted to describing bankruptcy costs. The reason for the lengthy discussion of bankruptcy costs is that there is some confusion about what actually constitutes bankruptcy costs. In addition, many researchers have declared bankruptcy costs to be unestimable and have conducted their tests without considering bankruptcy costs.

While bankruptcy costs have been dismissed by some researchers as being insignificant, they have been advocated by others as the sole factor limiting a firm's use of debt. This analysis includes bankruptcy costs, as well as a number of other theoretically relevant variables, in a model describing firms' debt ratios. By testing for the significance of these variables within the same model, we can determine whether bankruptcy costs are insignificant in explaining a firm's capital structure decision, whether bankruptcy costs alone explain a firm's capital



structure decision or whether bankruptcy costs in conjunction with other factors determine a firm's capital structure decision.

The various capital structure theories imply the significance of different combinations of the variables included in this analysis. Therefore, this analysis will provide evidence either supporting or refuting these theories. The analysis may help to resolve the inconsistency between the theories and the empirical evidence, alluded to by Myers.

This analysis makes two fundamental improvements over the previous capital structure studies. First, the analysis estimates a system of equations to allow for the interdependence of a firm's financing decision, its investment decision, its dividend decision and its tax rate. Second, the analysis incorporates a more comprehensive list of the factors that have been theorized as determinants of firms' capital structures, thus alleviating the misspecification problem.

The misspecification problem is particularly pervasive in capital structure studies that have tested for the significance of bankruptcy costs. Capital structure studies have in general ignored the indirect costs of bankruptcy and have focused on the direct costs of bankruptcy and the probability of bankruptcy. For example, Castanias [12] states that indirect bankruptcy costs are excluded from his tests because they cannot be estimated. This analysis employs the bankruptcy literature to develop realistic proxies for bankruptcy costs, which are then incorporated into a capital structure model.

In addition to the two fundamental changes cited above, the analysis makes several additional improvements upon previous capital structure studies. The improvements are designed to more accurately evaluate the factors that affect a firm's capital structure decision. Therefore, this analysis provides a more reliable test of the implications of the various capital structure theories.

This study conducts a cross-sectional analysis of firm debt ratios for two alternative time periods. The results of the empirical analysis support the following conclusions: (1) A firm's financial decisions are interdependent. (2) Firms prefer to use internally generated funds to finance investment. (3) Agency costs do not play a major role in a firm's capital structure decision. (4) Bankruptcy costs are a significant determinant of a firm's capital structure. (5) Firms do not substitute non-debt tax shields for debt. (6) There are industry patterns in firm debt ratios. (7) Employing a debt ratio calculated with the book value of equity produces weaker results than the results obtained from a debt ratio calculated with the market value of equity. (8) Firms with higher business risk maintain lower debt levels.

In general, the findings of this analysis provide rather strong support for the Modified Pecking Order Theory. The evidence also indicates that bankruptcy costs have a significant impact on a firm's capital structure decision, however, the Bankruptcy Cost - Tax Shelter Theory is provided only limited support by the findings. The results of the analysis are inconsistent with agency theory and the DeAngelo-Masulis hypothesis that firms substitute non-debt tax shields for debt.

The rest of this chapter reviews the major theories of capital structure and provides a thorough description of the costs a firm incurs as a result of bankruptcy. Chapter two provides a review of the empirical capital structure studies. Chapter three describes the variables included in the analysis and the methodology employed. Chapter four presents the results of the analysis and discusses the conclusions drawn from the results.

### **Capital Structure Theories**

The factors that influence a firm's capital structure decision have been widely debated in the finance literature. The seminal work of Modigliani and Miller [49,50] served as a catalyst in this debate. Subsequent to their analysis, the capital structure research has focused on the factors that determine a firm's optimal capital structure. There also continues to be some controversy about the existence of an optimal firm capital structure.

Bankruptcy costs have been advocated by many as the factor which causes firms to limit their use of debt. However, several authors have questioned the importance of bankruptcy costs in the firm's capital structure decision. (see [5,27,47]) A number of theories have been developed which rely on factors other than bankruptcy costs to explain the firm's capital structure decision.

Miller [47] suggests that bankruptcy costs are not of sufficient size to influence a firm's capital structure decision. He compares the bankruptcy cost - tax shelter trade-off with the recipe for the fabled horse-and-rabbit stew - one horse and one rabbit.

Miller adds personal taxes to the Modigliani-Miller analysis and derives the result that the individual firm's capital structure decision has no effect on firm value. The analysis, however, demonstrates the existence of an optimal level of debt for the corporate sector as a whole. According to the Miller analysis, the rate on corporate bonds is grossed up to compensate investors for the higher taxes paid on bond income relative to stock income. The optimal aggregate debt level in the corporate sector is reached when the rate on debt is grossed up to the point where the firm obtains no net advantage from debt financing. Miller concludes that the firm's capital structure decision is irrelevant, at least with respect to firm value.

Miller proposes a neutral mutations hypothesis to explain the observation of intra-industry patterns in debt ratios. According to this hypothesis, firms fall into financing patterns which have no material effect on firm value. The patterns may make managers feel better, and since they do no harm, no one cares to stop or change them.

DeAngelo and Masulis [17] extend Miller's analysis by including nondebt tax shields such as depreciation, depletion allowances and investment tax credits (ITC). As the firm increases its use of debt, it also increases the probability that its earnings will be insufficient to utilize all of its tax shields. An optimal capital structure is shown to exist even in the absence of bankruptcy costs, because the firm will limit its use of debt to preserve the value of its tax shields. The authors further demonstrate that when bankruptcy costs exist, the firm will choose its optimal capital structure by trading-off marginal expected interest tax shields and marginal expected bankruptcy costs.

The Signalling Theory of optimal capital structure was developed by Ross [55]. According to the Signalling Theory, a firm's management sets the firm's capital structure such that it signals the firm's true value (type). Higher valued firms signal their higher value by maintaining a higher debt ratio than lower valued firms.

A firm's capital structure signals the firm type, however, once a firm's type is identified, the firm cannot change its value by changing its capital structure. Therefore, the firm's capital structure decision does not affect firm value, but rather the firm's value determines the capital structure decision. To arrive at this result, Ross assumes firms maintain management compensation packages based on firm value. The firms' managers must also be penalized should the firm go bankrupt.

Jensen and Meckling [31] suggest an agency cost solution for the capital structure decision. The authors recognize that adding bankruptcy costs to the Modigliani-Miller analysis leads to the existence of an optimal capital structure, however, they feel that minimizing total agency costs is a more complete theory of capital structure.

Jensen and Meckling identify several agency costs associated with the use of external capital. The agency costs of external equity are due to manager perquisite consumption and the costs incurred to limit the consumption of perquisites. The agency costs of external debt are due to the incentive for managers to transfer wealth from the debt-holders to the stockholders, the costs incurred to limit this transfer, and bankruptcy costs. As the firm increases the use of external debt (equity), the respective agency costs increase. The firm, therefore,

chooses its optimal capital structure by selecting the proportion of external debt and equity that minimizes total agency costs.

Barnea, Haugen and Senbet (BH&S) [5] also focus on agency costs in developing a theory of optimal capital structure. Unlike Jensen and Meckling, BH&S ignore the agency costs of equity in their theory. They suggest that the stock ownership fraction of managers of large corporations is small enough that changes in the amount of external equity financing will not affect the manager's behavior. BH&S suggest that firms choose their capital structures by trading-off the tax advantage of debt with its agency costs. The authors identify the wealth transfer incentive and the incentive to pass-up profitable investment opportunities as the agency costs of debt. The authors feel that bankruptcy costs have little effect on the firm's capital structure decision.

Myers [52] supports a modified form of the Pecking Order Theory to explain the firm's capital structure decision. The Pecking Order Theory states that firms prefer internal financing to external financing. According to the Pecking Order Theory, when external financing is required, the firm will issue debt first, then hybrid securities, such as convertible bonds, and equity will only be issued as a last resort. The Theory also suggests that firms maintain target dividend levels which are set according to the investment opportunities the firm has available. The firm will adjust dividends gradually to cash surpluses and will finance cash deficits by drawing down liquid assets, rather than cutting the dividend. Myers' modification extends the Pecking

Order Theory by allowing information asymmetries and bankruptcy costs to influence the financing decision.

The Pecking Order Theory was the outgrowth of a more general theory that was informally proposed by Donaldson [19]. Donaldson suggested that firms prefer to minimize their costs and constraints by using internally generated funds when they were available. He also noted that firms resisted cutting their dividend except as a defensive measure in a period of extreme financial distress. This theory is referred to as the Cost Minimization Theory throughout the rest of this analysis.

The theories presented above define firms' capital structures without relying on the existence of bankruptcy costs. The most frequently discussed theory of capital structure, however, continues to be the Bankruptcy Cost -Tax Shelter (BC-TS) Theory. According to the BC-TS Theory, a firm's optimal capital structure occurs at the level of debt that equates the marginal expected bankruptcy costs of debt with the marginal expected tax advantage of debt.

A number of authors have developed models of the BC-TS Theory. Kraus and Litzenberger [38] develop a BC-TS model in a state-preference framework. Kim [34] develops a BC-TS model in the context of the Capital Asset Pricing Model. Turnbull [64] develops a BC-TS model in an options framework. Scott [59] develops a BC-TS model in a multiperiod setting where investors are risk neutral and firms' earnings distributions are constant over time. All of these models derive the firm's optimal capital structure at the point where the marginal expected bankruptcy cost equals the marginal expected tax savings of debt.

### **Bankruptcy Costs**

The bankruptcy literature defines two types of bankruptcy costs: direct and indirect. Direct bankruptcy costs are defined as those costs which are directly related to the bankruptcy proceedings. Most authors cite the legal, administrative and accounting costs incurred in the bankruptcy proceedings as the direct costs of bankruptcy. In addition, the denial of tax loss carryovers and carrybacks and the loss on the liquidation of assets may be included in this list.

Haugen and Senbet [27] note that the costs of liquidating a firm's assets are not bankruptcy costs because the decision to liquidate is simply a capital budgeting decision. However, VanHorne [66] states that a bankrupt firm's assets are often sold at reduced prices. The difference between what the asset would sell for under ordinary circumstances and what it is liquidated for is a direct bankruptcy cost.

Indirect bankruptcy costs are those costs which are not directly related to the bankruptcy proceedings, but are incurred because a firm's claimholders believe there is a chance that the firm will default on its claims, due to financial distress. Indirect bankruptcy costs are frequently referred to as the costs of financial distress. These costs include the costs associated with the firm/supplier, firm/creditor, firm/employee, and the firm/customer relationships as bankruptcy becomes possible.

A distinction between direct and indirect bankruptcy costs is that indirect bankruptcy costs can be incurred even if a firm does not go bankrupt, whereas direct bankruptcy costs occur only if the firm actually goes bankrupt. Kim [34] incorrectly implies that indirect bankruptcy