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How important is capital structure policy to firm survival?☆

Y. Peter Chung [a], Hyun Seung Na [b], Richard Smith [a,*]

[a] A. Gary Anderson Graduate School of Management, University of California Riverside, United States
[b] College of Business, City University of Hong Kong, Hong Kong

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ABSTRACT

If there is an economically important optimal capital structure, then firms that deviate too far from the optimum will face greater risk of failure or acquisition. Using data from the oil industry we find no significant evidence that capital structure policy affects acquisition or failure probability. Firms appear to increase leverage when they face attractive growth opportunities or when poor operating performance reduces equity value or compels borrowing. Firms are acquired when rapid growth has reduced financial slack. In a clinical examination, we address the question of how firms with persistently low leverage can operate and survive for many years without being targeted for acquisition. Our evidence supports the pecking-order hypothesis, including acquisition among potential financing sources.

1. Introduction

The two predominant theories of corporate capital structure are the "optimal tradeoff" hypothesis and the "pecking order" hypothesis. Under the tradeoff hypothesis, taxes, distress costs, and agency costs combine to yield an optimal capital structure and firms are punished for deviating from that optimum through lower risk-adjusted returns, and potentially failure or acquisition. Under the pecking order hypothesis, capital structure is a result of investment opportunities and capital retention policies in the presence of asymmetric information. Firms confronted with new investment opportunities seek to mitigate adverse selection costs by exploiting the least risky forms of financing first. Leverage increases when investment opportunities are abundant and demand for investment capital is high. Leverage decreases when free cash flow is high and investment opportunities are scarce. Under this hypothesis firms are punished through the failure to maintain enough financial slack to take on investments without incurring substantial adverse selection costs or by retaining more slack than is optimal.

The static version of the tradeoff hypothesis (Kraus and Litzenberger (1973), Jensen and Meckling (1976), and Morellec (2004), among others) and the pure version of the pecking order hypothesis (Donaldson (1961) and Myers and Majluf (1984))

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* Corresponding author at: Anderson Graduate School of Management, University of California Riverside, 900 University Avenue, Riverside, CA 92521, United States. Tel.: +1 909 268 5709(mobile).
E-mail addresses: peter.chung@ucr.edu (Y.P. Chung), hyunsna@cityu.edu.hk (H.S. Na), richard.smith@ucr.edu (R. Smith).

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are the simplest articulations of the competing theories. Bridging these two are several hybrids. Fischer et al. (1989) and others begin with the tradeoff hypotheses and propose that empirical capital structure is dynamic. They recognize that restructuring is subject to economies of scale so that firms can drift away from their targets. They return to the targets, or even over-shoot, using lumpy episodes of debt financing. From the other direction, Myers (1984) introduces a modified pecking order, which provides that firms face debt capacity limitations and frictions associated with raising capital, and cannot strictly adhere to the pecking order predictions. Synthesizing these two, DeAngelo and DeAngelo (2007) hypothesize, consistent with the tradeoff hypothesis, that firms do have target capital structures, but that, consistent with the pecking-order hypothesis, they may depart from the targets by issuing debt to pursue attractive investment opportunities. Moreover, the two main hypotheses are not mutually exclusive. Empirical capital structure could be affected by considerations of both optimal tradeoff and adverse selection.

In this paper, we address the question of whether capital structure matters by examining what happens to firms that operate with capital structures that are much different from industry norms and that deviate materially from endogenous estimates of capital structure policy. Our empirical approach is most directly a test of the optimal tradeoff hypothesis. If there is an economically important optimal capital structure, firms with capital structures much different from industry norms and from endogenous estimates of capital structure policy are most likely to be operating away from what is optimal and will be at competitive disadvantage. Such firms are less likely to be able to sustain profitable operations and are more likely to be attractive as acquisition targets by those who would seek to correct the capital structure. Those that operate close to their optimums should be able to generate more net cash flow and be better able to take on new investment opportunities, including by acquisition of firms that operate away from their optimums or that fail because of having chosen an inappropriate capital structure.[1] Accordingly, we measure the effects of leverage on firm survival, acquisition, and failure. We also examine the effects of leverage on (revenue) market share of firms, and we look specifically at a subsample of low-leverage firms, as they are the ones most likely to be acquired if the debt tax shelter is an important driver of firm value.

Our methodological framework reflects a return to basics. Alchian (1950) argues that the deliberate pursuit of maximum profit (in our case, through choice of an optimal capital structure) is unrealistic as a decision construct since the information necessary to ascertain the optimum is not observable. Nonetheless, he reasons that even if managerial choices are random, the environment in which firms compete will identify choices that have survival value. Stigler (1958) uses this reasoning to test for the presence of scale economies in the steel, automobile, and oil refining industries. The underlying logic of Stigler's "survivorship" approach is that good strategies, in the context of a competitive market, should survive and grow while others should diminish.[2]

We apply this approach to the U.S. oil industry: focusing specifically on crude oil exploration and development. We selected the oil industry for three main reasons: First, there are enough participants to make large-scale empirical analysis feasible, but at the same time, the single-industry focus enables us to examine several companies on a micro level. Second, because the end product is a commodity, firms compete mainly on cost and, except for differences in profitability and growth opportunities, the tradeoff and pecking order hypotheses imply similarity of capital structure across firms. Third, it is the same industry that was studied by Miller and Modigliani (1958) in their original study of capital structure irrelevance.[3] The narrow focus on oil exploration firms yields a large sample but still enables us to fully investigate each of the firms in the sample for appropriate inclusion, to use a narrower classification than a 2-, 3-, or 4-digit industry code, and to conduct a limited clinical analysis on firms with extreme capital structures.

We use four approaches to test the optimal tradeoff hypothesis against the alternative pecking order hypothesis. First, we use single-stage probit and multinomial probit models to test whether firm survival, acquisition, and failure probabilities are affected by capital structure. The single-stage models enable us to examine non-monotonic relations between capital structure and these outcome variables but are subject to challenge because they do not formally control for the endogeneity of observed leverage ratios. Second, to confirm the single-stage results, and to allow for cross-sectional variation in optimal capital structure, we endogenize capital structure in a two-stage model. However, because of data limitations, we are unable to investigate non-monotonic relationships in this model. Third, we test for the presence of a static or dynamic optimal capital structure by aggregating firms into leverage-based deciles and testing whether aggregated market share changes are related to factors that could affect optimal capital structure under the tradeoff hypothesis. Fourth, we undertake a brief clinical study of firms with persistent low leverage to gain a better understanding of how low leverage can persist over many years.

Leverage measures vary across studies. At one extreme, Lemmon et al. (2008), DeAngelo and DeAngelo (2007), and others define leverage in a way that emphasizes the potential tax advantage of debt financing. They measure leverage as the ratio of interest-bearing debt to total assets. Implicitly, spontaneous financing and non-interest-bearing liabilities are interpreted to reduce leverage. At the other extreme, Baker and Wurgler (2002) and others define leverage in a way that emphasizes information asymmetry. They include preferred equity in leverage and exclude convertible debt.[4] Other studies use intermediate measures. Fama and French (2005), for example, define leverage as total liabilities to total assets. Welch (2011) also argues for

[1] Campello (2003) studies the relation between capital structure and operating performance. She finds that during recessions debt financing has a negative impact on firm sales growth in industries in which rivals are relatively unlevered. There is no similar effect during booms or in high debt industries. Campello (2006) finds a non-monotonic relation between debt financing and competitive conduct. Moderate debt is associated with sales gains but high debt leads to product market underperformance.

[2] It is the strategies that gain share, and not necessarily the individual firms. Stigler (1958) aggregates by size, and looks at aggregated share changes in size groupings.

[3] Miller and Modigliani (1958) also study electric utilities. However, as Myers (1984) notes, regulated firms are normally able to pass through inefficiencies related to capital structure, and thus are not well suited for tests of the tradeoff hypothesis.

[4] Appendix B provides formal definitions of the leverage measures.