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Refinancing, profitability, and capital structure ☆

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ABSTRACT

We revisit the well-established puzzle that leverage is negatively correlated with measures of profitability. In contrast, we find that at times when firms are at or close to their optimal level of leverage, the cross-sectional correlation between profitability and leverage is positive. At other times, it is negative. These results are consistent with dynamic trade-off models in which infrequent capital structure rebalancing is optimal. The time series of market leverage and profitability in the quarters prior to rebalancing events match the patterns predicted by these models. Our results are not driven by investment layouts, market timing, payout, or mechanical mean reversion of leverage.

1. Introduction

Trade-off theories of capital structure predict that firms choose levels of debt in order to balance the benefits from the interest tax shield with the costs of future financial distress or of current financial inflexibility. Although intuitive, these theories have received mixed empirical support. As surveyed in Graham and Leary (2011), trade-off theories appear to be consistent with broad stylized facts: low-volatility firms and firms with more tangible assets have more leverage. However, Graham and Leary (2011) argue that these theories fail on at least as many other grounds. For example, leverage appears to be too low relative to theoretical predictions, and much of the variation in market leverage ratios stems from variation in equity returns. The most troubling evidence is that profitable firms have low leverage despite their low likelihood of financial distress and their need to shield income from taxes. As Myers (1993) states, "The most telling evidence against the static trade-off theory is the strong inverse correlation between profitability and leverage."

Our first goal in this paper is to tackle this last failure from a new perspective based on the class of dynamic trade-off theories in which capital structure adjustment is infrequent, such as those in Fischer, Heinkel, and Zechner

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(1989), Goldstein, Ju, and Leland (2001), Strebulaev (2007), or Morellec, Nikolov, and Schürhoff (2012). In these models, which we call dynamic inaction models, debt issuance costs deter a firm from continuously optimizing its capital structure. Instead, the firm remains inactive for long spells until the benefits of adjusting leverage outweigh the costs. Our work is based on the simple observation from Myers (1984) that testing capital structure models requires distinguishing points at which firms have an optimal capital structure from points at which they do not.

To isolate such optimality points, we examine periods when firms simultaneously issue debt and initiate distributions to equityholders, both in large quantities. The optimality of such large upward rebalancing follows directly from dynamic inaction models because these refinancing points reflect optimal capital structure choices. More fundamentally, and as also discussed in Hovakimian, Opler, and Titman (2001), large decisions likely follow considerable deliberation, so it is hard to imagine that managers view these adjustments as suboptimal.

Using this methodology, we first test the cross-sectional prediction from dynamic inaction models that when firms do rebalance, more profitable ones choose higher levels of leverage. We confirm this prediction. We thus offer a sharp contrast to numerous studies (e.g., Bradley, Jarrell, and Kim, 1984; Rajan and Zingales, 1995; Shyam-Sunder and Myers, 1999; Fama and French, 2002) that find negative coefficients on profits in leverage regressions and conclude that this evidence contradicts trade-off theory. Interestingly, according to dynamic inaction models, our result of a positive correlation between leverage and profits is consistent with these previous findings. The reason is that the theory predicts a negative correlation between profitability and leverage in periods leading up to a leverage restructuring. Similar to these previous studies, we find a negative correlation when we examine points in time when firms are not adjusting their capital structure in large ways.

Our second goal in this paper is to formulate and execute tests that exploit the time-series dimension of the data. First, dynamic inaction models imply that prior to rebalancing, firms experience increases in profits. Thus, *changes* in profits should forecast restructuring, which is what we find using simple predictive regressions. Next, we examine the entire time path of firm decisions prior to rebalancing. We find that the observed behavior of rebalancing firms is consistent with the patterns predicted by dynamic inaction models. In particular, firms that deliberately increase their leverage experience a decrease in market leverage for several quarters prior to restructuring. At the same time, the profitability of these firms increases steadily for several quarters prior to the event. These patterns in the data mirror the patterns in data simulated from a standard dynamic inaction model.

It is worth noting that our testing strategy does not require finding exogenous variation in the data. Instead, our goal is to derive endogenous patterns in the data that emerge as unique implications of dynamic inaction models. We then examine whether these endogenous patterns are present empirically, and we eliminate the possibility that these patterns could have been generated by other mechanisms, such as mechanical mean reversion of leverage, the pecking order, payout initiatives, market timing, or capital structure theories based on dynamic investment models (e.g., Hennessy and Whited, 2005). This testing strategy is sensible given the general observation that the empirical implications from a theory need not take the form of a causal effect of one variable on another. Finally, because we use a model to generate predictions that take the exact form of the tests that we execute, the connection between theory and tests is tight.

This type of analysis that compares predictions from dynamic models with endogenous patterns in the data has precedents in the literature, such as Leary and Roberts (2005), Whited (2006), Riddick and Whited (2009), and Dudley (2012). Our paper is unique in this class because of the questions it addresses. For example, Whited (2006) and Riddick and Whited (2009) examine investment and cash saving. Although Leary and Roberts (2005) also examines capital structure adjustment, they examine adjustment towards target leverage, while we isolate behavior at points of adjustment. Dudley (2012) also studies large events and their relation to capital structure choices. However, his large events are investment spikes, whereas ours are large financial rebalancings.

Our work complements a set of studies that examine debt and equity issuance. For example, Hovakimian, Opler, and Titman (2001), Hovakimian, Hovakimian, and Tehranian (2004), Leary and Roberts (2005), and Frank and Goyal (2009, 2012) find that profitability predicts debt issuance and equity reduction, a finding consistent with both static trade-off theory and dynamic inaction models. However, these studies focus on whether *levels* of various variables can predict *changes* in leverage. In contrast, our cross-sectional leverage regressions focus on *levels* of leverage, which have been notoriously hard to reconcile with theory. In addition, our time-series predictive regressions are new in that they examine whether *changes* in profitability can be used to predict large refinancing transactions, that is, large debt-for-equity swaps.

Our paper is also related to several other studies. First, Korteweg and Strebulaev (2012) also find that profitability and leverage are positively, though not significantly, correlated at times of adjustment. Our paper differs from theirs because they impose a specific model solution on the data. In contrast, we *ask* whether the predictions of a large class of models hold in the data, and our tests rely on fewer parametric assumptions. Second, our work touches upon Hovakimian (2004), who examines the evolution of book leverage around debt transactions. However, our time-series tests are richer because we also examine market leverage and profitability. Third, Dittmar (2004) examines capital structure changes that accompany spin-offs, based on the intuition that these events represent fresh starts. Thus, both our paper and Dittmar (2004) examine large events. However, Dittmar (2004) does not find a positive correlation between profitability and leverage after spinoffs. Finally, relative to both Hovakimian (2004) and Dittmar (2004), our connection to theory is tighter because we derive our empirical predictions directly from a dynamic trade-off model.

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