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A century of capital structure: The leveraging of corporate America ☆

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ABSTRACT

Unregulated US corporations dramatically increased their debt usage over the past century. Aggregate leverage—low and stable before 1945—more than tripled between 1945 and 1970 from 11% to 35%, eventually reaching 47% by the early 1990s. The median firm in 1946 had no debt, but by 1970 had a leverage ratio of 31%. This increase occurred in all unregulated industries and affected firms of all sizes. Changing firm characteristics are unable to account for this increase. Rather, changes in government borrowing, macroeconomic uncertainty, and financial sector development play a more prominent role. Despite this increase among unregulated firms, a combination of stable debt usage among regulated firms and a decrease in the fraction of aggregate assets held by regulated firms over this period resulted in a relatively stable economy-wide leverage ratio during the 20th century.

1. Introduction

This paper sheds light on the evolution and determination of corporate financial policy by analyzing a unique, panel data set containing accounting and financial market information for US nonfinancial publicly traded firms over the last century. Our analysis is organized around three questions. First, how have corporate capital structures

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changed over the past one hundred years? Second, do existing empirical models of capital structure account for these changes? And, third, if not explained by existing empirical models, what forces are behind variation in financial policy over the last century?

We begin by showing that the aggregate leverage ratio (i.e., debt-to-capital) of unregulated firms was low and stable, varying between 10% and 15%, from 1920 to 1945.[3] In contrast, leverage more than tripled, from 11% to 35%, between 1945 and 1970. Since then, leverage has remained above 35%, peaking at 47% in 1992. Combined with an increase in non-debt liabilities, the aggregate corporate balance sheet shifted from 25% liabilities in the 1930s to over 65% liabilities by 1990.

This change is robust, observed in a variety of leverage measures that reveal additional insights into the changing nature of financial policy over the last century. For example, we show that debt gradually substituted for preferred equity between 1920 and 1960, when relatively little preferred equity remained. We also show that cash holdings exhibited a secular decrease concomitant with the secular increase in debt usage. In aggregate, cash and short-term investments accounted for nearly 25% of assets in 1945, but fell to 6% by 1970 when cash began a moderate climb to just over 10% in 2010. As a result, measuring leverage net of liquid assets reveals an even more pronounced levering up of unregulated firms during the last century.

Further analysis reveals that these aggregate trends are systemic. The leverage series of each unregulated industry—defined by the Fama and French 12-industry classification—exhibits a pattern similar to that found in the aggregate. The leverage of each size-based portfolio of firms—defined by the highest, middle, and lowest quintile of the annual size distribution—also exhibits a pattern similar to that of the aggregate. The median firm had no debt in its capital structure in 1946, but by 1970 had a leverage ratio of 31%. Finally, the fraction of investment financed with debt doubled from approximately 10% in the pre-WW II era to over 20% after 1970.

These patterns are in contrast to those for nonfinancial regulated firms, for which the aggregate debt-to-capital ratio was fairly stable over the century. The changing relative indebtedness of regulated and unregulated firms, along with changes in the relative asset sizes of the two sectors, led to a largely stable economy-wide corporate leverage ratio (Frank and Goyal, 2008) that masked the secular increase experienced by most firms. Our paper focuses on this increase in leverage among unregulated firms.

Having established the dramatic increase in leverage among unregulated firms, we first ask to what extent this trend can be accounted for by changing firm characteristics identified in prior studies as capital structure determinants (e.g., Rajan and Zingales, 1995; Frank and Goyal, 2009). The answer is not much, if at all. We estimate regressions of leverage on firm characteristics using pre-WW II data and use these coefficients to make post-WW II predictions. Predicted leverage computed using realized firm characteristics is flat to declining from 1945 through the end of our sample period—in stark contrast to the increase in observed leverage over this period. Inspection of individual characteristics reveals that, with the possible exceptions of earnings volatility and firm size, none of the average or aggregate characteristics change over the century in a way that would support greater debt capacity or higher optimal leverage. Alternative estimation periods and model extensions, such as time-varying parameters and nonlinear relations, do not improve the out-of-sample fit. Thus, any explanation for these secular trends in financial policy must come from sources of variation not central to the existing capital structure literature.

The inability of firm characteristics to account for the shift in leverage policies over time suggests either omitted firm characteristics that have yet to be identified, or macroeconomic factors that altered firms' propensities to use debt. We therefore turn to our final set of analyses, which examines macroeconomic factors capturing changes in the economic environment that are theoretically relevant for financial policy. These factors capture changes to taxes, economic uncertainty, financial sector development, managerial incentives, and government borrowing. While a complete investigation into each underlying theory is beyond the scope of this paper, our results provide suggestive evidence.

Specifically, one of the more robust relations that we find is a negative association between corporate leverage and government leverage, the latter defined as the ratio of Federal debt held by the public to gross domestic product (GDP). A one standard deviation increase in government leverage is associated with a one-quarter standard deviation decrease in aggregate corporate debt-to-capital. This marginal effect on capital structure is significantly larger than that of other macroeconomic factors, such as GDP growth, inflation, and the BAA–AAA corporate bond yield spread, as well as firm characteristics, such as profit margins, asset growth, and the market-to-book equity ratio. This negative relation holds not just for the level of debt but also for the flows of debt in the two sectors. Thus, when the government reduces debt issuance, corporations increase their use of debt relative to equity, resulting in an increase in corporate leverage.

There are several potential mechanisms behind these findings. First, our results are consistent with government deficit financing crowding out corporate debt financing through competition for investor funds (Friedman, 1986). Second, and closely related, market imperfections, such as taxes (McDonald, 1983), informational frictions (Greenwood, Hanson, and Stein, 2010), and transaction costs (Krishnamurthy and Vissing-Jørgensen, 2012) generate an imperfectly elastic demand curve for corporate debt, as investors are no longer able to costlessly transform return streams from corporations to match their consumption needs. Consequently, fluctuations in the supply of government debt, a substitute for corporate debt, can shift the demand curve for corporate debt in a manner that affects equilibrium quantities.

Alternatively, the supply of government debt may proxy for latent investment opportunities. Increases in

[3] We define unregulated firms as all nonfinancial firms excluding those in the utilities, railroads and telecommunications industries.