



## Leverage and pricing of debt in LBOs <sup>☆</sup>

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### ABSTRACT

We show that the structure and pricing of debt in LBOs mostly depend on a single characteristic of the target firm, pre-LBO profitability. We find a positive relationship between pre-LBO profitability and deal leverage that is consistent with a dynamic trade-off theory of capital structure in the presence of adjustment costs. We argue that the wide range of debt tranches used in LBO financing can be folded into two main categories, senior and junior debt, where the pricing of senior and junior debt depends on their relative use and on bankruptcy risk. Our evidence also suggests that senior lenders oversupply cheap credit during hot buyout markets.

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## 1. Introduction

The recent literature on capital structure argues that firms adjust leverage infrequently because of adjustments costs associated with changes in leverage.<sup>1</sup> Leary and Roberts (2005), Flannery and Rangan (2006), and Lemmon et al. (2008) show that while firms dynamically rebalance their leverage to stay within an optimal range, in the presence of frictions the adjustment towards the optimum is typically not immediate and firms generally deviate from optimal leverage. Building on this idea and on the theories of dynamic capital structure (Fischer et al. (1989), Leland (1998), Goldstein et al. (2001)), Strebulaev (2007) argues that because cross-sectional tests performed on data generated by dynamic models can be misleading, tests of capital structure should be carried out at "refinancing points", defined as the moments in which a firm rebalances its capital structure.

LBOs represent one clear example of such "refinancing points" because they involve a complete overhaul of the liabilities structure of the target firm (Jensen (1986)). The debt restructuring during LBOs is so profound that it makes them stand out from other financing operations in two main ways: First, they sharply increase leverage of target firms to levels where default risk is of first-order importance. Second, the large amounts of debt financing are typically obtained in the form of multiple debt tranches that differ in terms of funding sources (banks, institutional investors, arm's length financing), contractual features

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<sup>1</sup> See Graham and Leary (2011) for a comprehensive review.

(maturity, seniority and collateral) and pricing. Therefore, an analysis of capital structure in LBOs cannot abstract from issues such as lender heterogeneity, debt seniority and pricing.

Accordingly, in this paper we address the following three questions: First, are the determinants of buyout capital structure the same as those that explain capital structure of public corporations? Second, is it possible to capture the complex structure of multiple debt tranches in LBOs by a simple distinction between senior and junior debt? Third, how does the choice between senior and junior debt affect the pricing of LBO debt?

Regarding the first question, an important difference between studying leverage at refinancing points rather than in the cross-section is the expected relationship between profitability and leverage. In cross-sectional studies, the inverse relationship between leverage and profitability emerges as a pervasive regularity (Myers (1993), Fama and French (2002), among many others). However, a dynamic trade-off theory predicts that at refinancing points higher profitability reduces expected bankruptcy costs and increases leverage. Therefore, we should expect a positive relationship between profitability and leverage in LBOs.

Our first objective is then to test the sign of the relationship between profitability and leverage in LBOs. Our empirical tests are based on a worldwide sample of 238 LBOs, that include 1006 individual debt tranches. They represent 32% of total LBO volume by deal size during the period 1997–2008. For every deal we reconstruct all debt tranches by combining three databases—SDC, LPC Dealscan and Capital IQ. As predicted by the dynamic trade-off theory, we find a positive and significant relation between profitability and leverage in all our regressions. Our findings also confirm the significant role that practitioners ascribe to EBITDA multiples in LBO lending (Rosenbaum and Pearl (2009)). We also find that market-to-book and cash flow volatility are significant determinants of capital structure, consistent with prior evidence on public firms. Our results therefore suggest an important role of firm-specific characteristics in explaining LBO capital structure.

Regarding the role of seniority of LBO lenders, we first show that the complex tranche structure of buyouts can be simplified by splitting LBO debt according to whether it is provided by senior or junior lenders: Traditional bank financing (term loans A and credit facilities) and institutional loans (term loans B or higher) are always senior to the other debt tranches such as bonds and mezzanine facilities. We document that, while senior lenders provide the bulk of debt financing, junior debt is economically large and constitutes about 25% of total debt. Importantly, the use of high levels of junior debt financing is specific to LBO transactions: Colla et al. (2011) document for a sample of more than 3000 U.S. public firms that more than 75% of firms use exclusively senior debt, in turn accounting for about 90% of total debt.

We examine what determines the mix of senior and junior debt in a deal. Our regressions show that, consistent with Houston and James (1996), banks and institutional investors are conservative and participate in LBOs that involve lower risk firms. However, this tendency reverses partially during hot buyout markets. In hot markets, senior leverage becomes significantly more aggressive, as senior lending *increases* while profitability of target firms *decreases*. At the same time we find that senior tranches become *cheaper* during hot markets. This evidence suggests that banks and institutional investors systematically loosen lending conditions during hot buyout markets and junior investors appear to be crowded out by the availability of cheap senior debt.

Next, we examine how the choice between senior and junior debt affects LBO debt pricing. As one would expect, the seniority is reflected in pricing: The median spread of senior debt over the base rate is 260 bps, while the median spread of junior debt is 600 bps. Once we sort tranches by seniority, a clear distinction emerges between cheap senior debt provided by banks and institutional investors, and expensive junior debt provided by high-yield lenders. We examine spreads at the tranche level and find they increase with maturity, with the inclusion of PIK and toggle features, and decrease with the inclusion of covenants.<sup>2</sup> We also find that tranche spreads can be explained by the same factors as corporate bond yields (Campbell and Taksler (2003)): Spreads increase with equity volatility and the market-wide cost of debt (the credit spread).

To analyze deal pricing, we collapse tranches at the deal level and examine the cost of LBO debt. We expect spreads and leverage to be related. In particular, spreads should increase with leverage, thus reflecting the higher risk of default.

We follow an instrumental variable approach to address leverage and spreads being jointly determined: We first estimate leverage and use its predicted values as an explanatory variable for spreads. We show that the total cost of borrowing is positively and significantly related to total leverage, and that this relationship is driven by senior leverage. When we examine the determinants of the differential between junior and senior spreads, we find that the differential decreases with the relative mix of senior to junior debt. Intuitively, as senior debt becomes increasingly risky, it commands a higher price, thus reducing the relative advantage of cheap senior debt financing.

In addition to these results, this paper documents several facts regarding the LBO market. During our sample period, LBO lending has shifted away from bank financing, with increasing amounts of LBO debt provided by non-bank institutional investors, confirming evidence obtained by Altman (2007) and Ivashina and Sun (2011). Second, lenders loosen lending conditions over time, and from 2006 onwards deals begin to include novel and contractually riskier debt tranche types, like second-lien loans and "covenant lite" tranches. Third, the involvement of private equity investors in LBO financing has become a global phenomenon, with significant numbers of large LBOs involving non-U.S. investors, non-U.S. target firms, or both.

How do our results compare to prior LBO evidence? Axelson et al. (2010) (AJSW) use a large global sample of buyout deals to compare their capital structure with that of public firms that are matched by continent, industry and year. They find that market conditions explain capital structure in LBO deals, but no relationship exists between LBO capital structure and the characteristics of the matched public firms. We similarly find that market conditions matter, but we also show that the *actual* target firm characteristics do explain LBO leverage. Our evidence therefore both confirms and rejects the evidence in AJSW. It confirms that LBOs

<sup>2</sup> We observe financial covenants (net worth and debt/EBITDA ratios), sweep covenants (excess CF sweep, asset sales sweep, debt issue sweep, equity issue sweep) and insurance proceeds covenants.

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