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Capital Structure and Leverage in Private Equity Buyouts

by Greg Brown, University of North Carolina at Chapel Hill; Robert Harris, University of Virginia; and Shawn Munday, University of North Carolina at Chapel Hill*

Private equity buyouts depend on debt financing. In fact, the practitioner and academic research literature generally refers to buyouts as *leveraged* buyouts, or LBOs, precisely because of the important role of debt in funding such transactions. But in contrast to the literally thousands of empirical studies over more than half a century that have focused on the capital structure of *public* companies, there are remarkably few large-scale empirical studies of the role that leverage plays in buyouts—its effects on the risk, returns, incentives, and other basic characteristics of LBOs. The relative scarcity of research on PE capital structure is attributable mainly to the lack of widely available financial data on buyout deals or other aspects of PE capital structures. The few studies that we now have rely mainly on comparatively small proprietary datasets or are limited to a subset of more transparent transactions, such as public-to-private buyouts or financings that include publicly traded bonds.

With this in mind, we recently conducted a study designed to shed light on the various kinds of debt now used to finance buyout transactions, and to provide some current insights on the profitability and leverage of such transactions using newly available data. In the pages that follow, we summarize the current state of knowledge on buyout financing from both a theoretical and empirical perspective with the aim of informing academics, practitioners, and policymakers.

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We begin by providing an overview of the different ways that debt can enter into the financing of buyout transactions—not only at the level of the portfolio companies, but also at the level of the funds or investors in those funds. Then, following a brief discussion of capital structure theory, we use the existing literature to address several specific questions of importance to both practitioners and policymakers: What accounts for the cyclical nature of private equity? How does leverage affect the alignment of interests and incentives between the general partners (GPs) and the limited partners (LPs) who provide the bulk of the equity capital in buyouts? How has PE performed as an investment and how is that performance linked, if at all, to leverage? We close by presenting the findings of our recent analysis of new deal-level data.

Before turning to the detailed analysis, we provide a summary of our main conclusions:

- Debt enters into the PE buyout ecosystem in a variety of ways. Along with direct borrowing by the individual portfo-

lio company acquired in the buyout transaction, the buyout funds themselves are increasingly borrowing using either LP commitments or equity interests in the underlying companies as collateral. In addition to these borrowings, private equity GPs and LPs have been raising debt independent of the funds or portfolio companies. In this way, buyout capital structures have been evolving over time to incorporate incremental leverage as the debt markets and PE firms have created new ways to attract risk capital.

- Leverage decisions made as part of PE buyout deals depend, at least to some extent, on the characteristics of those deals. In particular, finance theory predicts that the deal partners (typically employed by the GP) will trade off the benefits of debt with the expected costs. Potential benefits include a greater debt tax shield and stronger management incentives to generate cash flow. Potential costs arise mainly from the increased financial risk, including the risk of and costs associated with bankruptcy, as well as other operating and financial frictions. The leverage-supporting characteristics of deals vary across industry and geography, and over different time periods, though to a lesser extent than both academics and practitioners appear to believe. All of which suggests that many of the same forces that shape capital structure in public companies are at work in PE buyouts.
- Leverage makes possible PE firms' concentration of ownership, which in turn is expected to improve monitoring of operating performance and managerial decision making. Along with more disciplined capital spending, a number of studies suggest that PE has a comparative advantage in managing high leverage and its potential costs—one that effectively enables PE-backed firms to take on higher levels of debt than comparable public companies.
- Although reducing potential agency conflicts between GPs and their operating managers and creditors, the typical PE investment structure introduces conflicts of interest and incentives between GPs and LPs that can, at least in part, be managed by contractual arrangements.
- The most recent and comprehensive research suggests that PE funds generate superior risk-adjusted returns compared to public equity investments. This implies that even after their fees, GPs have created value for LP investors through a number of interrelated sources including better governance, operational engineering, multiple expansion and leverage. While it is difficult to empirically characterize risks in private investments, studies suggest that PE firms have comparative advantages that allow them to mitigate the impact of leverage on financial risks faced by other investors.
- Studies of PE capital structures and return and risk outcomes continue to confirm the highly cyclical nature of private equity activity, suggesting that institutional features combined with macroeconomic cycles are to some degree hardwired into the industry.
- Using a new sample of thousands of individual PE buyouts transacted over more than three decades, we find that, in almost all sectors, the vast majority of deals were profitable when compared to public market returns. We also document that the relationship between leverage and returns depends on the way leverage is measured. When leverage is measured as the ratio of net debt to total enterprise value, we observe a strong positive relationship with returns, which is consistent with a risk-return trade-off. High debt-to-value deals tend to target larger, established companies with low growth rates that can provide predictable cash flows to service debt. Entry EBITDA multiples tend to be lower in such cases, and the companies pay down more debt than average. But when we measure leverage as net debt divided by EBITDA (typically referred to as "the leverage ratio"), we find a weakly *negative* relationship with returns. Deals with high leverage ratios tend to target companies with faster growing earnings and higher operating margins. Deals with high leverage ratios are associated with above-average entry EBITDA multiples, but do not appear to be riskier than deals with low leverage ratios.

"PE firms have comparative advantages that allow them to mitigate the impact of leverage on financial risks faced by other investors."

Overview of Private Equity and the Use of Debt

PE funds are typically structured as closed-end private partnerships with a life span of ten or more years. The partnership is made up of limited partners (LPs) and general partners (GPs), each of which have rights and responsibilities as governed by their partnership agreement. The LPs are institutional and high-net-worth individual investors who provide the majority of the capital to the partnership. The GP manages the capital, deciding when it is called, what it is used for, and how and when it is returned to the LPs subject to provisions in the partnership agreement. The GPs typically charge a management fee on the committed or the invested capital and earn a share of the profits, known as "the carry," though typically only after a preferred return (or hurdle rate) is realized by the LPs. The LPs' liability risk is limited to the capital they contribute. The GP role is typically managed by professional PE fund manag-

ers. These managers protect themselves from liability, at least in part, by not serving directly as the GPs, but instead as shareholders of the corporation that serves as the GP.[1]

As the PE industry has evolved over the last half century, so too has the use of debt. Since the earliest days of leveraged buyouts, PE managers have used debt financing, "multiple arbitrage," and operational improvements combined with more effective governance as the primary drivers of value creation. PE typically targets gross equity returns in excess of 20%, which is higher than cost of equity capital for many strategic acquirers who compete with PE to own assets. LP suppliers of equity have illiquid claims and cede control to the GP when capital is called or returned. Moreover, the GP has a much higher concentration of ownership, and much of their annual compensation comes from the returns.[2] The resulting high cost of private equity, together with the perceived incentive benefits of concentrating ownership, pushes GPs to use as much leverage as they can confidently support, with the goal of minimizing their blended cost of capital, and so enabling them to compete more effectively for assets. Typical uses of debt proceeds by PE-backed companies are similar to those of public companies, including the funding of M&A transactions, the refinancing of existing debt, and the recapitalization of a company's balance sheet. Traditional PE financings have most frequently included issuances in both the syndicated bond and bank markets. However, as financing alternatives evolve, PE remains at the vanguard pursuing investment opportunities for which traditional sources of capital may have once been too expensive.

In the 1970s and 1980s, PE-backed companies were among the earliest and most frequent issuers of high-yield bonds, which were used mainly to fund their takeover efforts. To compensate investors for their higher chance of issuer default, high-yield bonds offer higher interest rates and sometimes investor-friendly structural features. Until the 1980s, traded high-yield bonds were simply the outstanding bonds of "fallen angels," once investment grade companies that had experienced credit rating downgrades. Drexel Burnham and other investment banks launched the modern high-yield market in the 1980s by selling new bonds from companies with non-investment grade ratings to fund mergers and leveraged buyouts.

Many of the issuers of high-yield bonds continue to be companies backed by private equity. Today's high-yield bonds typically take the role of junior debt capital—subordinate to senior secured loan debt but senior to the PE fund's equity investment. High-yield bond investors include mutual funds, pension funds, insurance companies and arrangers of instruments that pool debt securities (as in collateralized debt obligations, or CDOs). High-yield bonds offer investors the potential for diversification, higher current income, capital appreciation, and longer duration. The size of the global high-yield corporate bond market was estimated to be in excess of $2.8 trillion at the end of 2019, of which some $2.5 trillion had been issued by U.S. industrials.[3]

With the advent of "market flex" language in the syndicated loan market during the Russian debt crisis of the late 1990s, loan syndications emerged as a full-fledged capital markets alternative for PE financings.[4] Leveraged loans, which are loans with non-investment grade ratings, are typically senior secured debt instruments, either first or second lien. They also typically provide floating-rate coupons, may or may not have covenant provisions, and usually have shorter duration than bonds.

The syndicated leveraged loan market, which developed as an offshoot of the investment grade loan market, provides a way for borrowers to access banks and other institutional capital providers of loans in a less expensive and more efficient form than traditional bilateral credit lines. As a result, by the late 1990s many PE-backed companies were relying heavily on the leveraged loan market to fund their portfolio companies. Leveraged loan investors include banks, finance companies, institutional investors (typically using structured vehicles such as collateralized loan obligations, or CLOs), loan mutual funds, and ETFs. The Bank of England estimates the current size of the global leveraged loan market at more than $2 trillion, a rise of more than 100% since 2007. U.S. leveraged loans outstanding at the end of 2019 amounted to over $1.2 trillion, with the remainder mostly denominated in euros.[5]

Away from the syndicated loan markets, private credit alternatives expanded dramatically during the post-financial crisis period. In the wake of the financial crisis, many financial institutions faced the need to reduce leverage, thanks in part to higher capital reserve requirements and increased regulation that forced many banks to curtail traditional bank

1 See Josh Lerner, Ann Leamon, and Felda Hardymon, (2012), *Venture Capital, Private Equity, and the Financing of Entrepreneurship*, Wiley Press.

2 Anecdotal evidence suggests that while the gross internal rate of return private equity managers typically underwrite varies with changes in the market cycle and dynamics, typical estimates range from 15%-30%, with 20%-25% most frequently sighted. Managers have generally tended toward the lower end of the range in the post-financial crisis period.

3 "U.S. Corporate Debt Market: The State of Play in 2019," *S&P Global Market Intelligence*.

4 "Leveraged Commentary & Data (LCD): Leveraged Loan Primer," *S&P Market Intelligence*.

5 "U.S. Corporate Debt Market: The State of Play in 2019," *S&P Global Market Intelligence*.

loan lending. As a result, alternative sources for risk capital stepped into the void, developing a range of private credit structures to meet the growing capital needs of companies, particularly in the middle market. Faced with an historically low interest rate environment, institutional investors have increased allocations to private credit.[6] Private credit assets under management (AUM) exceeded $767 billion in 2018, more than three times the amount in 2008. Much of that expansion can be attributed to supply-side growth driven by PE-backed borrowers. While typically more expensive than a bank or syndicated loan alternative, private credit capital has certain advantages over traditional market alternatives. Notable among them are quick and efficient access for middle-market companies where banks are lending less; fewer counterparties; less regulation and potentially higher leverage levels; the tendency for lenders to hold the loans until maturity; and less public visibility. Despite the emergence and significant growth of private credit in the post-financial crisis decade, the syndicated bank and bond markets continue to be the largest sources of PE debt financing, particularly for the largest, most complex, and multinational financings in which the relative size, liquidity, and sophistication of the syndicated markets continue to be most important.

As the depth and breadth of credit markets have expanded with investor appetite, innovations have followed. Figure 1 depicts various layers of debt that have emerged and the Appendix provides more detail. The emergence of holding company debt in the early 2000s was one innovation. Holding company (HoldCo) debt, which is issued above the operating company (OpCo) level, is junior in priority of repayment, has a junior collateral claim to all debt at the OpCo, and is typically non-cash pay because it is subject to restricted payment provisions of OpCo debt. The primary role of HoldCo debt has been to provide a mechanism for adding incremental debt in a transaction beyond what is accessible at the OpCo.

From the "bottom-up" perspective of OpCo creditors, HoldCo debt behaves essentially as equity and has minimal impact on the cash flow and creditworthiness of the operating company. While holding company debt is generally riskier than operating company debt, often holding only a pledge against the underlying equity as collateral, it can be priced to meet investor demand for yield in robust markets. At the same time, from the "top-down" perspective of private equity, HoldCo debt behaves very similarly to OpCo debt; it can be used to reduce the size of the equity investment while increasing the risk of the residual equity. Although more expensive and riskier than OpCo debt, it is cheaper than equity capital. Not all market conditions support HoldCo debt financings; it becomes accessible only when investor risk appetites are high and credit markets are robust.

Securitized markets have also developed over the last two decades, spurring further innovation and access to capital for private equity.[7] Securitized debt is a form of financing commonly used by companies to raise debt proceeds with the backing of illiquid assets on their balance sheet. Securitized financing requires the creation of a special purpose vehicle (SPV). Effectively a trust that is separate from the operating company, the SPV provides legal isolation of the assets from the original holder of the assets. After receiving the assets from the operating company, the SPV then issues securities backed by the assets of the trust and delivers the proceeds to the operating company. The interest and principal on the securities are paid from the cash flows that arise from the trust assets; the operating company effectively "rents" the assets back from the SPV.

Because the debt issued by the SPV is nonrecourse to the originator, an important benefit of securitized debt is that the credit rating of the debt is based on the SPV's assets rather than the originator's cash flow and assets. The proceeds raised from the sale of the securitized assets are returned to the operating company, thereby enabling illiquid assets of the originator to be turned into cash.

Although securitized financings are commonplace for financial institutions—which use them to finance mortgages or credit card receivables—one of the first times it was used by private equity was during the buyout of Hertz in 2005 by The Carlyle Group. In the case of buyouts, the PE backer is able to raise more debt at lower cost than a traditional financing structure would allow. The concept of a SPV structure is frequently used in commercial mortgage-backed securitizations as well, and was also co-opted by private equity in the form of an OpCo/PropCo structure to finance buyouts of companies with substantial real estate assets on their balance sheets.[8] Whole business securitization structures have also been used by franchise businesses when financing PE-backed acquisitions.[9]

Fund-Level Debt. In a more recent development, the advent of *fund-level* debt has been adopted by private equity. In the case of fund-level debt, the lenders can look either to the

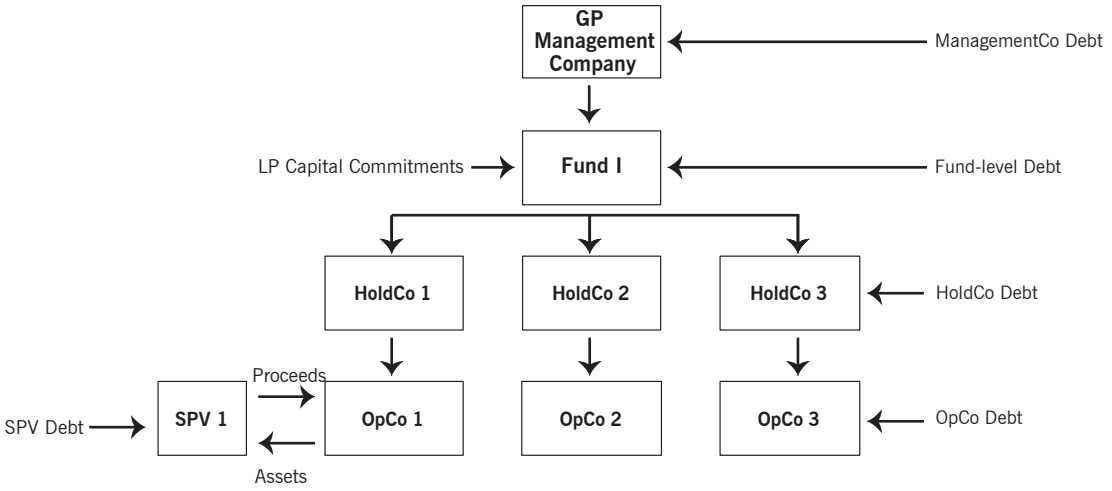
6 Shawn Munday, Wendy Hu, Tobias True, and Jian Zhang, (2018), "Performance of Private Credit Funds: A First Look," *The Journal of Alternative Investments*, 21(2), 31-51.

7 Anil Shivdasani and Yihui Wang, (2011), "Did Structured Credit Fuel the LBO Boom?" *Journal of Finance*, 66(4), 1291-1328.

8 For example, the Toys "R" Us LBO of 2006.

9 For example, the Dunkin' Donuts LBO, 2007.

Figure 1
Overview of Debt in Private Equity



unfunded capital commitments of the LPs or to the underlying equity collateral invested in companies across the fund's portfolio for collateral. In the case of unfunded capital commitment, lenders underwrite the LP credit risk, which in many cases is considered investment grade. In the case of fund-level loans with pledges of collateral from funded commitments, the risk of illiquid equity investments in private companies is often considered non-investment grade and is quite high.

While the adoption of fund-level debt is a relatively new phenomenon in private equity, it has long been used in private credit to enhance LP returns. Business Development Companies (BDCs) have for many years benefited from access to SBIC-guaranteed debt at the fundlevel. Other private credit funds have access to loans at the fund level, often in the form of subscription lines (also referred to as "capital-call" or "wireline" facilities). PE managers can use such subscription lines to facilitate less frequent capital calls from limited partners. These subscription lines typically have to be repaid somewhere in the 30-day to one-year timeframe but can be reborrowed.

Some PE fund managers use fund-level leverage to act as leverage above and beyond what may be efficient (or allowed) at the portfolio company, thereby increasing internal rates of return at the expense of a (modest) reduction in multiples of invested capital. While the effects of fund-level leverage are straightforward when fully disclosed, some ambiguity exists in reporting standards as a result of the less than consistent disclosure of fund-level returns on both a before- and after-fund-level leverage effects basis.[10]

Management Company-Level Debt. More recently, GPs have borrowed loans or issued bonds at the management company level to finance their operations. Management Company (ManagementCo) debt can be used to provide incremental leverage on underlying investments of the fund, seed/acquire new investment strategies, compensate employees, or achieve other general corporate purposes. Lenders and creditors often look to the cash flows of the ManagementCo or personal guarantees of the shareholders of the management company for credit support. Loans at the management company-level are traditionally rated investment grade and funded by large banks and financial institutions. Both secured and unsecured investment-grade bond issuances have been syndicated by the management companies as well. ManagementCo debt effectively acts like any other corporate debt of a financial services company.

A Brief Overview of Capital Structure Theory

The most basic question about leverage in private equity is this: Why do PE buyouts have substantially higher leverage than similar public companies? If the optimal, or value-maximizing, capital structure is indeed a higher level of debt, why

10 See James F. Albertus Matthew Denes (2020), "Private Equity Fund Debt: Capital Flows, Performance, and Agency Costs," SSRN working paper 3410076.

don't public companies operate with more debt? Alternatively, if public company capital structure is on average optimal, doesn't that imply that PE deals are overleveraged and excessively risky?

To provide a framework for answering these and other related questions, we start with an overview of capital structure theory based on the traditional literature that focuses on public companies. This overview will serve as a basis for understanding what may be relevant for private companies and, in particular, the PE buyout transactions that we focus on later. We end this section with an overview of capital structure theory that is related specifically to private equity.

Classic Theory

In the classic trade-off theory of capital structure, companies choose an optimal level of debt based on the tax shield provided by the deductibility of interest payments and the frictions associated with high levels of debt such as higher expected bankruptcy costs. The optimal capital structure is determined in a static equilibrium as the point where the tax benefits of higher debt are just offset by the marginal expected costs of greater frictions.[11]

The trade-off theory predicts that the optimal capital structure decision should be largely the same for private and public companies with similar firm characteristics and financial conditions. As a consequence, the trade-off theory can explain changes in optimal capital structure only to the extent that the difference in ownership structure between public and private companies affects either the tax shields or financial frictions associated with debt.

While higher debt levels result in a greater tax shield, PE-backed companies face much the same tax policies as public companies; and large public companies, thanks to their global operations, often have more sophisticated tax avoidance opportunities that may be unavailable to smaller private companies. If anything, then, corporate tax incentives are likely to work to promote the acquisition of small and mid-sized firms by larger public firms.

In short, even if taxes play an important role in determining optimal capital structure, they are likely to play a relatively modest role in explaining why PE buyouts have more debt. And so if the classic trade-off theory is to explain why buyout deals have high leverage, there must be differences in other frictions that are affected by debt financing. As we discuss later, PE-owned companies have reasons to operate with higher leverage as well as advantages over public companies in managing the expected costs of financial distress that have nothing to do with corporate taxes.

The strongest challenger to the static trade-off theory is the so-called "pecking order" theory, which predicts that companies will choose internal over external funds whenever possible; and when forced to raise outside capital, they will choose debt over equity to minimize the "information costs" arising from information asymmetries between managers and the market. In particular, outside investors in companies proposing new securities offerings worry about a "lemons problem" and price-protect themselves by reducing the value of the firm when the offerings are announced. Because the lemons problem is greater for shareholders than bondholders, issuing equity is generally the most costly and hence least desirable way to raise capital.

Other research has focused on the possible effects, negative as well as positive, of capital structure and leverage ratios on managerial incentives to maximize efficiency and value. Most important for our purposes is Michael Jensen and William Meckling's seminal paper[12] that presented the theory of "agency costs" associated with raising and operating with outside equity. More specifically, Jensen and Meckling showed how the combination of information asymmetry and agency conflicts between managers and outside shareholders over things like the optimal size and diversification of public companies effectively reduces their value. Heavy debt financing, as Jensen and Meckling noted at the end of their article, has significant potential to manage agency conflicts by concentrating ownership and minimizing the need to rely on outside capital.

The theory of agency costs sheds light on an important fundamental difference between private and public ownership. Whereas the PE buyout investors typically take a controlling interest in a company, giving them full control of the board and the power to hire and fire management—which they often exercise—the ability of public shareholders to reform companies that fail to serve their interests generally depends on costly interventions by the market for corporate control, with its threat of takeover, and other forms of shareholder activism.

What's more, especially in large, mature companies, shareholder activists often exert pressure to pay out excess (equity) capital and operate with higher leverage ratios, with the aim of discouraging corporate overinvestment. But in PE-controlled companies, as we just saw in highly lever-

11 Franco Modigliani and Merton H. Miller, (1958), "The Cost of Capital, Corporation Finance and the Theory of Investment," *The American Economic Review*, 48(3), 261-297. See Stewart Myers, (2001), "Capital Structure," *The Journal of Economic Perspectives*, 15, 81-102, for a detailed discussion.

12 Michael C. Jensen and William H. Meckling, "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," *Journal of Financial Economics*, 3 (1976) 305-360, Q North-Holland Publishing Company.

aged public companies, the high leverage not only spurs the search for efficiencies and disciplines capital spending, but plays a perhaps still more important role: facilitating the concentration of ownership that enables PE companies to acquire and maintain full control over their portfolio companies.

Nevertheless, as we also discuss below, if this concentration of control in the hands of the firm's largest investor works to minimize the cost arising from the agency conflict between managers and owners, the structure of PE funds generates a new agency relationship between the GPs and their LPs that gives rise to new frictions.

Capital Structure Theory as Applied to Private Equity

In a much cited 1989 *Harvard Business Review* article called "Eclipse of the Public Corporation,"[13] Jensen viewed the rise of "LBO partnerships" like KKR and Clayton & Dubilier as a "new organizational form"—one that, in acquiring and operating companies across a broad range of industries, was competing directly with, and threatening to supplant, public conglomerates. As Jensen put it, "The LBO succeeded by substituting incentives held out by compensation and ownership plans for the direct monitoring and often centralized decision-making of the typical corporate bureaucracy."[14]

The heavy debt financing played a critically important role in consummating the deal we just noted—making possible the concentration of ownership and control by the PE sponsor. But it also played a valuable ongoing corporate governance function, providing what Jensen described as "an automatic internal monitoring-and-control system." That is, if problems were developing, top management would be forced by the pressure of the debt service to intervene quickly and decisively. By contrast, in a largely equity-financed company, management could allow much of the equity cushion to be eaten away before taking the necessary corrective action.

The crux of Jensen's argument, then, is that debt serves as a control mechanism to focus the efforts of managers and owners on increasing efficiency and value. But if this model was appropriate for mature companies with stable lines of business, it was not likely to work for companies requiring significant capital investment or in early stages of development, such as firms backed by venture capital. Nonetheless, venture capital is predicated on much the same concentrated ownership structure as PE buyouts, only for the most part without leverage (though as we will see below, some new forms of VC debt have emerged in recent years).

Viewed within the context of the pecking-order theory, the information gap between managers and shareholders that increases the costs of public companies operating with outside equity is effectively closed by the concentration of ownership and board participation of PE buyout (as well as VC) sponsors. And the potential information gap between lenders and managers in public companies could also be reduced by PE sponsors' greater interaction and pressure to remain on good terms with their bankers and other debt providers. Thanks to their more frequent dealings, greater two-way flow of information, and stronger relations with banks, the most reputable PE sponsors, as studies have reported, have been able to get better lending terms.[15] And to the extent the expected costs of financial distress are significantly lower for PE-backed companies—an argument we present more evidence for below—the classic trade-off theory would also predict much higher optimal levels of debt.

Agency Conflicts within PE: the GP-LP Relationship

But all this begs the question: What other information or agency problems could a private ownership structure create that are not present in a public ownership model? After all, although there are no public shareholders in the PE model, there are LPs who depend on fair treatment by GPs for their net returns in much the same fashion as shareholders depend on managers and boards. Hence there would appear to be similar potential for self-dealing and other abuses.

In a number of important respects, then, the principle-agent relationship between private equity GPs and LPs adds a layer of complexity and friction that could be important for understanding optimal capital structure in PE buyouts. The potential agency conflicts in question arise from the delegated asset management typical in PE fund structures, and the contracts that are designed to manage such conflicts.

As one example, a GP's limited liability and the option-like carried-interest provisions could provide GPs with incentives to invest in even overpriced and overleveraged deals. Recognizing these incentives, LPs presumably choose to invest with GPs that they feel are best suited to meet their investment goals. LPs also sometimes negotiate partnership agreement terms that are deemed to better align the GP's interests with those of the LP.

As another example, fund-level debt could benefit the GP in ways that provide no benefit to, and even additional costs

13 Michael Jensen, (1989), "Eclipse of the Public Corporation," *Harvard Business Review*, 67(5), 61-74.

14 Jensen, "Active Investors, LBOs, and the Privatization of Bankruptcy," cited earlier.

15 The theoretical framework provided by Malenko and Malenko (2015) highlights the impact of reputation in securing capital.

for, the LP. For example, many LPs are not taxable entities and thus derive no benefit from any sort of tax shield provided by borrowing at the fund level. In addition, many LPs have the ability to adjust their own effective fund leverage through their own borrowing (or lending), presumably at a lower cost.

But to come back to the possibility just mentioned, the agency conflict, or imperfect alignment of interests and incentives, between LPs and GPs could result in a predictable pattern of "procyclical" LBO leverage that takes the form of too many overpriced and overleveraged deals in robust economies and loose credit conditions—and to excessive cutbacks in prices, leverage, and LP commitments under recessionary conditions.[16] The excessive retrenchment of capital in such cases is attributable to the agency conflict—the temptation of GPs, when provided excessive capital, to invest even in bad deals. And the net effect of this GP-LP conflict is a predictable scarcity of LP and hence PE investment during economic downturns. The most visible sign of this conflict of incentives is a predictable plummeting of late-cycle returns stemming from the excess of overpriced deals transacted by GPs during boom times.

And like the conflict of incentives in the relationship between GPs and LPs, a similar agency problem is likely to complicate the relationship between banks (lenders) and GPs. During boom periods, the risk of overpriced deals is borne disproportionately by the banks with their fixed claims. This misalignment of interests and outcomes also contributes to the cyclicality of LBO leverage—tending to excess in good times, and too little in bad.

The Evidence on Debt and Leverage in LBO Transactions

We now summarize the findings of studies that bear on several fundamental questions about leverage in buyout transactions. Although we focus mostly on past empirical work, in the last portion of our discussion we supplement these findings with ongoing analysis using a new dataset on *individual portfolio companies*.

Why Is the Leveraged Buyout Market So Cyclical?

We start with one of the most basic questions about private equity and associated credit markets: What drives the historically pronounced cyclical behavior of LBOs? As the literature has expanded, several explanations for the procyclical pattern in LBO leverage levels have emerged. Chief among them are market timing, GP-LP agency conflicts, agency problems between banks and PE investors, fluctuations in aggregate risk premia, and the growing use of subscription lines of credit.

A number of studies have provided evidence that GP-LP agency conflicts play an important role in the procyclical pattern seen in LBO leverage levels. Specifically, the leverage of LBOs responds more to relaxations or contractions of credit market conditions than that of other companies. Since LBO leverage is procyclical, leverage peaks when debt is cheap during "hot" credit markets. In contrast, public companies generally respond to the same market conditions by reducing their *market* leverage and thus exhibiting a "countercyclical" leverage pattern. Pro-cyclical PE investment patterns and countercyclical investment performance have also been documented in venture capital as well as buyouts.[17]

Studies have also confirmed the ability of PE investors to time their debt market issuance in order to "arbitrage" the conditions between debt and equity markets by increasing the leverage of deals in response to cheap credit—and documented the significant contribution of such market timing to the pro-cyclical pattern of buyout activity. A study published in 2010 finds that the more reputable PE firms are less likely to participate in LBO transactions when credit risk spreads are narrow and lending standards relaxed.[18] A 2012 study finds that LBOs have higher leverage when debt market liquidity is high and credit and leveraged loan spreads are low.[19] And a 2019 study comparing PE to strategic buyers concludes that periods of overvalued credit markets lead to increases in the leverage of PE funds and the price-to-earnings ratios paid by strategic buyers.[20] None of these studies, however, finds that hot credit markets are associated with better PE fund performance.

Banks have a unique position as credit experts, providers of access to capital markets investors, and advisors on transac-

16 These and similar results are predicted by theoretical frameworks, including those formulated by Ulf Axelson, Tim Jenkinson, Per Strömberg, and Michael S. Weisbach, (2013), "Borrow Cheap, Buy High? The Determinants of Leverage and Pricing in Buyouts," *Journal of Finance*, 68(6), 2223-2267; and Alexander Ljungqvist, Matthew P. Richardson, and Daniel Wolfenzon, (2019), "The Investment Behavior of Buyout Funds: Theory and Evidence," *Financial Management*, 49(1), 3-32.

17 See Paul Gompers, Josh Lerner, Anna Kovner, and Daniel Scharfstein, 2008, "Venture Capital Investment Cycles: The Impact of Public Markets," *Journal of Financial Economics*, 87, 1-23; and Steven N. Kaplan, and Jeremy C Stein, (1993), "The Evolution of Buyout Pricing and Financial Structure in the 1980s," *Quarterly Journal of Economics* 108 (2): 313-357. Axelson, Jenkinson, Strömberg, and Weisbach (2013) find that debt market conditions predict LBO leverage. Ljungqvist, Richardson, and Wolfenzon (2019) find that PE funds accelerate their investment flows and earn higher returns when investment opportunities improve, competition for deal flow eases, and credit market conditions loosen.

18 Cem Demiroglu and Christopher M. James (2010), "The Role of Private Equity Group Reputation in LBO Financing," *Journal of Financial Economics*, 96(2), 306-330.

19 Wouter De Maeseneire and Samantha Brinkhuis, (2012), "What Drives Leverage in Leveraged Buyouts? An Analysis of European Leveraged Buyouts' Capital Structure," *Accounting & Finance*, 52, 155-182.

20 Marc Martos-Vila, Matthew Rhodes-Kropf, and Jarrad Harford, (2019), "Financial vs. Strategic Buyers," *Journal of Financial and Quantitative Analysis*, 54(6). 2635-2661.

tions. Additionally, banks are compensated on a transaction basis instead of on an hourly or "when value is created" basis. To the extent such banks are in a better position to observe deal prospects than the market as a whole, they are likely to allocate capital and services in a more pro-cyclical manner than other participants and so exacerbate PE credit cycles.

Since the mid-1980s, syndicated loans have been the primary structure for debt financing in PE deals. While these loans originate in a bank, a syndicate of lenders acts as the funders and the originating bank owns only a portion of the loan. A 2013 study[21] of syndicated lending in PE deals investigates the market-timing distortions that might be attributed to it.[22] In addition to the effects on cyclicality, the authors of this study find that banks are no better equity investors than other LPs. When compared to stand-alone, or "parent-financed" deals, bank-affiliated deals had worse financing terms for the borrowers and worse *ex post* outcomes—notably, more debt downgrades and fewer upgrades. At the same time, although parent-financed deals provided significantly better financing terms for borrowers, they failed to exhibit better *ex ante* credit characteristics or deliver better *ex post* outcomes.[23]

As the authors of this study also discuss, this relationship and the involvement of banks in private equity has sparked substantial debate, including the inclusion of the Volcker Rule in the U.S. Dodd-Frank Act of 2010.[24] Furthermore, parent-financing deals pose an additional market risk. Banks, which occupy a unique position as debt market intermediaries, are able to "originate and distribute the debt from their own risky deals during the peak of the market, thereby amplifying the cyclicality of investments and the credit market."[25]

Other studies have demonstrated effects of macroeconomic conditions on LBO leverage levels, as well as investors' demand for a higher liquidity premium during bust periods.[26] As one example, a 2017 study[27] that focuses on the effects of the risk premium finds that 30% of the total variation in PE buyout activity can be attributed to changes in the aggregate equity risk premium while only 10% can be attributed specifically to credit market conditions.[28] In addition, the authors note a number of firm-level differences, including the following: "(1) firms with high market beta or high idiosyncratic volatility (a higher cost of capital and greater illiquidity costs) are less likely to be targets and there are even fewer high-beta firms when the risk premium is high; (2) firms with poor corporate governance and in less competitive industries are more sensitive to changes in the risk premium; (3) more liquid industries (easier for acquirers to exit) are less sensitive to movements in the risk premium.

How Have Buyouts Performed, and How Has Leverage Affected Risk?

The most common way to measure the performance of buyouts in academic studies is to compare the returns of PE investments to comparable public market returns. Most analysis of buyout funds has been conducted at the fund level. For example, a 2016 study by L'Her et al.[29] found that PE buyout funds outperform public equities before making any adjustments for differences in risk, but that such outperformance becomes insignificant after adjusting the benchmark for the systematic risks of buyout portfolio companies.

But in a more recent comprehensive study of buyout fund returns, Steve Kaplan and one of the present authors found that PE returns have exceeded a wide range of public market indexes on average over a variety of horizons and using a number of benchmarks.[30] Reinforcing that finding, another 2019 study undertook an extensive review of risk and return estimates for buyout funds and concluded that, although estimates vary substantially by method, time period, and data source, the most recent and comprehensive studies appear to be converging on PE fund risk estimates that are slightly higher than public markets (beta of around 1.3), and historical risk-adjusted outperformance of around 3% per year.[31]

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21 Lily H. Fang, Victoria Ivashina, and Josh Lerner, (2013), "Combining Banking with Private Equity Investing," *Review of Financial Studies*, 26(9), 2139-2173.

22 Shleifer and Vishny (2010) find that during credit market booms, banks will fund more risky projects when debt securities are mispriced by outside investors and banks hold only a portion of the loan as they receive loan origination fees. This increases the cyclicality of the credit market.

23 "The superior nonpricing terms of parent-financed deals are concentrated entirely in credit market peaks when banks retain the least of the loans, which suggests that the superior financing terms result from favorable credit supply conditions. They also find that bank involvement in private equity—especially their role as lenders—generates significant cross-selling opportunities for banks, which enables them to capture more future revenues (while their risk exposures can be syndicated out)." See Fang, Ivashina, and Lerner (2013), p. 2144.

24 The basis for the Volcker rule is the belief that "equity investments by banks could reflect bank managers' incentives to grow revenues and maximize volatility, which can create systemic risks. Such incentives might arise because banks' own equity values increase with volatility, and large banks enjoy implicit bail-out guarantees". See Fang, Ivashina, and Lerner (2013), p. 2140.

25 Fang, Ivashina, and Lerner (2013), p. 2141.

26 See Francesco Franzoni, Eric Nowak, and Ludovic Phalippou, (2012), "Private Equity Performance and Liquidity Risk," *Journal of Finance*, 67(6), 2341-2373; and Valentin Haddad, Erik Loualiche, and Matthew Plosser, (2017), "Buyout Activity: The Impact of Aggregate Discount Rates," *The Journal of Finance*, 72(1), 371-414.

27 Haddad, Loualiche, and Plosser (2017). https://www.nber.org/system/files/working_papers/w22414/w22414.pdf.

28 Buyout activity is negatively related to the market-wide risk premium after controlling for credit market conditions.

29 Jean-Francois L'Her, Rossitsa Stoyanova, Kathryn Shaw, William Scott, and Charissa Lai, (2016), "A Bottom-Up Approach to the Risk-Adjusted Performance of the Buyout Fund Market," *Financial Analysts Journal*, 72(4), 36-48.

30 Gregory W. Brown and Steven N. Kaplan, (2019), "Have Private Equity Returns Really Declined?" *The Journal of Private Equity*, 22(4), 11-18. See also Robert Harris, Steven N. Kaplan and Tim Jenkinson, (2014), "What Do We Know about Private Equity Performance?" *Journal of Finance*, 69(5).

31 Arthur Korteweg, (2019), "Risk Adjustment in Private Equity Returns," *Annual*

What's more, as Will Goetzmann and colleagues[32] argued in a recent study, PE funds also appear to provide diversification benefits to LPs in the form of "priced risk factors" in illiquid markets that are only partly spanned by public factors.[33] By providing exposures somewhat different from those of public markets, PE markets are effectively providing investors with an additional source of "factor risk premia" and hence value-adding diversification.

While the fund-level analysis discussed above suggests that funds in aggregate generate superior risk-adjusted returns, it is difficult to accurately characterize risk in private investments. For example, one recent study[34] disputes the widespread belief that PE investments have higher volatility than public equity due to higher leverage. The study's results suggest that the volatility of private equity returns is not detectably higher than that of public equity, despite its higher leverage. The authors argue that buyout fund managers prefer to invest in companies whose underlying business activities are inherently less risky and can therefore bear higher leverage, which increases profits without the commensurate expected increase in overall volatility.

Another study[35] provides evidence of a negative relationship between deal leverage and return that is attributed to heightened competition among bidders during periods of easy credit. As an equilibrium outcome of the deal process, good credit market conditions are related to both larger amounts of debt and higher transaction prices. But the higher price translates to a lower deal return upon exiting, an effect that is especially notable for less reputable funds with poor interim performance.[36]

As noted earlier, hot credit markets can lead to high leverage, which could lead to higher default rates.[37] But it is hard to discern this relationship in the data, where estimates of the effects of leverage on the probability and cost of distress vary widely, especially between PE-backed private companies and public companies. For example, a 2010 study by the Private Equity Council concluded that PE-backed firms had a default rate of 2.8%, as compared to a rate of 6.2% for similar public companies during the 2008-2009 recession.[38] Another study published in the same year,[39] after examining over 2,000 public and private companies that obtained leveraged loan financing between 1997 and 2010, reported that PE-backed firms were no more likely to default than similar public companies with comparable leverage, and showed themselves better able to deal with financial distress. In the words of the authors, "When private equity-backed firms do become financially distressed, they are more likely to restructure out of court, take less time to complete a restructuring, and are more likely to survive as an independent going concern than financially distressed peers not backed by a private equity investor." As if to anticipate these findings, a study done 12 years earlier estimated the distress costs of a set of LBOs that entered bankruptcy in the 1990s. When the authors combined their estimates of 10%-20% of total enterprise values with (ex post unconditional) probabilities of bankruptcy for buyouts of around 5%, the expected financial distress costs for LBOs ended up averaging as low as 0.5% to 1% of firm value.[40]

Viewed together, the findings of these studies suggest that PE has a comparative advantage in managing high leverage—one that effectively enables PE-backed firms to take on higher levels of debt without incurring commensurate levels of financial risk that would otherwise reduce their values. Nevertheless, in a sign that public companies can also learn

Review of Financial Economics, 11, 131-152.

32 William N. Goetzmann, Elise Gourier, and Ludovic Phalippou, (2018), "How Alternative Are Private Markets?" SSRN Working Paper 3227020. https://doi.org/10.2139/ssrn.3227020.

33 Goetzmann et al. (2018) provide an eight-factor model that captures 57.2% of the total variance of private market returns. The eight factors are: all European private funds (except those focusing on Venture Capital), non-small (i.e., largest three quartiles) Venture Capital funds, U.S. non-small Real Estate funds, U.S. non-small Distressed Debt funds, energy (oil & oas) funds, funds with a low-risk profile, and the other two factors cannot be easily characterized. Four of their eight private factors are relatively well spanned by a five-factor model that includes the U.S. market equity factor, the size factor [SMB] of Eugene Fama and Ken French, (2015), "Five-Factor Asset Pricing Model," *Journal of Financial Economics*, 116(1), 1-22; the alternative value factor [HMLd] of Clifford S. Asness, Andrea Frazzini, (2013), "The Devil in HML's Details," *The Journal of Portfolio Management*, Volume 39, Number 4, the quality of earnings factor [QMJ] of Clifford S. Asness, Andrea Frazzini, and Lasse H. Pedersen, (2018), "Quality Minus Junk," *Review of Accounting Studies*, 24, 1-79; and the low-beta factor [BAB] of Andrea Frazzini and Lasse Heje Pedersen, (2014), "Betting Against Beta," *Journal of Financial Economics*, 111(1), 1-25.

34 Megan Czasonis, William B. Kinlaw, Mark Kritzman, and David Turkington, (2020), "Private Equity and the Leverage Myth," SSRN *Working Paper* 3540545.

35 Reiner Braun, Nicholas G. Crain, and Anna Gerl, (2017), "The Levered Returns of Leveraged Buyouts: The Impact of Competition," SSRN *Working Paper* 2667870.

36 See Marc Martos-Vila, Matthew Rhodes-Kropf, and Jarrad Harford, (2019), "Financial vs. Strategic Buyers," *Journal of Financial and Quantitative Analysis*, 54(6). 2635-2661; who find that as competition increases among PE funds, gains captured from the overvalued debt market may be captured by the target firms, and thus PE funds may experience lower returns. Two theoretical rationales, the co-insurance effect and the monitoring effect explain this behavior. The co-insurance effect derives from the fact that "strategic buyers are less able than financial buyers to exploit investors' misperceptions because strategic buyer combines projects and the valuation mistake partially offset each other." The monitoring effect derives from the fact that "overvaluation increases the moral hazard problem and enhances the importance of better governance to eliminate misbehavior, which are the strength of PE funds."

37 For supporting evidence, see Steven N. Kaplan, and Jeremy C. Stein, (1993), "The Evolution of Buyout Pricing and Financial Structure in the 1980s," *Quarterly Journal of Economics,* 108(2), 313-357; and Ulf Axelson, Tim Jenkinson, Per Strömberg, and Michael S. Weisbach, (2013), "Borrow Cheap, Buy High? The Determinants of Leverage and Pricing in Buyouts," *Journal of Finance*, 68(6), 2223-2267.

38 See Private Equity Council (2010).

39 Edie Hotchkiss, David C. Smith, and Per Strömberg, (2010), "Private Equity and the Resolution of Financial Distress," NBER Chapters, in *Market Institutions and Financial Market Risk, National Bureau of Economic Research, Inc*.

40 Gregor Andrade and Steven N. Kaplan, (1998), "How Costly is Financial (Not Economic) Distress? Evidence from Highly Leveraged Transactions That Become Distressed," *Journal of Finance,* 53, 1443-1493.

to use high leverage to their advantage (as Jensen suggested they would), Steve Kaplan and Jeremy Stein's 1993 study of large leveraged recaps of public companies in the late '80s provides evidence of management's ability to handle their debt loads by reducing their operating as well as financial risks.[41]

How Do PE Firms Add Value Through Leverage?

As discussed earlier, the potential gains from higher leverage are likely to come through several channels, but can be related back to a fundamental trade-off between the benefits coming from the tax shield and more efficient operations and the costs associated with a higher probability of financial distress. A 2011 study[42] finds that the estimated tax savings associated with the debt in public-to-private LBOs are positively related to acquisition premiums, but the fact that such premiums are roughly twice the size of the tax savings implies that the tax savings from increasing financial leverage effectively accrue to the selling public shareholders rather than the PE fund sponsoring the LBO.[43] On the other hand, a 2014[44] analysis of the confidential corporate tax returns in 317 public-to-private LBOs find more room for value creation from the debt tax shield. Specifically, the authors document that debt levels remain high for several years after acquisitions and that EBITDA growth makes the value of the tax shield more durable than assumed in other analyses. On the other hand, a recent study[45] of the corporate taxes and leverage of a large sample of U.S. public and private companies actually finds a negative relation between tax rates and leverage, which suggests that the tax shield is not a primary driver of leverage decisions.[46]

Public companies are acutely aware of the effects of financial distress and the importance of maintaining financial flexibility. For PE-backed companies, however, the PE sponsors' access to credit effectively works to "relax the financial constraints of portfolio companies."[47] And along with the strong ties between GPs and the banking industry that give PE investors preferred access to credit, their capital commitments by LPs with long-term holding periods provide PE investors with another source of capital during economic downturns. And as we mentioned earlier, buyouts sponsored by more reputable PEs with strong track records are less likely to experience financial distress during their operating lives.

Leverage trade-offs have been studied in other asset classes as well. For example, a 2011 study of the optimal fund-level leverage in real estate finds that the advantages include tax shield, ability to purchase more properties, liquidity and flexibility, and increase in return on invested equity.[48] Among the drawbacks of such fund-level leverage is loss of the benefits of the investor's bond exposure and incurring double transaction costs in the bond market, interest rate volatility risk, additional fees and management alignment difficulties, and high cost of distress.

In his 1989 *Harvard Business Review* article cited earlier, Jensen proclaimed the superiority of the corporate governance structure of PE-owned firms over that of public companies. Jensen argued that together "with active boards, high-powered management compensation, and concentrated ownership," the leverage component plays a critical role in the success of PE buyouts, first by making possible the concentration of equity ownership, and then by exerting pressure on management to operate more efficiently and pay out excess capital.

In support of Jensen's argument, a growing literature has investigated the effects of private equity ownership on firm productivity, product quality, employment, and related dimensions; and during normal times, these studies have found substantial positive effects on the operations of the firms in which they invest.[49] In addition to direct value creation,

41 Steven N. Kaplan and Jeremy C Stein, (1993), "The Evolution of Buyout Pricing and Financial Structure in the 1980s," *Quarterly Journal of Economics,* 108 (2): 313-357.

42 Tim Jenkinson and Rüdiger Stucke, (2011), "Who Benefits from the Leverage in LBOs?" SSRN Working Paper 1777266.

43 A result that is confirmed empirically by Braun, Crain, and Gerl (2017).

44 Jonathan B. Cohn, Lillian F. Mills, and Erin M. Towery (2014), "The Evolution of Capital Structure and Operating Performance after Leveraged Buyouts: Evidence from U.S. Corporate Tax Returns," *Journal of Financial Economics*, 111, 469-494.

45 Ivan Ivanov, Luke Pettit, and Toni M. Whited, "Taxes Depress Corporate Borrowing: Evidence from Private Firms," (September 18, 2020). Available at SSRN: https://ssrn.com/abstract=3694869 or http://dx.doi.org/10.2139/ssrn.3694869.

46 The effect is stronger for private companies. The authors show that the value benefits from a decline in credit spreads associated with lower taxes more than offset the decline in value of the tax shield. Consequently, lower taxes incentivize higher debt levels.

47 During the financial crisis, PE-backed companies decreased investments less than non-PE-backed companies. PE-backed companies have been less bound by financial constraints: higher debt issuance and equity issuance, a relative decrease in the cost of debt, greater growth in their stock of assets in the years after the crisis, increased their market share in the industry during the crisis, more likely to be sold through nondistressed merger and acquisition (M&A) transactions. See Shai Bernstein, Josh Lerner, and Filippo Mezzanotti, (2019), "Private Equity and Financial Fragility during the Crisis," *Review of Financial Studies*, 32(4), 1309-1373.

48 Maarten van der Spek, and Chris Hoorenman, (2011), "Leverage: Please Use Responsibly," *Journal of Real Estate Portfolio Management,* 17(2), 75-88.

49 See Greg Brown, Robert Harris, Tim Jenkinson, Steve Kaplan, and David Robinson, (2020a), "Private Equity: Accomplishments and Challenges" *Journal of Applied Corporate Finance*, 32(3). Examples include Shai Bernstein and Albert Sheen, (2016), "The Operational Consequences of Private Equity Buyouts: Evidence from the Restaurant Industry," *Review of Financial Studies*, 29, 2387-418; Shai Bernstein, Josh Lerner, Morten Sorensen, and Per Strömberg, (2016), "Private Equity and Industry Performance," *Management Science*, 63(4), 1198-213; Quentin Boucly, David Sraer, and David Thesmar, (2011), "Growth LBOs," *Journal of Financial Economics* 102, 432-453; Steven J. Davis, John Haltiwanger, Kyle Handley, Ron Jarmin, Josh Lerner, Javier Miranda, (2014), "Private Equity, Jobs, and Productivity," *American Economic Review*, 104(12), 3956-3990; Kose John, Larry Lang, and Jeffrey Netter, (1992), "The Voluntary Restructuring of Large Firms in Response to Performance Decline," *Journal of Finance* 47, 891-917; Steven Kaplan, S. (1989), "The effects of Management Buyouts on Operating Performance and Value," *Journal of Financial Economics*, 24(2), 217-254; Frank R. Lichtenberg and Donald Siegel, (1990), "The Effects of Leveraged Buyouts on

the anticipation of these improvements by itself allows for higher leverage at the time of the buyout, which in turn generates value from the debt tax shield. And consistent with this argument, a 2011 study has demonstrated a clear link between post-buyout performance and the level of bank financing.[50]

What Do Studies Tell Us About Collateralized Loan Obligations, Direct Lending, and Venture Debt?

Thus far we have focused on evidence from the perspective of the portfolio company, GP, or LP—that is, essentially from the borrower's perspective. Of course, for every borrower there is a lender, and a body of studies has examined the effects of such borrowing on the efficiency of debt markets that provide capital to the private equity industry.

After the global financial crisis, for example, several studies examined the market for collateralized loan obligations (CLOs), which are effectively collateralized debt obligations backed by corporate debt. A 2012 study[51] provides evidence that adverse selection is not, as many observers have assumed (because originators are not keeping the loans they originate), an inevitable consequence of the securitization of corporate loans.[52] The authors find no consistent evidence that securitized corporate loans are riskier than similar non-securitized loans, neither during the 2005-2007 period lead-up to the financial crisis nor for the subset of loans purchased by the CLO from its underwriters.[53] The authors argue that the larger loan size and the syndication process itself make corporate loans less vulnerable to adverse selection than the securitized mortgages to which they are regularly compared. Corporate loans, at origination, are funded by a group of banks and institutional investors whose concern about their reputations lead them to screen the quality of such loans.[54]

Loan covenants also play a role in allocating control rights between PE-backed issuers and their investors. A 2016 study[55] investigates the possible negative effects of the rising number of covenant-light (cov-lite) leveraged loans, including the higher costs of resolving financial distress stemming from higher coordination costs borne by dispersed lender groups. Contrary to what their name might suggest, cov-lite loans do not have fewer covenants, but weaker enforcement mechanisms, which has at least the potential to make them riskier.

The increasing use of cov-lite loans is especially relevant for leveraged loans, since they are widely syndicated to a diverse group of institutional investors.[56] With the bulk of leveraged loans funded by CLOs, loan mutual funds, hedge funds, securities firms, insurance companies. and pension funds, any renegotiation triggered by financial covenants requires multiple-party coordination. But contradicting the widespread view that the rising use of cov-lite loans reflects the demands of the borrowing companies, the authors present evidence that as cov-lite volumes have expanded, the yields on cov-lite loans—and thus the effective cost of cov-lite financing for issuers—have actually fallen over time, reflecting increases in investor demand.[57]

Recently, academic interest has expanded to direct lending by nonbank creditors. In a 2018 study[58] that provided a first look at the risks and returns of private credit funds, the authors found positive returns for the top three quartiles in terms of IRR and excess returns relative to leveraged-loan, high-yield and BDC indexes. Direct lending funds, which undertake a "bilateral" origination of a loan between a single borrower and a small group of lenders, are shown to have a relatively low beta and positive alpha compared to the leveraged loan and high-yield indices, which is viewed as evidence of diversification benefits relative to other credit strategies.

A 2019 study[59] examined the effect of changes in bank regulatory capital positions on the entry of nonbank lenders. The study showed that undercapitalized banks were especially likely to remove loans with higher capital requirements from their balance sheets when bank capital is scarce, and that a significant portion of these loans was reallocated to

Productivity and Related Aspects of Firm Behavior," *Journal of Financial Economics*, 27(1), 165-194; and Erik Stafford, (2017), "Replicating Private Equity with Value Investing, Homemade Leverage, and Hold-to-Maturity Accounting," SSRN Working Paper 2720479.

50 Shourun Guo, Edie S. Hotchkiss, and Weihong Song, (2011), "Do Buyouts (Still) Create Value?" *Journal of Finance*, 66(2), 479-517.

51 Effi Benmelech, Jennifer Dlugosz, and Victoria Ivashina, (2012), "Securitization without Adverse Selection: The Case of CLOs," *Journal of Financial Economics*, 106(1), 91-113. https://doi.org/10.1016/j.jfineco.2012.05.006.

52 Several studies provide evidence that securitization resulted in lower lending standards, which led to adverse selection in the collateral pools underlying these products. See Benmelch et al. (2012) and Benjamin J. Keys, Tanmoy Mukherjee, Amit Seru, and Vikrant Vig, (2010), "Did Securitization Lead to Lax Screening? Evidence from Subprime Loans," *Quarterly Journal of Economics*, 125, 307-362.

53 Fundamental agency tensions can plague this subset. The CLO underwriter is typically a bank and is responsible for loan screening and interacting with the rating agencies. However, these underwriting banks "may use this channel to sell fractions of their own riskier loans to CLOs" (Benmelch et al. (2012).

54 "Fractions of the same underlying loan are simultaneously held by multiple CLOs as well as by other institutional investors and banks. In addition, the bank that originated the loan (the lead bank) typically retains a fraction of the loan on its balance sheet and each underlying loan is rated" (Benmelch et al. (2012). These all provide incentives of the investors for better screening process and risk retention by the originator.

55 Bo Becker and Victoria Ivashina, (2016), "Covenant-Light Contracts and Creditor Coordination." https://www.hbs.edu/faculty/pages/item.aspx?num=50952.

56 Traditional lenders like banks and finance companies account for about 10%-15% of loan origination.

57 If the rising of cov-lite loans is driven by demand shock from the borrowers, the price would be expected to rise.

58 Shawn Munday, Wendy Hu, Tobias True, and Jian Zhang, (2018), "Performance of Private Credit Funds: A first look," *The Journal of Alternative Investments*, 21(2), 31-51.

59 Rustom M. Irani, Rajkamal Iyer, Ralf R. Meisenzahl, and Jose-Luis Peydro, (2020), "The Rise of Shadow Banking: Evidence from Capital Regulation," SSRN Working Paper 3166219.

nonbanks. Such credit reallocation was viewed as a capital market response to the negative impacts of the 2008 crisis, when loans funded by nonbanks experienced both a sizable reduction in credit availability and greater price volatility in the secondary market.

Another 2019 study[60] looked at the post-crisis lending of non-bank financial institutions, including finance companies (FCOs), private equity/venture capital (PE/VC) firms, hedge funds, bank-affiliated finance companies (bank FCOs), investment banks, insurance companies, business development companies (BDCs), and investment managers. While most studies examine a syndicate led by a commercial bank, this study focused on the direct negotiation process between non-bank financial institutions and borrowers. Based on a randomly collected sample of publicly traded middle-market firms during the post-crisis period (2010-2015), the authors find that non-bank lending was widespread—accounting for almost a third of the market—and that these institutions fund less profitable, more leveraged, and more risky and volatile firms. In particular, the study showed that PE (including venture capital) firms were especially likely to lend to faster growing, R&D-intensive firms.

What's more, to address the agency problem between the borrowers and lenders, non-bank lenders are less likely to monitor borrowers by including financial covenants, but more likely to align incentives using warrants and engage in more intensive ex-ante screening. The authors also find that nonbank loans have 1.9% higher interest rates, but that the difference between bank and non-bank loans are due to the market segmentation and differences in funding costs rather than difference in loan risks.

Yet another 2019 study[61] examines the growth in direct lending during the period 2003-2016, and the potential extent of adverse selection costs. The analysis documents how institutional investors have aggressively entered the market, accounting for about 80% of the direct loan volume in 2016. Direct lending tends to become more active when banks face tighter capital and regulatory constraints, and is more prevalent among borrowers with limited credit history. But even so, the study finds direct loans to be of similar credit quality to bank-originated loans. In addition, and more tellingly, direct loans issued by PE or investment management firms exhibit significantly better performance than other institutional loans.

Increasingly, young firms backed by venture capital are entering debt markets as a source of external capital. Because such firms are unlikely to possess tangible assets and positive cash flows, it is difficult for them to secure traditional bank lending. To fill the gap, so-called "venture debt" has become increasingly popular as start-up financing intended to "extend the runway" between venture rounds and reduce equity dilution.

A 2016 study[62] of venture debt financing that conducted a "discrete choice" experiment using 55 senior U.S. venture debt lenders concluded that (1) patents are as important as tangible assets as collateral to lenders; (2) venture debt lenders show a preference for start-ups that offer warrants that can help overcome the agency problems; and (3) VC backing can substitute for positive cash flow, but only for early-stage ventures. In addition, a 2018 study[63] also finds that venture debt can create firm value by reducing dilution, aligning the entrepreneur's incentives with the firm's, and inducing entrepreneur's risk-taking behavior.

New Evidence on Buyout Leverage (and Performance) at the Deal Level

As part of our ongoing research, we analyzed a new proprietary dataset that has leverage information for individual buyout deals provided by the StepStone Group. Our sample consisted of 6,248 buyout transactions from the period 1984 through 2020 with sufficient performance and financial accounting data for our analysis. Although this is only a subset of total transactions, they are among the largest and together represent about $1.3 trillion in combined equity investments and about 4.5 trillion in total enterprise value (TEV). By our estimates, these transactions cover about half of the value of all (global) historical buyouts with PE fund sponsors. As one would expect, most deals in the first half of the sample are fully exited, but as we move closer to the present, an increasing proportion are not fully exited. We now summarize the main results of the analysis (and refer the reader to the white paper for a more thorough presentation of the methods and results).[64]

The typical PE deal in our sample was held for 4.6 years and part of a fund with an average size of about $2.6 billion, though there is of course a wide range of fund sizes. Although the mean deal's TEV is $718 million, the median

60 Sergey Chernenko, Isil Erel, and Robert Prilmeier, (2019), "Nonbank Lending," National Bureau of Economic Research Working Paper, no. 26458. https://doi.org/10.3386/w26458.

61 Maria Loumioti, (2019), "Direct Lending: The Determinants, Characteristics and Performance of Direct Loans," SSRN Working Paper 3450841.

62 Gaétan de Rassenfosse and Timo Fischer, (2016), "Venture Debt Financing: Determinants of The Lending Decision," *Strategic Entrepreneurship Journal*, 10(3), 235-256.

63 Jesse Davis, Adair Morse, and Xinxin Wang, (2018), "The Leveraging of Silicon Valley: Venture Debt in the Innovation Economy," SSRN Working Paper 3222385.

64 The paper, "Debt and Leverage in Private Equity: A Survey of Existing Results and New Findings," can be downloaded from the Institute for Private Capital website.

TEV is only $195 million. Thus, as expected, the size of the deals is heavily skewed, with a relatively large number of small and mid-sized transactions, and a few much larger deals. Although deal size dropped during the global financial crisis of 2008-2009, it has grown significantly in the last decade to the point that by 2019 the median deal had returned to its previous peak reached in 2007. The mean entry EBITDA multiple paid by the PE sponsor was 10.8 times.

As measures of leverage, we use two metrics representing different ways of viewing capital structure at the deal level. One is a "flow" measure that can be used to assess debt-servicing capability, which is defined as entry Net Debt divided by entry EBITDA. The average leverage ratio was 4.2 times, with an interquartile range of 2.8 to 5.4. Over the life of a deal, the leverage ratio declined slightly for the typical firm, though more than a quarter of the firms experienced increasing leverage ratios.

The second measure of leverage is a "stock measure"—defined as entry Debt-to-TEV or (D/V)—which measures the fraction of total firm value financed with debt. The average D/V was 0.49, with an interquartile range of 0.37 to 0.62. D/V values tended to decline relatively more than the flow leverage ratios over the life of a deal—and rarely increased.

The large majority of firms increased in value while owned by PE firms, although such growth has proved very cyclical, with deals done in the 1997-2001 and 2006-2008 periods growing much less than average. Nevertheless, the growth in the TEV of buyouts has become much more pronounced since the GFC. Such TEV growth derives from two general sources: increases in operating performance and increases in valuation multiples. Annual growth rates in revenue and EBITDA, which both averaged about 12%, were considerably lower than the average TEV growth rate of 19%, which suggests that much of recent TEV growth is attributable to expanding valuation ratios as well as increased growth and profitability.[65] For the large majority of deals, we found that the EBITDA multiple not only increases, but that multiple expansion has reached a record high in recent years.

In sum, our findings show that PE buyouts in recent years have produced larger deals, and higher growth rates and enterprise values.

Our flow measures of leverage (Net Debt divided by EBITDA) at the deal level have exhibited considerable cyclicality, with values well above average during the years leading up to the GFC and then plummeting in 2008 and 2009. Nevertheless, by 2018, leverage ratios had returned to pre-GFC levels. Despite the cyclicality, there has generally been more variation within years than across years—and a wide range of values not only across industries, but even within every industry. What's more, regardless of deal year or industry, we find that leverage ratios decline on average during a deal's life; but there is a wide range of outcomes, and for more than a quarter of transactions, leverage ratios increase.

"For the large majority of deals, we found that the EBITDA multiple not only increases, but that multiple expansion has reached a record high in recent years."

But unlike leverage ratios based on EBITDA, we found that the average D/V ratio in PE buyouts declined sharply during the GFC and has not increased since then. During the financial crisis, moreover, the typical deal shifts from being financed with a majority of debt to a majority equity. And the average D/V ratio since 2015 has been lower than at any other time during our sample period. The average D/V ratio varies by industry, but the majority of transactions in recent years have been financed with 40% to 60% debt for all industries. And over the life of the deals, D/V declines significantly in the vast majority of cases.

In sum, the growth in leverage ratios and decline in D/V ratios post-GFC has been driven by a confluence of trends. First, higher expected revenue and profitability growth have attracted higher EBITDA multiples. Higher entry multiples, by definition, increase both the value of a transaction and the leverage ratio for a given level of debt. Nevertheless, a modest decline in D/V ratios post-GFC has tempered the increase in leverage ratios slightly. Realized high growth in EBITDA, combined with record multiple expansion, has resulted in more rapid declines in both the leverage ratio and D/V ratio over a typical deal's lifetime.

Buyout Performance Measured at the Portfolio Company Level

Measuring performance at the deal level is typically done on gross returns since fees and carry depend on the overall perfor-

65 See, for example, Figures 1.6 and 1.7 in Bain & Company's *Global Private Equity Report 2020*.

mance of a fund. A recent study using portfolio company data from Burgiss[66] shows that buyout deals are generally profitable in all time periods, across all industry sectors, and in all major geographies. Unfortunately, that study did not have detailed information on leverage.

When using the StepStone sample, we find similar, but somewhat stronger performance than in the Burgiss data. The median gross money multiple was 1.84 (as compared to 1.55 in the Burgiss data) with an interquartile range of 1.07 to 3.07. The median deal gross IRR was 21.0%, with an interquartile range of 4% to 43%. Median gross PMEs showed that deals typically outperformed public market returns, though the lowest quartile gross performance of buyout deals is generally inferior to market returns.

Gross deal-level performance has been quite cyclical, with high returns from deals closed in the mid-1990s, early 2000s, and post-GFC. Conversely, gross returns were relatively weak for deals closed in the late 1990s and leading up to the GFC. And when we examined deal returns by sector, we found remarkably consistent results, with surprisingly small differences across sectors. In almost all sectors, the vast majority of deals were profitable (before fees) on both an absolute and market-adjusted basis.

The StepStone data allowed us to look at the relationship between leverage and performance at the deal level. Summarized at a high level, the findings show that deals with high D/V ratios tend to be larger companies with lower EBITDA and TEV growth as well as lower operating margins than low D/V deals. In addition, high D/V deals have higher entry leverage ratios than low D/V deals, but over the life of the deal, high D/V deals experience significant drops in net debt outstanding accompanied by large declines in both D/V *and* leverage ratios. In contrast, low D/V deals experience substantial growth in net debt, no change in D/V ratios, and large increases in leverage ratios. Exit EBITDA multiples expand less in high D/V deals than in low D/V deals. In terms of deal performance, the top quartile of D/V deals generate much higher returns than the other three quartiles, though returns increase monotonically with D/V.

Like high D/V deals, deals with high leverage ratios are also larger and have lower TEV growth over the life of the deal. However, deals with high leverage ratios have higher operating margins and experience higher EBITDA growth. Perhaps the biggest contrast with high D/V deals is that the entry EBITDA multiples are much higher for deals with high leverage ratios than those with low leverage ratios. Over the life of the typical high leverage deal, net debt expands but both the leverage ratio and D/V contract. Upon exit, deals with high leverage ratios also experience weak multiple expansion and the variation in multiple expansion is much greater than for low leverage ratio deals—the opposite of what is observed for D/V.

Viewed together, our results suggest that deals with high leverage ratios are expected to grow revenues and profits to service the higher leverage. But in contrast to high D/V transactions, the performance of high leverage ratio deals is inferior to that of low leverage ratio deals. And regardless of the level of D/V, deals with high leverage ratios are larger, have higher entry EBITDA multiples, and less expansion in EBITDA multiples over the life of the deal. In contrast, there is a strong positive relation between D/V and performance regardless of the entry leverage ratio.

Overall, our findings echo the conclusions of others about the cyclicality of leverage found in other studies. Moreover, they show the deal performance is linked to the use of debt, but that such linkage depends on how leverage is measured relative to the cash flow and value of the underlying company.

Conclusions

Although private equity has grown dramatically as an asset class in the last few decades, there have been relatively few large-scale empirical studies of the role that leverage plays in buyouts—its effects on the risk, returns, incentives, and other basic characteristics of LBOs. In these pages, we provide an overview of the evolution of PE capital structures, the types of leverage used, the theories offered to explain capital structure choices, and the recent empirical studies that shed light on leverage in PE deals.

Buyout capital structures have evolved over time as the debt markets and PE firms have created and adopted new ways to attract debt capital. Debt enters into the PE buyout ecosystem in a variety of layers and structures. PE firms continue to use innovative capital structures, adding layers of debt at the fund and investor level on top of those at the portfolio company. Moreover, the forms and sources of debt vary, widely introducing an array of incentive and risk-sharing elements that are more complex than the simple, "stylized" view of leverage as borrowings that work to increase equity returns on an underlying asset with an exogenous set of operating returns and risks.

Leverage decisions in PE are shaped by many of the same forces and considerations that influence public companies. That said, a number of studies suggest that PE has a comparative advantage in managing high leverage and its potential

66 Gregory W. Brown, Robert S. Harris, Wendy Hu, Tim Jenkinson, Steven N. Kaplan, and David Robinson, (2020b), "Private Equity Portfolio Companies: A First Look at Burgiss Holdings Data," SSRN Working Paper 3532444.

costs—one that effectively enables PE-backed firms to take on higher levels of debt than comparable public companies. Leverage also plays a role in facilitating the concentrated ownership of firms (by a PE fund), which itself is expected to lead to better governance, and increases in the operating efficiency and value of the business. And consistent with this thinking, research continues to show PE buyouts providing net returns to LPs that exceed the returns to public market investors. But on the negative side, the structure of PE deals also continues to raise concerns about possible conflicts of interests and incentives between GPs and their LPs and creditors that may be managed only with partial success by PE's contractual arrangements.

The capital structure decisions in PE vary considerably across the cycle, with rises and falls in leverage with fluctuations in credit market conditions and PE investment and returns. A number of studies offer explanations of the highly cyclical nature of private equity activity, suggesting that institutional features combined with macroeconomic cycles are to some degree hardwired into the industry. Several explanations for the procyclical pattern in LBO leverage levels have emerged, including market timing, GP-LP agency conflicts, agency problems between banks and PE investors, fluctuations in aggregate risk premia, and the growing use of subscription lines of credit.

Finally, our exploration of individual buyouts using a new large dataset provides more evidence of PE outperformance. It also shows that the relationship between debt and performance depends on how leverage is measured. When debt is measured as a percentage of deal value, we find the expected positive relationship with average returns—consistent with a simple model of financial leverage generating a risk-return trade-off. But when leverage is measured as a multiple of EBITDA, we find only a weak negative relationship with performance. The data suggest that firms with high debt-to-value ratios are more likely to be mature "value" firms whereas firms with high leverage ratios tilt towards growth—and these differences explain the results related to performance.

Looking forward, there is of course much more to learn about the effects of PE leverage and capital structure choices. It is difficult to measure and characterize the risk of PE investments and how it is affected by leverage. In fact, even the choice of an appropriate measure of leverage—whether in relation to value or operating cash flow—is important for understanding the links between leverage and PE investments. The rich field for research is increasingly fueled by new innovations in financing as investors are exposed to risks stemming from debt of many forms and at many layers in PE structures. We look forward to considerable progress in our understanding of these issues as more comprehensive, including portfolio company, data become available to researchers.

GREG BROWN is the Sarah Graham Kenan Distinguished Professor of Finance at UNC's Kenan-Flagler Business School and Research Director of the Institute for Private Capital.

BOB HARRIS is the C. Stewart Sheppard Professor of Business Administration at the University of Virginia's Darden School of Business.

SHAWN MUNDAY is Professor of Practice of Finance at UNC's Kenan-Flagler Business School and Executive Director of the Institute for Private Capital.

Appendix I: A Brief Summary of the Structural Variations and Uses of PE-Related Debt:

Management Company Debt: Debt issued or borrowed at the management company level backed by the partners' interest in the management company and/or personal guarantees. This can be either secured or unsecured and can be in the form of a loan or bond. Large global PEs (several of which are publicly listed) have borrowed in the form of term loans and issued bonds. The term loans have been senior secured first lien, typically with 7-year tenors. The bonds have been both secured and unsecured obligations with long-dated maturities (including 30 years). Most of these issuances have been investment grade rated with effective yields in the low single digits. Use of proceeds includes M&A, seed new business lines, fund dividends to partners, and general corporate purposes

Fund-Level Debt: Debt borrowed at the fund-level, backed by undrawn LP capital commitments and/or pledges of equity collateral of the underlying portfolio companies (HoldCo's and OpCo's).

- **Subscription Lines:** One common form of fund-level debt is typically referred to as a "wire line" facility or "subscription line." These instruments enable the borrower to use proceeds instead of LP capital to make early investments or pay fees and expenses. Typical features include:
  - limited as a percentage of the LPs' capital commitments (commitments from the most creditworthy LPs earn a 90% advance rate, and commitments from lesser credits earn lower advance rates or, in some cases, zero),
  - are secured by the LPs' capital commitments,
  - generally must be repaid in the early or middle part of the fund's life (unless extended), although terms are beginning to lengthen.

Because subscription lines are backed by either undrawn capital commitments or a pledge of underlying illiquid equity collateral, they do not lever funds in the sense of allowing funds to invest more than committed capital.

- **SBIC Loan:** SBA-guaranteed debt provided at the fund level to private capital funds that are designated participants in the SBIC program. Features include:
  - leverage at 2:1 debt/equity up to a cap of $175mm,
  - senior in right of repayment to all other LP & GP capital,
  - act as a form of low-cost incremental capital to invest in small businesses,
  - typically priced in the very low single digits.

SBIC loans effectively allow funds to invest more than LP committed capital at a specified 2:1 ratio up to a size constraint.

- **"Other" Fund-Level Debt**: There are a variety of other sources of debt that can provide incremental leverage at the fund level to meet borrowers' needs. Often these facilities are structured to meet fund investment needs that are constrained by the operating agreement or LPA. For example, a fund past its draw-down period may seek to invest incremental capital into a portfolio company to preserve or enhance value of the investment. The loan could be collateralized at a low LTV via a pledge of the underlying illiquid equity investments across the existing portfolio. The lender is effectively stepping in front of the LPs and GPs in right of repayment. These loans are typically priced in the mid-to-high teens or higher. Another example includes combination facilities that include characteristics of a subscription facility with a loan backed by portfolio company equity pledges.

Holding Company (HoldCo) Debt: Debt issued or borrowed at the holding company level that is structurally subordinate to all claims at the OpCo level. The debt is typically backed by a pledge of the equity collateral in the underlying portfolio company and guaranteed by relevant subsidiaries. Holding company debt is utilized to provide incremental leverage in a transaction when existing debt covenants preclude the addition of incremental debt at the operating company level. When viewed at the operating company level, all debt above the operating company is junior in all respects; effectively, ManagementCo/Fund-level/HoldCo debt behaves as if it were equity from the perspective of OpCo lenders. Pricing is typically in the very high single digits to double-digit range.

Operating Company (OpCo) Debt: Debt issued or borrowed at the operating company level. It can be structured as senior or junior, secured or unsecured, loan or bond, etc. What is typically recognized as the LBO debt in a leveraged buyout.

SPV Debt: Some operating companies will utilize SPV structures to finance their operations. These structures typically involve creating a SPV then transferring a specified set of collateral to the SPV, which is then borrowed against by the SPV. The OpCo makes a recurring "rent" payment to the SPV in exchange for use of the underlying collateral. The SPV structure is used to achieve more efficient forms of financing for the company in lieu of traditional OpCo financing structures. Examples include airlines, rental car companies, finance companies, etc.

Many of the specific channels for debt financing remain hard to study because of a lack of transparency, but a comprehensive knowledge of the landscape facilitates an understanding of how various stakeholders are impacted by leverage.

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