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Valuing Late-Stage Companies and Leveraged Buyouts

This note focuses on the valuation of late-stage companies with a particular emphasis on leveraged buyouts (LBOs). Late-stage investments can arise in situations involving growth equity, turnarounds, mezzanine investments, and distressed debt. In contrast to venture capital, where firms are typically at an early stage of development, late-stage investments involve more-established businesses that have an ability to take on higher levels of leverage to augment investor returns. This note takes the perspective of a private equity (PE) investor and assumes some basic familiarity with the structure of PE investing. It provides a basic overview of the primary sources of financing, the metrics used to gauge LBO capital structures, and a step-by-step example of an LBO analysis.

What is an LBO?

An LBO is the purchase of a firm by an outside individual, another firm, or the incumbent management using large amounts of debt to finance the purchase. The target firm for an LBO can be a freestanding private or public company or a division of a company. Most often, LBOs are undertaken by PE firms that specialize in these transactions (e.g., Blackstone, Carlyle Group, and KKR). PE firms that specialize in LBOs are often referred to as *sponsors*, because they in effect sponsor or propose the deal. Unlike strategic buyers, who often have assets or expertise to combine with the target firm, sponsors are typically financial buyers whose expertise lies in arranging the financing and incentives for management to perform in a highly leveraged transaction (HLT). That said, sponsors must also have a keen eye to identify opportunities for business development and operating improvements.

The limited partners (LPs) in sponsors' funds provide the bulk of equity contributions to finance LBOs. As equity holders, they assume a high degree of operational risk and financial risk, which arises from the high amounts of leverage that sponsors employ. Sponsors work with banks and investment banks to arrange the LBO debt. Debt holders do not bear as much risk in an LBO as the equity holders. As leverage becomes extremely high, however, debt holders take on more operational risk, and in the extreme, if the equity becomes worthless, debt holders become the equity holders of the firm. Sponsors usually hope to exit an investment within a five-year time frame through an initial public offering (IPO), sale to a strategic buyer or another PE fund (a secondary LBO), or a recapitalization. If the sponsors are delayed in exiting or unable to exit the investment, it has a negative effect on their returns.

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Overview of Buyout Financing

LBO activity is heavily influenced by the credit markets, which affect the ease and cost of borrowing. In this section, we briefly review some of the instruments used to finance LBOs and discuss some of the commonly used metrics to benchmark LBO capital structures.[1]

In an LBO, debt is combined with equity to purchase a company (or division of a company). Two types of debt are normally employed in an LBO transaction: *senior debt* and *subordinated debt*. **Exhibit 1** provides a schematic illustrating the ranking of commonly used financing sources in LBOs. Notice that debt is ranked within the structure of a company's liabilities, and the terms *senior* and *subordinated* refer to a claim's rank within the capital structure in the event of default. Senior debt has a higher priority in the capital structure, whereas subordinated debt ranks below it and thus has a lower claim on company assets. Senior debt is also typically secured by collateral that can take the form of assets, property, or securities pledged by the borrower to secure the debt obligation. When a firm's earnings are insufficient to fully service the debt obligations, the holders of secured debt have recourse to the pledged property to recover the unpaid interest and principal. Secured debt (also called bank debt or first-lien debt, or FLD) in LBOs can take the form of asset-based lending facilities, amortizing, and institutional term loans. It typically entails stricter *maintenance covenants* that are more flexible than the *incurrence covenants* used with subordinated debt. On the other hand, an advantage, particularly of bank debt, is that it typically does not involve prepayment penalties and sponsors can pay down the debt if there is sufficient cash to do so. Beginning in 2004–05, there has been growth in second-lien debt (SLD), to the point where it has replaced other subordinated debt in LBO capital structures.[2]

Subordinated debt is considered more speculative than senior secured debt because of its lower priority in bankruptcy and because the borrowing is typically done on an unsecured basis. The holders of subordinated debt have a general claim against the borrower in the case of default, but only assets not pledged explicitly and cash remaining after satisfying higher-priority creditors are available to pay unsecured claims. Subordinated debt is often structured to delay amortization until the senior secured debt has been repaid. Although the deferred amortization alleviates the near-term cash burden on the firm, it subjects the firm to greater refinancing risk at a later date.

Subordinated debt can be issued in the form of leverage loans or high-yield (HY) bonds. Leverage loans are syndicated bank loans issued by noninvestment-grade borrowers. Leverage loans are a private transaction, whereas HY bonds are publically issued bonds that require the issuer to provide ongoing financial disclosure. HY bonds typically have incurrence covenants, which allow a borrower to incur debt so long as some chosen financial ratio remains below a stated level (e.g., debt cannot exceed 5× earnings before interest, taxes, depreciation, and amortization, or EBITDA). Importantly, under this type of covenant, the firm's capacity to take on additional debt increases as EBITDA grows. Further, HY bonds are nonamortizing (i.e., have bullet amortization), which frees cash for other uses but can make it more difficult to repay the debt before maturity. Mezzanine financing is also a form of subordinated debt that is privately arranged, which can be customized to a particular deal and typically is more costly than leveraged loans or HY debt.

To maximize leverage, LBOs frequently combine loans and bonds in the capital structure. Although the mix of loans and bonds is heavily influenced by prevailing credit market conditions, specific deal considerations, and judgment, **Table 1** lays out several factors that can influence the choice and provides a summary of some key points from the previous discussion.

[1] There are myriad types of financing that can be employed to finance an LBO. This note necessarily focuses on the major debt sources and the broad distinctions between senior and subordinated debt.

[2] A second-lien loan has a second priority claim to the assets of the borrower. In the case of default, second-lien holders are entitled to repayment from the proceeds of collateral sales after the proceeds have been applied to first-lien holders but prior to any claim of unsecured claims. Unlike first-lien term loans, second-lien term loans generally have minimal or no amortization (i.e., bullet amortization).

Table 1. Factors affecting the choice of loans versus bonds.

• **Ease of repayment** Loans are generally prepayable anytime at par. Bonds are noncallable for some period of time, usually two to five years—sponsor may have to tender for bonds in the open market to retire them. (e.g., breakage costs as obstacle to merger/change of control at exit). ⇨ *Loans typically have greater ease of repayment than bonds.*
• **Desire for operating and financial flexibility** Loans often require amortization, which reduces cash available for other uses; bonds have bullet amortization, which allows cash to be used for other things. Loans require more restrictive maintenance covenants; bonds have fewer restrictions (no maintenance covenants, only incurrence covenants). ⇨ *Bonds impose fewer restrictions on operations, and it is typically easier to take on additional debt with bonds.*
• **Bond investors generally accept more risk** Bonds are subordinated to senior debt and have longer maturities. They are generally more expensive than senior debt, but less expensive than equity. ⇨ *The use of bonds may facilitate more leverage overall than funding with loans alone. Larger deals are likely to make use of bond financing.*
• **Extent of disclosure and reporting requirements** Bank debt and loans are private instruments that are not subject to the US Securities and Exchange Commission (SEC) reporting requirements. HY debt is typically issued to qualified institutional buyers in the Rule 144A market. Most domestically issued HY bonds are simultaneously registered with the SEC, and subsequently 144A debt is exchanged for public debt. The exchange subjects the issuing entity to SEC reporting requirements. Therefore, although LBO firms may no longer have publicly traded equity, if LBOs are financed with HY bonds, they can face similar periodic reporting requirements to those of a public company. ⇨ *All else equal, the disclosure requirements (cost savings of being private) can be higher (lower) for LBOs financed with HY bonds than those financed only with loans.*

Source: Created by author.

In sum, by combining senior and subordinated debt, LBO sponsors can utilize greater amounts of debt, thereby reducing the transaction's overall cost of capital.

The ease of borrowing in the LBO market is frequently measured by credit metrics using debt-to-EBITDA multiples. As shown in **Exhibit 2**, total debt-to-EBITDA ratios for middle-market LBOs are the sum of senior debt and subordinated debt-to-EBITDA. For example, in 2017, total debt of 5.5× EBITDA is made up of 5.4× senior and 0.1× subordinated debt. Total debt-to-EBITDA ranges from a low of 3.2× EBITDA in 2009, following the collapse of Lehman Brothers in September 2008, to a high of 5.5× EBITDA in 2017. The multiples refer to *turns* of EBITDA and imply that an LBO with $50 million in pro forma EBITDA is financed on average with $275 million in total debt (5.5 × $50 million), of which $270 million is bank debt (5.4 × $50 million) and $5 million is subordinated debt (0.1 × $50 million). In all years, secured forms of debt account for the lion's share of LBO debt financing. This suggests that lenders are reluctant to provide funding

without security, and the strength of the target firm's assets as debt collateral is an important factor in sizing up the attractiveness of an LBO target.

Exhibit 2 also shows the average purchase price multiples (PPMs) for middle-market LBOs. PPMs measure the price or cost of acquiring target companies (typically inclusive of fees and transactions costs) and the willingness of sponsors to pay for future earnings. As PPMs rise, a sponsor has to raise more capital in total to complete a deal. Average PPMs ranged from a low of 6.6× EBITDA in 2009 to a high of 11.6× EBITDA in 2017. Following our previous example, in 2017, the average purchase price of a deal was $580 million (11.6 × $50 million).

Contributed equity provides the remaining funds for a buyout. The rise in PPMs in recent years has outstripped the increase in debt multiples, such that the equity contribution has grown to around 50% (**Exhibit 3**). All else equal, as the sponsor's equity contribution increases, the returns to PE investment decrease. The equity in a deal usually involves the funds invested by the sponsors (on behalf of their LPs) and rollover equity (typically 2% to 5%), contributed or rolled over by the target firm's management. Rollover equity serves as an important vehicle to align the incentives of management and sponsors. The equity contribution protects lenders against losses in the business, and the enterprise value (EV) at the time of purchase would have to decline by more than the equity contribution before the principal on debt is jeopardized. As market conditions become more uncertain, debt holders demand a larger equity cushion.

Value Drivers in an LBO

In LBO transactions, sponsors seek to generate high returns on their invested equity. Sponsors can enhance their returns in an LBO in several ways:

1. The use of leverage

   The principal way sponsors augment returns on LBOs is through the use of leverage. In order for leverage to pay off, however, the sponsors have to cash out of the deal and repay the debt. All else equal, as debt is repaid, equity value increases relative to EV. In a highly levered firm, even small increases in the company's EV can substantially increase the value of its equity. High leverage, however, is a double-edged sword, and relatively small declines in EV can also severely reduce the value of equity. Therefore, although the use of debt increases the sponsors' expected returns, it also increases their risk or variability of returns.

   Another benefit of leverage is that interest on debt is tax deductible, and due to this tax subsidy, the after-tax cost of debt is generally lower than the cost of equity. As a result, provided the firm has sufficient capacity to service debt, increasing a company's leverage should reduce its cost of capital.

2. Operational improvements (e.g., margin expansion, revenue growth)

   As Michael Jensen forcefully articulated, LBO transactions push firms to operate with more focused strategic goals and to achieve better results for shareholders.[3] At the heart of an LBO are strong managerial incentives created through equity participation and the discipline of high debt service. Operating improvements and margin expansion arise from large interest and principal payments that discipline management to improve sales, drive down costs, and control capital expenditures to a greater extent than under the pre-LBO debt structure.

[3] Michael C. Jensen, "Agency Costs of Free Cash Flow, Corporate Finance and Takeovers," *American Economic Review* 76 (May 1986): 323–29.

LBOs are structured to give managers substantial incentives to increase EBITDA and the value of the business. Management is initially required to purchase, or is granted, a meaningful portion of the equity (typically on the order of 5% to 10% of the equity). Effective incentives require managers to bear risk, and therefore, a sizeable portion of their wealth must depend on the firm's performance. Although these stakes may seem relatively small, managerial stakes in an LBO are now considerably riskier due to the high leverage.[4] As a residual risk holder, therefore, a manager's wealth is exposed to a much greater degree to both upside and downside swings in performance compared with the pre-LBO firm. Also, it is important to remember that these stakes are illiquid—managers cannot easily reduce their exposure and "their feet are held to the fire" until there is an exit.

3. Multiple arbitrage (e.g., buying at a low multiple and selling at a high multiple)

   PE funds typically have a 10-to-12-year life, so sponsors ideally seek to invest and exit a target company well within that time frame. The PPMs in **Exhibit 2** show substantial variation over time, from 7× to 12× EBITDA, and for secondary LBO deals, these PPMs represent some sponsors' exit multiple. PPMs are based on prevailing market conditions at the time of exit, and while sponsors can to some extent control the timing of exit, they have less control over the multiple received once the decision to exit is made.

Valuing an LBO

Having reviewed some of the financial issues and motivations behind LBOs, we turn now to the basic steps needed to analyze an LBO. The main steps involved in developing an LBO model are as follows:

1. Build base-case projections—business and industry due diligence determine model drivers and assumptions.
2. Decide on an appropriate target internal rate of return (IRR)—how much reward is needed for the risk and type of transaction (e.g., stable buyout, growth equity, distressed/turnaround situation, and management quality/need).
3. Assume a realistic capital structure—based on industry dynamics, comparable transactions, and the current state of financial markets.
4. Forecast an exit strategy and appropriate range of exit multiples.
5. Calculate IRRs using base-case projections, range of entry and exit multiples, and capital structure.
6. Stress test the model to achieve the right risk/reward profile. The "tension" in buyouts often centers on the feasibility of debt financing versus the adequacy of equity returns.

PE firms conduct extensive due diligence and financial analysis to evaluate a prospective LBO deal. Due diligence is undertaken to develop a better understanding of the business, industry, and possible financing arrangements. This information and the historical financial performance of the firm are used to develop a model for the proposed transaction.

[4] Using the following formula for the levered (equity) beta (β_e), $\beta_e = \beta_u \times (1 + D/E)$, given a pre-LBO unlevered beta (β_u, all equity) of 1, if the LBO is financed with 60% debt, the resulting debt-to-equity ratio (D/E) is 1.5, and the post-LBO equity beta increases to 2.5. This formula assumes that the beta of debt is zero and that shareholders bear all of the business risk of the firm, something that does not hold at extremely high levels of leverage.

An LBO model is similar in many respects to a standalone discounted cash flow (DCF) model, with one important difference. DCF analysis is often undertaken to ascertain the intrinsic value of a company, or the value of a company on an ongoing basis. By contrast, if a sponsor is considering an LBO, it undertakes the analysis to help reach a decision (go or no-go) about a target firm. Generally speaking, a sponsor is less concerned about the intrinsic value of the company and more focused on whether a target can meet its particular return requirements within its anticipated holding period, which depend to a large extent on the purchase price.

The steps involved in developing an LBO model are applied to NewCo in **Exhibits 4** through **7**.[5] Consider a proposed LBO for NewCo financed by $500 million in senior bank debt, $250 million in HY bonds, $400 million in equity, and $75 million in cash on hand. The total sources or purchase price for the transaction is $1,225 million ($750 million + $400 million + $75 million), which on a net of cash basis is $1,150 million (**Exhibit 4**).[6] Fees and expenses of $40 million will be spent on the deal.[7]

From the information above, we can determine the *enterprise value* of the transaction. The EV is $1,110 million, which is $750 million in new debt, and the sponsor's equity contribution ($400 million), less fees and expenses ($40 million), which do not accrue to the firm but go to pay investment banking and attorney fees. Given EBITDA of $130.6 million in year 0, the *entry enterprise multiple* for NewCo is 8.5× EBITDA.

The analysis begins with a forecast of the cash flows for NewCo after the LBO over a five-year forecast period, the length of which is dictated by the sponsors hoped-for exit horizon. These forecasts include the ways sponsors perceive they can add value. For example, the main areas of synergy for NewCo are increases in sales growth and gradual improvement in earnings before interest and taxes (EBIT) margins. The improvement in EBIT margins comes from efficiencies that reduce the cost of goods sold (COGS) and selling, general, and administrative expense (SG&A), both as a percentage of sales.

To capture the sponsors' perspective, the cash flows used to evaluate an LBO are typically *postfinancing* cash flows, referred to as equity residual cash flows (RCFs). RCFs reflect the sponsors' perspective because, as equity investors, they receive or have discretion over any cash flow remaining after the payments to debt holders (i.e., interest and principal payments). DCF analyses conducted using the weighted-average cost of capital (WACC) or adjusted present value (APV) approaches to valuation are based on free cash flows (FCFs) to total capital. FCFs are *prefinancing* cash flows are the combined cash flows shared by all capital providers of the firm (i.e., both debt and equity capital providers).

A comparison of the components of FCFs and RCFs is shown in **Table 2**. Interest expense for RCFs includes cash and noncash interest expense. Noncash interest expense can arise in LBOs if some of the debt used to finance the deal is pay-in-kind (PIK) debt. Similar to depreciation, noncash interest expense (or other noncash charges) must be added back to determine cash flow.[8] As seen in **Table 2**, the only differences between the FCFs and RCFs concern the treatment of net interest expense and principal payments, and otherwise, the deductions for capital expenditures and increases in net working capital (NWC) are common to both approaches.

[5] For a useful overall reference on valuation, deal structuring, and LBO models, see Joshua Rosenbaum and Joshua Pearl, *Investment Banking: Valuation, Leveraged Buyouts, and Mergers & Acquisitions* (Hoboken, NJ: J. Wiley & Sons, 2009).

[6] Typically, in an LBO, to the extent that the target firm has cash on hand, it reduces the amount of financing the sponsor has to raise.

[7] We assume in our example that all the fees and expenses are immediately expensed. Certain fees associated with financing are typically deferred and amortized over the life of the instrument. The amortization of financing fees is a noncash charge for the company.

[8] PIK debt, sometimes called accreting debt, adds the noncash interest to the principal owed to the lender over time. It allows the borrower to deduct the imputed interest expense on the obligation, but no cash leaves the firm, so a tax benefit arises from the deductibility of a noncash expense.

Table 2. Comparison of components between FCFs and RCFs.

FCF to Total Capital	RCF to Equity
EBIT × (1 – *T*), where *T* is the firm's marginal cash tax rate	(EBIT – **Net Interest expense**) × (1 – *T*) = Net income Less: **Principal payments (Amortization)**
Items common to both: Plus: Depreciation and amortization (D&A) Plus: Other noncash charges (e.g., PIK interest) Less: Capital expenditures (CapEx) Less: Increases in NWC	

Source: Created by author.

Recognizing that the only difference between EBIT and net income is after-tax net interest expense, we can also derive RCFs from FCFs in **Equation 1**:

$$\text{RCF} = \text{FCF} - \text{Net interest expense} \times (1 - T) - \text{Principal payments} \quad (1)$$

RCFs generated by the target can be: (1) reinvested in the firm, (2) paid out to sponsors as a dividend, (3) escrowed in a cash account for later use or distribution at the point of exit, or (4) used to pay down the debt.

Because lenders typically require amortization on the senior debt, RCFs are often used to repay the LBO debt. In the following discussion, all interest is assumed to be cash interest. When the sponsors use the RCFs to pay down debt, we leave out principal payments to find the cash available to retire debt (CARD) in **Equations 2** and **3**:

$$\text{CARD} = \text{Net income} + \text{D\&A} - \text{CapEx} - \text{Increase in NWC} \quad (2)$$

$$= \text{FCF} - \text{Net interest expense} \times (1 - T) \quad (3)$$

Both approaches to obtaining CARD are illustrated in **Exhibit 5**. The same values are found using either **Equation 2** or **Equation 3**, but if the FCFs have previously been calculated, it is often easier to simply deduct after-tax net interest expense to find CARD.

Our next step is to incorporate the LBO debt structure and estimate the new interest expense and principal payments. **Exhibit 6** shows the details of these calculations. Interest expense generated from the debt feeds back to net income in **Exhibit 4**, and therefore affects our calculations of RCFs too. The recently passed Tax Cuts and Jobs Act of 2017 reduced the corporate tax rate from 35% to 21% and limited the extent of interest deductibility. Companies that were previously unrestricted in the amount of net interest expense they could deduct now cannot deduct more than 30% of their 12-month EBITDA through 2021. After that, the cap on interest deductions becomes more restrictive, at 30% of 12-month EBIT. S&P Global Ratings estimates that nearly 70% of companies whose debt exceeds 5× EBITDA will be negatively impacted by the interest-deductibility cap.[9] Due to the high amount of leverage used in this deal, net interest expense may be capped and is the lesser of the actual expense or 30% of EBITDA.

[9] The new rules afford some flexibility and allow companies to deduct or carry back interest payments above the 30% cap to the extent that they did not reach that limit in previous years.

In our example, the senior bank debt is assumed to pay fixed interest of 6% annually (LIBOR = 2% + 4%),[10] and the HY bonds 9% annually. In addition, the senior bank debt is assumed to carry mandatory amortization of 5% of the face value of the debt per year (i.e., $25 million), and the sponsors can choose to make optional debt repayments to the extent there is remaining cash flow available. Because the HY bonds have bullet amortization, they will not be paid off before maturity.

From the cash flows in **Exhibit 5**, in year 1, we see there is $76.3 million in CARD. Because cash was depleted to facilitate financing of the LBO, $10 million of this is used to replenish the firm's operating cash balance, leaving $66.3 million for debt repayment in year 1. Of this, $25 million is used for mandatory amortization, and the remaining $41.3 million is used for optional debt repayment. After year 1, no further increases in operating cash are required.

Interest expense for the senior bank debt is based on the amount of debt outstanding at the beginning of the year (end of previous year). Although some debt is usually paid off during the year and interest expense can be calculated on the average balance, here interest expense is modeled on the beginning balance to reduce the chances of creating a circular reference.[11] In year 1, senior bank debt generates $30 million in interest expense (6% × $500 million), and the HY bonds $22.5 million in interest expense (9% × $250 million) for a total interest expense of $52.5 million. Net interest expense in year 1 is shown in **Exhibit 6** as $52.5 million because the $10 million in cash is assumed to earn 2% annually in interest income on a zero balance.[12] Net interest expense of $52.5 million exceeds 30% of year 1 EBITDA, so net interest expense is capped at $43.8 million. The debt schedule is built for the remaining years in an analogous manner. When completed, we see that NewCo's RCFs are projected to pay down 62.1% of the total debt from $750 million at the outset of the transaction to $284.1 million in year 5. Most sponsors typically seek to pay off at least half the debt in a five-year time frame, and this deal does well on that dimension.

The final task of the analysis is to estimate a terminal value for the company and equity. In our case, we use the entry multiple for NewCo as the base-case exit multiple (**Exhibit 7**). The entry multiple is frequently used as a base case to ensure that the returns do not become arbitrarily high as a result of projecting a higher multiple at exit than entry (i.e., multiple arbitrage). Multiples are based on market conditions at the time of exit, and the chosen exit multiple must be checked against current multiples in the marketplace for comparable public companies and recent transactions.

If NewCo is able to exit at 8.5× EBITDA, the resulting company or EV for the transaction is $1,559.2 million ($183.5 million × 8.5). To derive the terminal equity value that accrues to the sponsors, the remaining net debt in year 5 must be subtracted from the EV. After adding $10 million in cash and deducting $284.1 million in debt, the terminal equity exit value is $1,285.1 million.

Using the above information, we calculate an expected IRR of 26.3% for the sponsors, assumed in this case to own 100% of the equity. Note that because all the interim cash flows were used to pay down debt, the cash flows to the sponsors in years 1 through 4 are zero. Another metric used by sponsors to evaluate the success of a deal, the cash-on-cash return (CoC), is calculated as the terminal equity exit value divided by the initial equity investment, expressed as a multiple. In NewCo's case, CoC is 3.2× ($1,285.1 million ÷ $400.0 million). Unlike IRR, CoC does not account for the time value of money. Given

[10] LIBOR = London Interbank Offered Rate. The interest rate on bank debt is often a floating rate over LIBOR, but in this case, we simplify and assume it is a fixed-rate obligation.

[11] If interest expense had been calculated on the average balance, there is a negligible difference. In this case, senior bank debt generates $28.0 million in interest expense (6% × ($500 million + $433.7 million) ÷ 2)), and the HY bonds generate $22.5 million in interest expense, for a total interest expense of $50.5 million in year 1.

[12] In year 1, interest income is $0.0 million because the beginning cash balance is zero and in years 2 to 5, it is $0.20 million (2% × $10 million). Although it may seem unrealistic to assume a zero cash balance, it is a frequently used modeling assumption ("cash-free/debt-free closing") because the amount earned in interest income is not a major driver of the results.

the risks associated with high leverage, sponsors typically have high hurdle or target rates (minimum required IRRs) in excess of 25% and target CoCs of 2.0× to 4.0×, but these targets may be reduced for deals completed under adverse economic conditions or in highly competitive situations. Based on the kind of returns sponsors traditionally seek from LBOs, NewCo meets the IRR and CoC standards under the base case. That said, this deal will require additional sensitivity analysis and due diligence to check downside scenarios.

Earlier, we noted that one avenue by which sponsors can augment their returns is through the use of leverage. We can see the effect of leverage on returns by calculating the unlevered return to NewCo, assuming that the sponsors had put up the entire purchase price in equity—that is, that they didn't use any debt ($1,150 million). On an unlevered basis, the FCFs in years 1 to 5 from **Exhibit 5** and the terminal EV in year 5 of $1,559.2 million accrue to the sponsors. The unlevered expected IRR is 16.1%, and thus the increase to 26.3% is due to the use of leverage.

Sponsors do extensive sensitivity analyses with the LBO model to help assess the strength of the returns. In the case of NewCo, for brevity's sake, we show one commonly used sensitivity analysis that assesses changing levels of the terminal year EBITDA and the exit multiple. Both of these are likely to be major drivers of sponsor returns. For example, if the exit multiple falls to 7.5× EBITDA and the year 5 EBITDA is reduced by 10% from $183.5 million to $165.2 million, the expected IRR and CoC fall to 19.2% and 2.4×, respectively, and the deal begins to look more marginal. The sponsors undoubtedly will explore other sensitivities to gain greater comfort with the risks and returns for the transaction.

Comparisons with Other Methods of Valuation

Students rarely begin studying valuation with LBOs, and the curriculum more typically emphasizes company valuation using the WACC method. This often leaves students with questions about the differences in valuation methods. There are two important differences between the WACC and RCF approaches to valuation. The first, as mentioned earlier, is that the WACC approach assumes the use of FCFs and prefinancing cash flows, whereas the RCF approach is based on postfinancing cash flows. As a consequence, the WACC method yields an estimate of EV, whereas the RCF method yields an estimate of equity value. A second difference is that the WACC method assumes that the company maintains a constant leverage ratio. This assumption is appropriate in many corporate contexts because firms often have target leverage ratios they seek to maintain.[13] By contrast, the capital structures put in place with LBOs are designed to be *transient in nature*. The debt is initially high to force changes in the company and then paid off as operating performance improves. As debt is paid off, the firm's leverage ratio changes, violating a basic assumption of the WACC method. The same problem of a changing cost of equity arises using the RCF approach to value the equity. Although the discount rates in the WACC and RCF approaches can be adjusted period by period, the accuracy of such adjustments has led academics to propose APV as an alternative approach to negate the need to adjust for changing leverage.[14] APV also yields an estimate of EV but discounts the FCFs at the unlevered cost of equity and adds any resulting tax benefits separately. Conceptually, EV is derived under each method by finding the present value (PV) of the projected FCFs over the life of the firm from period t to N as shown below for the WACC method in **Equation 4** and the APV method in **Equation 5**:

[13] John R. Graham and Campbell Harvey, "The Theory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics* 60 (2001): 187–243.

[14] For a fuller description of APV, see Richard A. Brealey, Stewart C. Myers, and Franklin Allen, *Principles of Corporate Finance*, 8th ed. (New York: Irving McGraw-Hill, 2006). For fuller treatment of the RCF approach, see Robert M. Conroy and Robert S. Harris, "Using the Equity Residual Approach to Valuation: An Example (Abridged)," UVA-F-1609 (Charlottesville, VA: Darden Business Publishing, 2009).

$$\text{WACC method:} \qquad \text{EV} = \sum_{t=1}^{N} \frac{FCF_t}{(1 + (\frac{D}{V} \times k_d\,(1-T) + \frac{E}{V} \times k_e))^t} \tag{4}$$

where D/V and E/V are the target levels of debt (D) and equity (E) relative to value (V), and k_d and k_e are the costs of capital for debt and equity, respectively.

$$\text{APV method:} \qquad \text{EV} = \sum_{t=1}^{N} \frac{FCF_t}{(1+k_u)^t} + \sum_{t=1}^{N} \frac{T \times INT_t}{(1+k_d)^t} \tag{5}$$

where k_u is the unlevered cost of equity and $T \times INT_t$ is the interest tax shield. The APV and WACC methods differ primarily in the way the after-tax benefits of interest are captured—WACC incorporates them in the cost of capital (i.e., in the term $k_d\,(1 - T)$), and APV adds them (PV of tax shields) to the unlevered value of the firm. The unlevered value of the firm does not change as debt is paid off (k_u is independent of financing), and as the amount of debt declines, the interest payments also decrease. Hence APV focuses on the *amount of debt* compared to the WACC method, which focuses on the *value of debt* by assuming a constant target (or proportion) of debt. The frequently observed payoff of debt in LBOs lends itself to APV as a valuation method.

On the other hand, sponsors are most concerned about whether a given deal meets their return requirements They typically bypass the problems associated with the discount rate and instead calculate an expected IRR from the RCFs. The IRR is then compared against a minimum hurdle or target rate to reach a decision about the attractiveness of the deal. The IRR measures the *expected profitability* embedded in the RCFs (average annual expected return), and the target rate serves as the *standard* by which they judge profitability (minimum required return). As sponsors and equity holders, their required return should be considerably higher than WACC or k_u. NewCo was initially 67% debt financed based on its EV, and returning to our earlier example, if an all-equity-financed firm with a beta of 1 does a buyout that is 67% debt-financed, its beta increases to 3.0.[15] This implies an increase in the cost of equity from 10% before the buyout to 22.2% after the buyout, suggesting that target rates of 25% are close to market-adjusted rates and are not unreasonable for highly leveraged deals.[16]

Yet it is fair to say that sponsors' target rates are "sticky" and do not change as frequently as market adjusted rates. Sponsors under pressure to deploy capital sometimes reduce their target rates in periods of intense competition to win deals. But these periods often coincide with plentiful capital and rising purchase price and debt multiples. In these situations, sponsors are often heard to say, "We used to look for target rates of 25% on deals, but now we're happy to get 20%." All else being equal, rising debt multiples should lead to *higher* risk-adjusted rates. By *reducing* their target rates in these circumstances, sponsors may achieve their goal of putting capital to work, but could be prone to overinvest in high-risk deals.

Conclusion

Buyouts and other late-stage investments have become a regular part of corporate finance. This note provides a basic overview of the primary sources of financing and the metrics used to gauge LBO capital structures. In addition, it provides a step-by-step example of an LBO analysis to familiarize students with the approach used by PE firms to evaluate deals. The issues presented by buyouts require managers to be knowledgeable about the many forms of financing, the trends in capital markets, and the concepts of valuation, which, all told, present a formidable challenge. This note serves as a foundation upon which students can continue to build their skills in this increasingly important area of corporate finance.

[15] The risk-adjusted rate reflects the leverage at initiation of the deal, and as debt is paid off, the levered beta and cost of equity decline.
[16] The estimates are derived using the capital asset pricing model and assume a risk-free rate of 4% and a market risk premium of 6%.

Exhibit 1

Valuing Late-Stage Companies and Leveraged Buyouts

Selection and Mix of Primary LBO Capital Sources

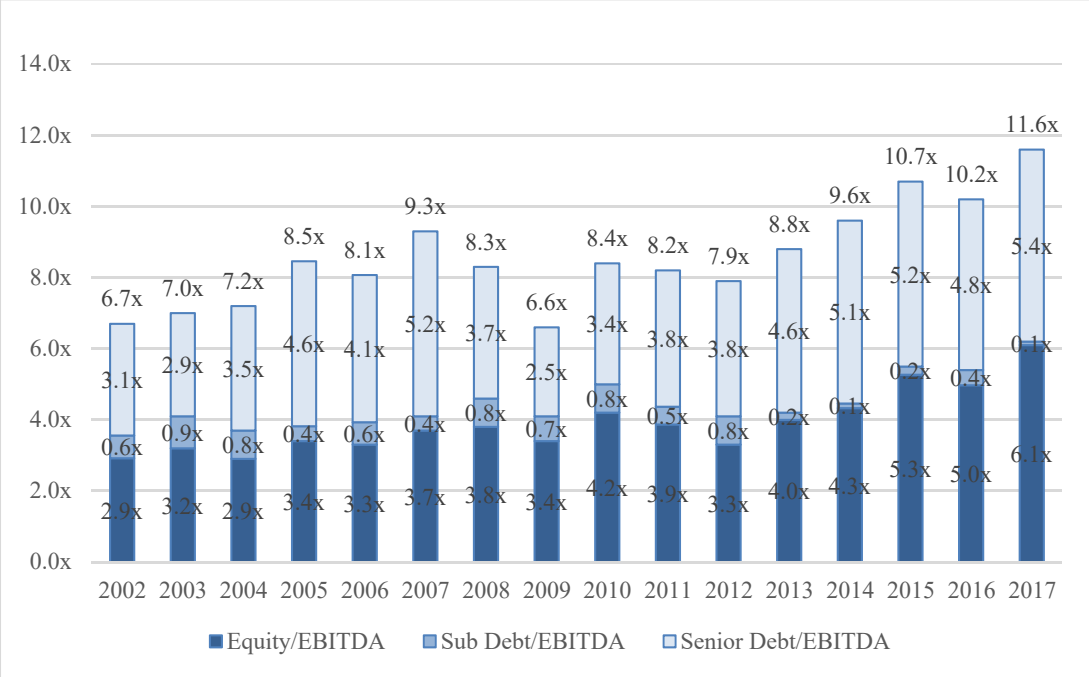
	Type of Capital	Key Features
Rank in bankruptcy	**Senior Debt**	
	Revolver	Drawn as needed; secured by first lien
	Term Loan (TL) A	Funded at closing; secured by first lien; amortizing 5-to-6-year tenor; carry maintenance covenants: total debt < MAX×, FLD < MAX×, interest coverage > MIN×
	TL B, C, D	Institutional term loans; typically larger than TL As; 7-to-8-year tenor; amortize at nominal rate (1% per year)
	Senior Secured Notes	
	Second Lien Debt	Became popular from 2004–05 onward; second priority lien on assets; substitute for high-yield or mezzanine debt; fewer covenants than TL As but more than high-yield; superior prepayment options to bonds
	Subordinated Debt Senior Subordinated Notes Subordinated Notes Discount Notes	High-yield bonds; unsecured; minimum offer size of $150 million; typically fixed-rate interest; nonamortizing (bullet repayment); tenor 7–12 years, do not carry maintenance covenants; typically noncallable for a period
	Preferred Stock	Superior claim in bankruptcy to common equity; can be structured to convert into common equity at exit; can be redeemable or perpetual; dividend can be accreting (PIK) to ease cash burden on firm but augment sponsors' terminal payment at exit; if cash dividend, not deductible for tax purposes and inferior in its tax treatment to interest
	Common Equity	Cushion to protect senior claims against deterioration of enterprise value; made up of sponsors' equity contribution and rollover equity from management, which helps to align incentives

Source: All exhibits, unless otherwise specified, were created by author.

Exhibit 2

Valuing Late-Stage Companies and Leveraged Buyouts

Average Debt and Purchase Price Multiples for Middle-Market LBOs
(Issuers with less than $50 million of EBITDA)



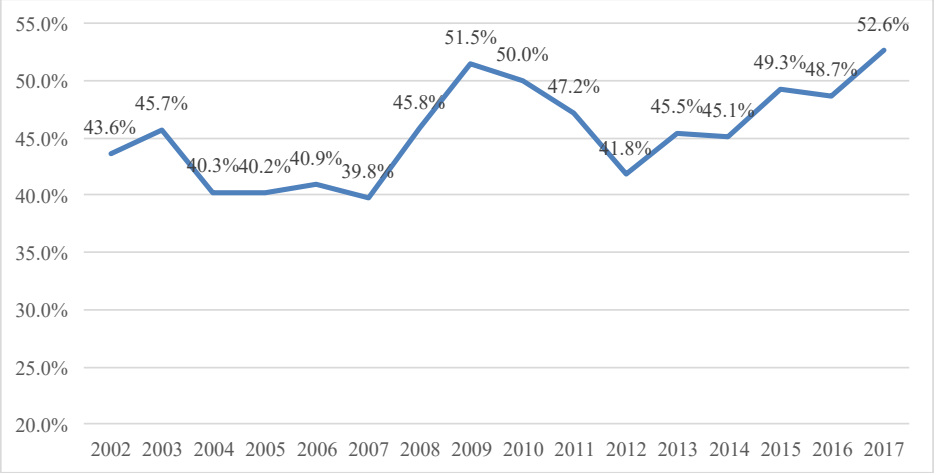
Sub Debt = subordinated debt.

Data source: Standard & Poor's LCD.

Exhibit 3

Valuing Late-Stage Companies and Leveraged Buyouts

Average Equity Contribution to Middle-Market LBOs



Data source: Standard & Poor's LCD.

Exhibit 4

Valuing Late-Stage Companies and Leveraged Buyouts

Pro Forma Capitalization and Income Statement for NewCo

(in millions of dollars)

Pro Forma Capitalization	Amount	Multiple	Percent
Senior Bank Debt	$500.0	3.8x	43.5%
Subordinated Notes	250.0	1.9x	21.7%
Total Debt	750.0	5.7x	65.2%
Sponsor Equity	400.0	3.1x	34.8%
Purchase Price	$1,150.0	8.8x	100.0%
Entry Enterprise Value	$1,110.0	8.5x	

Income Statement

Assumptions / Drivers		0	1	2	3	4	5
Revenue Growth		2.0%	3.0%	4.0%	4.0%	4.0%	4.0%
EBIT Margin		15.0%	18.0%	20.0%	20.0%	20.0%	20.0%
Revenue		$525.0	$540.8	$562.4	$584.9	$608.3	$632.6
COGS			(319.0)	(326.2)	(339.2)	(352.8)	(366.9)
Gross Profit			221.7	236.2	245.6	255.5	265.7
SG&A			(75.7)	(73.1)	(76.0)	(79.1)	(82.2)
EBITDA		130.6	146.0	163.1	169.6	176.4	183.5
Depreciation and Amortization			(48.7)	(50.6)	(52.6)	(54.7)	(56.9)
EBIT			97.3	112.5	117.0	121.7	126.5
Net Interest Expense			(43.8)	(48.3)	(43.2)	(37.5)	(31.2)
Earnings before Taxes			53.5	64.2	73.8	84.2	95.3
Taxes (T)	21.0%		(11.2)	(13.5)	(15.5)	(17.7)	(20.0)
Net Income			$42.3	$50.7	$58.3	$66.5	$75.3

Exhibit 5

Valuing Late-Stage Companies and Leveraged Buyouts

Residual Cash Flow Projections for NewCo LBO

(in millions of dollars)

Residual Cash Flows

		0	1	2	3	4	5
EBIT			$97.3	$112.5	$117.0	$121.7	$126.5
Net Interest Expense			(43.8)	(48.3)	(43.2)	(37.5)	(31.2)
Earnings before Taxes			53.5	64.2	73.8	84.2	95.3
Taxes (T)	21.0%		(11.2)	(13.5)	(15.5)	(17.7)	(20.0)
Net Income			42.3	50.7	58.3	66.5	75.3
Net Income			$42.3	$50.7	$58.3	$66.5	$75.3
plus: Depreciation and Amortization			48.7	50.6	52.6	54.7	56.9
less: Capital Expenditures			(13.5)	(14.1)	(14.6)	(15.2)	(15.8)
less: Increase in Working Capital			(1.1)	(1.5)	(1.6)	(1.6)	(1.7)
Cash Available for Debt Repayment			**$76.3**	**$85.7**	**$94.7**	**$104.4**	**$114.7**
EBIT × (1 − T)			$76.9	$88.9	$92.4	$96.1	$100.0
plus: Depreciation and Amortization			48.7	50.6	52.6	54.7	56.9
less: Capital Expenditures			(13.5)	(14.1)	(14.6)	(15.2)	(15.8)
less: Increase in Working Capital			(1.1)	(1.5)	(1.6)	(1.6)	(1.7)
Free Cash Flow to Total Capital			110.9	123.9	128.9	134.0	139.4
less: Net Interest Expense × (1 − T)			(34.6)	(38.2)	(34.1)	(29.6)	(24.7)
Cash Available for Debt Repayment			**$76.3**	**$85.7**	**$94.7**	**$104.4**	**$114.7**

Exhibit 6

Valuing Late-Stage Companies and Leveraged Buyouts

Debt Schedule and Credit Metrics for NewCo LBO

(in millions of dollars)							
			0	1	2	3	4	5
Operating Cash			$0.0	$10.0	$10.0	$10.0	$10.0	$10.0
LIBOR Assumption		2.0%						
Senior Bank Debt Beginning Balance				$500.0	$433.7	$347.9	$253.2	$148.8
Mandatory Amortization				(25.0)	(25.0)	(25.0)	(25.0)	(25.0)
Optional Amortization				(41.3)	(60.7)	(69.7)	(79.4)	(89.7)
Ending Balance				433.7	347.9	253.2	148.8	34.1
Bank Debt Interest Expense	**L +**	**4.0%**		**30.0**	**26.0**	**20.9**	**15.2**	**8.9**
HY Bonds Beginning Balance				250.0	250.0	250.0	250.0	250.0
Bullet Paydown				-	-	-	-	-
Ending Balance				250.0	250.0	250.0	250.0	250.0
HY Bonds Interest Expense		**9.0%**		**22.5**	**22.5**	**22.5**	**22.5**	**22.5**
Total Interest Expense				**52.5**	**48.5**	**43.4**	**37.7**	**31.4**
Net Interest Expense				52.5	48.3	43.2	37.5	31.2
Capped Net Interest Expense		30.0%	EBITDA	43.8	48.9	50.9	52.9	55.0
Credit Metrics								
Total Debt			$750.0	$683.7	$597.9	$503.2	$398.8	$284.1
Total Debt / EBITDA				4.7x	3.7x	3.0x	2.3x	1.5x
EBITDA / Interest Expense				2.8x	3.4x	3.9x	4.7x	5.8x
(EBITDA − CapEx) / Interest Expense				2.5x	3.1x	3.6x	4.3x	5.3x

Exhibit 7

Valuing Late-Stage Companies and Leveraged Buyouts

Return Analysis for NewCo LBO

(in millions of dollars)	0	1	2	3	4	5
EBITDA						$183.5
Exit Multiple						8.5x
Enterprise Value						1,559.2
plus: Cash						10.0
less: Debt						(284.1)
Equity Value						1,285.1
Cash Flows	($400.0)	-	-	-	-	$1,285.1

Expected IRR	26.3%
Cash-on-Cash Return	3.2x

Sensitivity Analysis

IRR	Exit Multiple				
EBITDA	7.5x	8.0x	**8.5x**	9.0x	9.5x
146.8	15.6%	17.6%	19.5%	21.2%	22.9%
165.2	19.2%	21.2%	23.1%	24.8%	26.5%
183.5	22.5%	24.4%	26.3%	28.1%	29.7%
201.9	25.4%	27.4%	29.2%	31.0%	32.7%
220.2	28.1%	30.0%	31.9%	33.7%	35.4%

CoC	Exit Multiple				
EBITDA	7.5x	8.0x	**8.5x**	9.0x	9.5x
146.8	2.1x	2.3x	2.4x	2.6x	2.8x
165.2	2.4x	2.6x	2.8x	3.0x	3.2x
183.5	2.8x	3.0x	3.2x	3.4x	3.7x
201.9	3.1x	3.4x	3.6x	3.9x	4.1x
220.2	3.4x	3.7x	4.0x	4.3x	4.5x