

VALUATION OF LATE-STAGE COMPANIES AND BUYOUTS

Private equity involves a wide range of investment opportunities from venture capital to buyouts. The methods of valuation used to analyze private equity (PE) investments depend on the maturity of the company and the extent of financial information available to forecast company, industry, and macro trends. This note focuses on the valuation of late-stage companies with a particular emphasis on leveraged buyouts (LBOs). In addition to 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. While in practice there are multiple approaches to valuation, the approach chosen often comes down to which provides the most accurate representation of the situation and perspectives of the parties involved. This note takes the perspective of a PE investor and assumes some basic familiarity with the structure of PE investing. It provides a basic overview of the primary sources of financing and the metrics used to gauge LBO capital structures and a step-by-step example of an LBO analysis.

What is a Leveraged Buyout?

A leveraged buyout is simply the purchase of a firm by an outside individual, another firm, or the incumbent management using large amounts of debt to finance the purchase. Most often, LBOs are undertaken by private equity 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 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 that 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. Exits can come from an initial public offering (IPO), sale to a strategic buyer or another PE fund (secondary LBO), or a recapitalization. If the sponsor is unable to exit or is delayed in exiting the investment, it has a negative effect on investor returns.

The target firm for an LBO can be a free-standing private or public company or a division of a company. In a study of over 17,000 LBOs from 1970 through June 30, 2007, Kaplan and Strömberg (2008) found that 23% of buyouts involved private independent firms, 27% public firms, and 30% divisions of companies. Within these overall percentages, however, there are periods in which certain types of buyouts become more prevalent. For example, public to private buyouts were the most frequent type of buyout during 1985–89 (49%), before almost disappearing during 1990–94 (9%), and then growing gradually to comprise 34% of buyouts during 2005–06/07. As might be expected, buyouts of public companies typically are larger deals and therefore require more favorable credit market conditions to execute. **Exhibit 1** shows the number of buyouts by private equity firms from 2000 to 2009. The number of \$1 billion-plus deals peaked at 94 in 2007 and fell to 17 in 2009, following the credit contraction that began with the financial crisis in 2008. By comparison, middle-market deals, defined as those with disclosed transaction values below \$1 billion, are the most frequent type of buyout.¹ Middle-market deals are the “lifeblood” of private equity and sustain the industry throughout its boom and bust periods.

Increasingly the LBO market is global in nature. In the early years, the United States and Canada dominated LBO activity. For example, in 1985–89, buyouts of U.S. and Canadian firms accounted for 87% of LBOs; this percentage declined to 47% by 2005–06/07. Over the same periods, buyouts of UK firms grew from 7% to 15% of the market, and buyouts of firms located in Western Europe grew from 3% to 30% of the market (Kaplan and Strömberg, 2008).

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.²

¹ Middle-market deals are also defined by the level of EBITDA associated with a transaction. EBITDA is earnings before interest, taxes, and depreciation and amortization. An oft-cited definition of middle-market buyouts is that they comprise transactions with less than \$50 million in EBITDA. This definition comports with widely reported statistics for credit and debt conditions provided by Standard & Poor’s Leveraged Commentary & Data (LCD) unit.

² 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.

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 2** 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 the senior issues 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. In the case where 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 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 covenants (e.g., maintenance covenants) than those required for subordinated debt.³ On the other hand, an advantage, particularly of bank debt, is that it typically does not involve prepayment penalties and allows sponsors to pay down the debt if there are sufficient earnings to do so. Beginning in 2004–05, there has been growth in second lien debt (SLD), which has replaced some unsecured and subordinated debt in LBO capital structures.⁴ Senior subordinated debt in the form of loans is frequently provided by commercial banks, insurance companies, and leasing companies.

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 often takes the form of high-yield (HY) bonds. HY bonds typically have less restrictive "incurrence" covenants compared with "maintenance" covenants in senior debt. Incurrence covenants provide that a borrower can incur debt so long as some chosen financial ratio is below a stated level (e.g., debt cannot exceed $5 \times$ EBITDA). Importantly, under this type of covenant, the firm's capacity to take on additional debt increases as EBITDA grows. Further, HY bonds are non-amortizing (i.e., have bullet amortization), which frees cash for other uses but can make it more difficult to repay the debt before maturity. HY bonds are purchased by pension funds, insurance companies, and other institutional investors. Subordinated debt can also be provided by PE firms specializing in mezzanine financing. Mezzanine financing is

³ An exception to this occurred in 2007, when the competition for LBO loans led banks to forgo interest coverage and asset coverage covenants. As reported by Fitch, close to 15% of all leveraged loans in May 2007 were "covenant-lite," up from virtually 0% a year earlier.

⁴ 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 do not amortize.

customized to a particular deal and is typically more costly to arrange than HY debt. As such, the demand for it typically varies inversely with the availability of bank and HY debt.

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.

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

<ul style="list-style-type: none"> • Ease of repayment Loans are generally prepayable anytime at par. Bonds are non-callable 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). ⇒ <i>Loans typically have greater ease of repayment than bonds.</i>
<ul style="list-style-type: none"> • 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). ⇒ <i>Bonds impose fewer restrictions on operations, and it is typically easier to take on additional debt with bonds.</i>
<ul style="list-style-type: none"> • 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. ⇒ <i>The use of bonds may facilitate more leverage overall than funding with loans alone. Larger deals are likely to make use of bond financing.</i>
<ul style="list-style-type: none"> • Extent of disclosure and reporting requirements Bank debt and loans are private instruments that are not subject to the U.S. Securities and Exchange Commission (SEC) reporting requirements. HY debt is typically issued to Qualified Institutional Buyers in the Rule 144A market. Virtually all domestically issued HY bonds are simultaneously registered with the SEC, and upon effectiveness of the registration statement, 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 the LBO is financed with HY bonds, it faces similar periodic reporting requirements to those of a public company. ⇒ <i>All else equal, the disclosure requirements (cost savings of being private) are higher (lower) for LBOs financed with HY bonds than those financed only with loans.</i>

Source: Created by case writer.

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 debt-to-EBITDA multiples. As shown in **Exhibit 3**, the average total debt-to-EBITDA ratio for U.S. buyouts ranged from a high of 6.2× EBITDA in 2007 to a low of 4.0× EBITDA in 2009, following the collapse of Lehman Brothers in September 2008. A similar pattern is observed for the debt

multiples of European buyouts. Depending on the measure, total debt can be broken into secured debt (first lien or bank debt) and subordinated debt (or SLD). For example, in 2007, total debt of 6.2× was made up of 5.2× bank debt and 1.1× subordinated debt. The multiples refer to *turns* of EBITDA and imply that an LBO with \$50 million in pro forma EBITDA was financed on average with \$310 million in total debt (6.2 × \$50 million), of which \$255 million was bank debt (5.1 × \$50 million) and \$55 million was subordinated debt (1.1 × \$50 million). In all years, secured forms of debt accounted 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 consideration in sizing up the attractiveness of an LBO target.

Equity financing provides the remaining funds for a buyout. As seen in **Exhibit 4**, the average equity contribution has ranged from a low of 32% to over 50% from 2000 to 2009. The percentage equity contribution averaged 39.7% for both U.S. and European buyouts. All else equal, as the sponsor's equity contribution increases, the returns to private equity investment decrease. The average equity contribution includes equity contributed by PE firms 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 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.

Purchase price multiples (PPMs) measure the price or cost of acquiring target companies and the willingness of sponsors to pay for future earnings. As seen in **Exhibit 5**, over the period 2000 to 2009, PPMs for U.S. buyouts ranged from a low of 6.1× EBITDA in 2001 to a high of 9.8× EBITDA in 2007. PPMs for European buyouts are similar. The average PPM was approximately 8.0× EBITDA for both U.S. and European buyouts from 2000 to 2009. Not surprisingly, PPMs increase as debt-to-EBITDA multiples reach their highest levels in 2007, because greater availability of debt financing facilitates a sponsor's ability to bid higher.⁵

Over the period 2000 to 2009, the markets experienced some pronounced ups and downs. **Table 2** maps the earlier-discussed LBO metrics to periods defined by important economic events. Comparing the cold market period of 2001–02 following the dot-com collapse and the terrorist attacks of September 11, 2001, to the post-Lehman Brothers period after September 2008, one observes that the latter period was characterized by higher PPMs, substantially higher equity contributions, and higher basis point spreads (bps) over the London Interbank Offered Rate (LIBOR, or L). This period is described as “ice cold” because all the metrics combined suggest a climate in which it was extremely difficult to produce favorable PE returns. By comparison, in the hot market period from 2006 to the first half of 2007, PPMs increased to

⁵ Several studies examine how the availability and cost of financing affects LBOs. Axelson, Jenkinson, Strömberg, and Weisbach (2009) find that LBO capital structures are most strongly related to prevailing debt market conditions at the time of the buyout. Leverage decreases as interest rates rise. Similarly, Ljungqvist, Richardson, and Wolfenzon (2007) find that low interest rates result in an increased pace of investment by PE funds.

almost 9× EBITDA, but the total debt-to-EBITDA multiples averaged 6×, and the equity contribution decreased to 33%. Here, although PPMs were high, the debt markets provided a high level of lower-cost funding that facilitated a reduction in equity.

Table 2. LBO deal metrics in different market environments.

	2001–02	2003–04	2006–06/07	07/2007–8/08	9/2008–09
Market tone	Cold	Recovering	Hot	Lukewarm	Ice Cold
	Dot-com bust, Sept 11			Pre-Lehman	Post-Lehman
PPM	6.12×	7.47×	8.91×	9.08×	7.91×
FLD/EBITDA	2.60×	3.08×	4.09×	3.78×	2.83×
Debt/EBITDA	4.01×	5.05×	6.01×	5.71×	3.52×
Equity	37%	33%	33%	40%	47%
All in spread	L + 387 bps	L + 282 bps	L + 254 bps	L + 513 bps	L + 626 bps

Data source: S&P LCD, Loan Syndications and Trading Association (LSTA).

Since the end of 2009, the LBO market has begun to gradually recover. In the first quarter of 2010, the average FLD/EBITDA and total debt/EBITDA ratios rose to 3.3× and 4.8×, respectively, suggesting some easing in the debt markets. On the other hand, the average sponsor contribution remained high at 48%, and PPMs increased to 9.0× EBITDA. Although this suggests an improved outlook for LBO activity, it remains a challenging environment by historic standards.

Value Drivers in an LBO

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

1. Paying down debt, also known as deleveraging

For a given enterprise value, as debt is repaid, equity value increases. In a highly leveraged company, a relatively small increase in the company's enterprise value can lead to a substantial increase in the value of its equity. High leverage, however, is a double-edged sword, and a relatively small decline in enterprise value can also severely reduce the value of equity. Moreover, high interest charges can increase the risk of default by the company.

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 forcefully articulated by Jensen (1986), LBO transactions push firms to operate with more focused strategic goals and to achieve better results for shareholders. 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.

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. For U.S. buyouts, Kaplan and Strömberg (2008) find the CEO receives a median 5.4% of the equity (stock and options) and the management team 16% of the equity. Similar stakes are observed for UK buyouts where CEOs obtain 3% and the management team 15% of the equity.⁶ 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. For example, suppose the pre-buyout firm had a beta of 1 and was all-equity financed. If the post-buyout firm is 60% debt financed, the resulting equity beta increases to 2.5.⁷ Thus, as a residual risk holder, a manager's wealth is exposed to a much greater degree to both upside and downside swings in performance compared with the pre-buyout 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)

Private equity funds typically have a 10-year life, so sponsors ideally seek to invest and exit a target company within that time frame. The PPMs shown in **Exhibit 5** exhibit substantial variation over time, from 6× to 10× EBITDA, and for secondary LBOs, 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. Apart from the exit multiple, the time to exit can also have an important influence on returns. Kaplan and Strömberg (2008) find that an exit occurs for 12% of buyouts within 2 years of deal closing, for 42% of buyouts within 5 years, and for 76% of buyouts within 10 years. Their results imply that 24% of buyouts fail to achieve an exit after 10 years, which makes it unlikely that an exit will ever occur.

⁶ Kaplan and Strömberg's 2008 findings are for 43 U.S. LBOs from 1996 to 2004. Acharya and Kehoe (2008) examine 59 large UK buyouts from 1997 to 2004.

⁷ 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. At extremely high levels of leverage (e.g., 80% to 90%), the debt takes on equity-like characteristics, and the beta of debt in these circumstances is not zero.

From a historical perspective, the buyouts conducted in the 1980s featured much higher levels of leverage (80% to 90%) than those completed in the past decade (60% to 70%). As a result, in more recent buyouts, sponsors have had to generate larger operating improvements to realize appropriate returns from buyouts. A survey of general partners found for buyouts completed from 1986 to 1990 that 41% of average buyout returns were accounted for by financial leverage and 34% by operating improvements. By comparison, for buyouts completed from 1996 to 2000, financial leverage accounted for 24% and operating improvements for 43% of average buyout returns.⁸ The recent constrained borrowing environment suggests that operating improvements will likely remain an important ingredient of LBO returns going forward.

Valuing an LBO

Having reviewed some of the financial issues and motivations behind LBOs, in this section, we turn 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, management quality/need, etc.).
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.

Private equity 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. Generally speaking, the due diligence attempts to gain insight on a broad range of issues, including but not limited to those in **Table 3**.

⁸ “General Partner Survey,” *Asset Alternatives*, 2001.

Table 3. Issues considered as part of due diligence.

Firm Characteristics	Industry Characteristics
<ul style="list-style-type: none"> • Predictability and consistency of cash flows (key to credit quality) • Achievability of projections • Depth and quality of management • Future capital expenditures (important to assessing future cash needs for growth) • Growth capability given leverage constraints • Operational flexibility in downturn 	<ul style="list-style-type: none"> • Industry growth trends • Impact of outside threats on industry’s long-term performance (impact of regulation, taxes, and innovation) • Competitive threats from rivals (durability of margins) • Other successful LBOs in the industry (benchmarking on purchase price, leverage, etc.)

Source: Created by case writer.

An LBO model is similar in many respects to a standalone discounted cash flow (DCF) model. There are, however, several important differences. First, most companies do not make extensive use of leverage, and several adjustments to the basic DCF model are required to account for the substantially higher leverage that results in an LBO. Second, DCF analysis is often undertaken to ascertain the intrinsic value of a company, which is 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 than whether a target can meet its particular return requirements, which will depend to a large extent on the purchase price. Compared to intrinsic value, a PPM reflects market value at a point in time. Likewise, a target firm considering whether to accept a sponsor’s offer conducts a similar analysis to develop a range of possible purchase prices for negotiation.

The steps involved in developing an LBO model are applied to NewCo in **Exhibits 6 to 9**.⁹ Consider a proposed LBO for NewCo, which is bought for \$1,250 million (net of cash) and is financed by \$500 million in senior bank debt, \$350 million in subordinated notes, \$400 million in equity, and \$75 million in cash on hand. As shown in **Exhibit 6**, there is a strong link in LBOs between the purchase price and the proposed financing for a deal. The purchase price primarily reflects the amount of funds paid to the firm’s existing shareholders and in some instances to retire outstanding debt (or other securities). Here, the sources of funds used to finance NewCo equal the uses of funds, which go to repurchase \$985 million in existing equity, pay off \$300 million of existing debt, and to pay \$40 million in fees and expenses of the transaction.¹⁰ The main links between sources and uses and the pro forma balance sheet are as follows:

⁹ For a more detailed treatment of constructing LBO models and a useful overall reference on deal structuring and valuation, see Rosenbaum and Pearl (2009).

¹⁰ In our example, we assume that NewCo is a private company. LBOs of public companies typically require that a premium over its current share price be paid to public shareholders, and following the transaction, the target firm’s shares cease to trade publicly in the equity markets. To determine the funds needed to repurchase existing equity for a public company, we multiply the LBO offer price by the number of fully diluted shares outstanding.

1. Goodwill of \$200 million arises from the difference between the equity purchase price of \$985 million and \$785 million in book value of existing equity.
2. The existing \$300 million term loan is paid off and replaced by \$500 million in senior bank debt and \$350 million in subordinated notes.
3. Existing equity of \$785 million is extinguished and replaced with sponsors' equity. NewCo's equity is \$400 million less \$40 million in fees and expenses.¹¹ Although the sponsors contribute \$400 million in equity to the deal, only \$360 million accrues to NewCo's shareholders' equity account; the rest goes to pay investment banking fees and other expenses of the deal.

On balance, the changes brought about by the LBO increase NewCo's debt by \$550 million and reduce its equity by \$425 million. As a result, ignoring cash, leverage increases from 26% before the buyout (\$300 million ÷ \$1,166.7 million) to 66% after the buyout (\$850 million ÷ \$1,291.7 million). From the information above, we can also determine the *enterprise value* of the transaction. The enterprise value for the deal is \$1,210 million—the sum of repurchased equity (\$985 million) and existing net debt (\$225 million = \$300 million less \$75 million in cash) or the sum of pro forma shareholders' equity (\$360 million) and \$850 million in new debt. Assuming \$131.3 million in EBITDA in Year 0, the *entry enterprise multiple* for NewCo is approximately 9.2× EBITDA.

To capture the sponsors' perspective, the cash flows used to evaluate an LBO are typically *after-financing* 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 commitments promised to debt holders are paid (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 *pre-financing* cash flows that accrue to 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 4**. Interest expense for RCFs includes cash and non-cash interest expense. Non-cash 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, non-cash interest expense (or other non-cash charges) must be added back to determine cash flow.¹² As seen in **Table 4**, the main differences between the cash flows concern the treatment of financial charges, and otherwise, the deductions for capital expenditures and increases in net working capital are common to both approaches.

¹¹ We assume for simplicity in our example that all the fees and expenses are immediately expensed for the deal. Certain fees associated with financing are typically deferred and amortized over the life of the instrument. The amortization of financing fees is a non-cash charge for the company.

¹² PIK debt, sometimes called accreting debt, adds the non-cash 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 that a tax benefit arises from the deductibility of a non-cash expense. Another non-cash charge that can arise is from amortizing the financing costs associated with the deal.

Table 4. Comparison of components between FCFs and RCFs.

Free Cash Flow (FCF) to Total Capital	Residual Cash Flow (RCF) to Equity
EBIT $\times (1 - T)$, where T is the firm's marginal cash tax rate	(EBIT – Interest expense) $\times (1 - T)$ = Net income
	Less: Principal payments (Amortization)
<i>Items common to both:</i> Plus: Depreciation and Amortization (D&A) Plus: Other non-cash charges (e.g., PIK interest) Less: Capital Expenditures (CapEx) Less: Increases in Net Working Capital (NWC)	

Source: Created by case writer.

RCFs generated by the target can be reinvested in the firm, paid out to sponsors as a dividend (or escrowed in a cash account for later distribution or use), or used to pay down the debt. Because debt repayment is an important means by which sponsors can augment returns, RCFs are often used to repay the LBO debt. In the following discussion, all interest is assumed to be cash interest. When the sponsors intend to use the RCFs to pay down debt, the expression in **Table 4** is rewritten to leave out principal payments (**Equation 1**):

$$\text{Cash available to pay down debt} = \text{Net income} + \text{D\&A} - \text{CapEx} - \text{Increase in NWC} \quad (1)$$

Recognizing that the only difference between EBIT and Net income is after-tax interest expense, we can also derive the cash available to pay down debt from FCFs (**Equation 2**):

$$\text{Cash available to pay down debt} = \text{FCF} - \text{Interest expense} \times (1 - T) \quad (2)$$

Both approaches to obtaining the cash available for debt repayment are illustrated in **Exhibit 7**. After making the necessary payments to support operations and pay interest, the remaining cash is available for sponsors to use for debt retirement.

Returning to our example in **Exhibit 7**, the analysis begins with a forecast of the cash flows for NewCo after the LBO. Since an LBO sponsor typically wishes to exit within 5 years, the forecast period in an LBO model is usually assumed to be 5 years. These forecasts include the ways sponsors perceive they can add value. For example, the main areas of synergy for NewCo are growth in sales from 3% per annum before the buyout to 5% per annum after the buyout and gradual improvement in EBIT margin from 15% pre-buyout to 24% by the end of Year 5. The improvement in EBIT margins comes from production efficiencies that reduce cost of goods sold (COGS) and efficiencies in overhead and marketing expenses that reduce selling, general, and administrative expense (SG&A), both as a percentage of sales.

Our next step is to incorporate the LBO debt structure and estimate the new interest expense and principal payments. **Exhibit 8** shows the details of these calculations. Interest expense generated from the debt feeds back to the cash flows in **Exhibit 7** through its effect on net income. In our example, the senior bank debt is assumed to pay fixed interest of 8% annually

and the subordinated notes fixed interest of 10% annually. By comparison, if these were floating-rate notes, they would typically pay a fixed basis point spread (bps) over LIBOR (e.g., LIBOR + 500) or some other benchmark rate. In addition, the senior bank debt is assumed to carry mandatory amortization of 3% of the face value of the debt per year (i.e., \$15 million per annum), and any remaining cash flows after that can be used for optional debt repayment. Because the subordinated notes have bullet amortization, they do not provide an opportunity to pay off the notes before maturity.

From the cash flows in **Exhibit 7**, in Year 1, we see there is \$34.9 million in cash available to pay down debt. 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 \$24.9 million for debt repayment in Year 1. Of this, \$15 million is used for mandatory amortization, and \$9.9 million is used for optional debt repayment.

Interest expense for the senior bank debt is based on the average amount of debt outstanding at the beginning and end of the year to represent that some debt is usually paid off during the year. Senior bank debt generates \$39 million in interest expense ($8\% \times (\$500 \text{ million} + \$475 \text{ million} \div 2)$), and the subordinated notes generate \$35 million in interest expense, for a total interest expense of \$74 million in Year 1.¹³ Net interest expense in Year 1 is shown in **Exhibit 7** as \$73.9 million because the \$10 million in cash is assumed to earn 3% annually in interest income on the average maintained cash balance.¹⁴ The debt schedule is built for the remaining years in an analogous manner to that described for Year 1. When completed, we see that the cash generated from NewCo is projected to pay down the total debt from \$850 million at the outset of the transaction to \$529.9 million in Year 5, a 37.7% reduction. Although this may seem like a satisfactory amount of debt payoff, under normal circumstances, most sponsors would typically seek to pay off at least half the debt in a 5-year time frame.

The final task of the analysis is to estimate a terminal value for the company and equity. The terminal value of the company is typically estimated using a multiple of EBITDA. In our case, we have used the entry multiple for NewCo as a base case for the exit multiple. The entry multiple is frequently used as a base case to ensure that the returns are not arbitrarily high as a result of projecting a higher multiple at exit than entry (i.e., multiple arbitrage). Multiples are based on prevailing 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. In the case of NewCo, the entry multiple of $9.2\times$ EBITDA is high by

¹³ To avoid creating a circular reference between the ending debt balance and interest expense, one can also assume for simplicity that interest is paid on the full amount outstanding at the beginning of the year. In this case, senior bank debt generates \$40 million in interest expense ($8\% \times \$500 \text{ million}$), and the subordinated notes \$35 million in interest expense ($10\% \times \$350 \text{ million}$) in Year 1 for total interest expense of \$75 million in Year 1. The resulting difference in interest expense from using averages is small.

¹⁴ In Year 1, interest income is \$0.15 million because the beginning cash balance is zero ($3\% \times (\$0 + \$10 \text{ million} \div 2)$); in Years 2 to 5, it is \$0.30 million. For simplicity, one can also assume a zero cash balance. Although it may seem unrealistic to assume a zero cash balance, it is a frequently used modeling assumption because the amount earned in interest income is not a major driver of the results.

historical standards, and one would want to allow for the possibility of multiple contraction in gauging the strength of returns.

As shown in **Exhibit 9**, if NewCo is able to exit at $9.2\times$ EBITDA, the resulting company or enterprise value for the transaction is \$1,976.7 million ($\$214.4 \text{ million} \times 9.2$). To derive the terminal equity value that accrues to the sponsors, the remaining net debt in Year 5 must be subtracted from enterprise value. After deducting \$529.9 million in debt and adding \$10 million in cash, the resulting terminal equity exit value is \$1,456.8 million.

Using the above information, we can calculate the expected IRR for the sponsors. In our example, the sponsors are assumed to own 100% of the equity. Consequently, its investment of \$400 million in Year 0 and terminal cash flow in Year 5 results in an IRR of 29.9%. Note that because all the interim cash flows were used to pay down debt, no interim cash flows accrue to the sponsors in Years 1 to 4. Another metric used by sponsors to evaluate the success of a deal is the cash-on-cash return (CoC). CoC is calculated as the terminal equity exit value divided by the initial equity investment and is expressed as a multiple. In NewCo's case, CoC is $3.6\times$ ($\$1,456.8 \div \400 million). Unlike IRR, CoC does not account for the time value of money. Given the risks associated with high leverage, sponsors typically have high hurdle or target rates (minimum required IRRs) of around 25% and target CoCs of $2.0\times$ to $4.0\times$, 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, the base-case analysis for NewCo suggests it is likely to meet the sponsors' return thresholds.

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 ($\$1,250 \text{ million} = \$400 \text{ million in equity} + \$850 \text{ million in debt}$). On an unlevered basis, the FCFs in Years 1 to 5 and the terminal enterprise value in Year 5 of \$1,976.7 million accrue to the sponsors. The expected unlevered IRR is 16.7%, and thus the increase in the expected equity return to 29.9% arises from the use of leverage.

Because the analysis is conducted to help assess the strength of returns for a transaction, sponsors do extensive sensitivity analysis and stress testing with the LBO model. 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. Because the entry multiple was high at $9.2\times$ EBITDA, the sensitivity analysis is constructed to assess the adequacy of returns allowing for possible multiple contraction. Only one sensitivity examines exiting at a higher multiple (i.e., $10\times$ EBITDA); the rest look at selling at lower multiples. For example, if the exit multiple falls to $8\times$ EBITDA (the average PPM for deals over 2000–09) and the Year 5 EBITDA is reduced by 10% from \$214.4 million to \$193.0 million, the expected IRR falls to 20.7%, and the deal begins to look more marginal in terms of its return profile. The sponsors undoubtedly will explore a number of other sensitivities to gain greater comfort with the risk 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 pre-financing cash flows, whereas the RCF approach is based on after-financing cash flows. As a consequence, the WACC method yields an estimate of enterprise value, 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 (Graham and Harvey, 2001). 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.¹⁵ APV also yields an estimate of enterprise value but discounts the FCFs at the unlevered cost of equity and adds any resulting tax benefits separately. Conceptually, enterprise value (EV) is derived under each method by finding the present value of the projected cash flows over the life of the firm from period t to N as shown below:

$$\text{WACC method: } \sum_{t=1}^N \frac{FCF_t}{(1 + (\frac{D}{V} \times k_d (1-T) + \frac{E}{V} \times k_e))^t} \quad (3)$$

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 (**Equation 3**).

$$\text{APV method: } \sum_{t=1}^N \frac{FCF_t}{(1+k_u)^t} + \sum_{t=1}^N \frac{T \times INT_t}{(1+k_d)^t} \quad (4)$$

where k_u is the unlevered cost of equity and $T \times INT$ is the interest tax shield (**Equation 4**). 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 (the present value 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 payment also decreases. Hence APV focuses on the *amount of debt* compared to the WACC method, which assumes a constant target leverage ratio. The frequently observed payoff of debt in LBOs lends itself to APV as a valuation method.

¹⁵ For a fuller description of APV, see Brealey, Myers, and Allen (2006). For fuller treatment of the RCF approach, see Conroy and Harris, "Using the Equity Residual Approach to Valuation: An Example (Abridged)," UVA-F-1609 (Charlottesville, VA: Darden Business Publishing, 2009).

On the other hand, sponsors who are most concerned about whether the deal meets their return requirements avoid the issue of the discount rate and 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. An IRR is a measure of the *expected profitability* embedded in the RCFs, and a hurdle rate is the *standard* by which profitability is judged. Using this approach, the sponsors' target rates must appropriately adjust for the risk of the deal. The high target rates of 25% to 30% that sponsors hope to achieve are a reflection of the high risk of the deals, the illiquid nature of the investments, and compensation for their efforts and expertise. In actuality, the evidence suggests that their realized returns are considerably below this level (Kaplan and Schoar, 2005). Because sponsors are equity holders, their expected rates of return should be considerably higher than WACC or k_u . Returning to our earlier example, an all-equity-financed firm with a beta of 1 that undergoes a 60% debt-financed buyout will experience an increase in beta to 2.5. This implies an increase in the cost of equity from 10% before the buyout to 19% after the buyout.¹⁶ At 70% debt financing, the cost of equity increases to 24%—suggesting that target rates of 25% are close to market-adjusted rates and may not be unreasonably high given the high leverage of the deals.¹⁷

Yet it is fair to say that sponsors' target rates are “sticky” and are not adjusted as much or as frequently as market rates, which measure the opportunity cost of deploying capital to similar risk investments. Sponsors under pressure to deploy capital sometimes reduce their target rates in periods of intense competition to win deals. But periods of intense competition for deals 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% to 30% 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 are more 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 private equity firms to evaluate deals. The issues presented by buyouts require analysts to be knowledgeable about the many forms of financing, the trends in capital markets, and the basic concepts of valuation, which present a formidable challenge. This note serves as a useful foundation upon which students can continue to build their skills in this growing area of corporate finance.

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%.

¹⁷ The risk-adjusted rate reflects the leverage at initiation of the deal, and as debt is paid off, the beta and cost of equity decline.

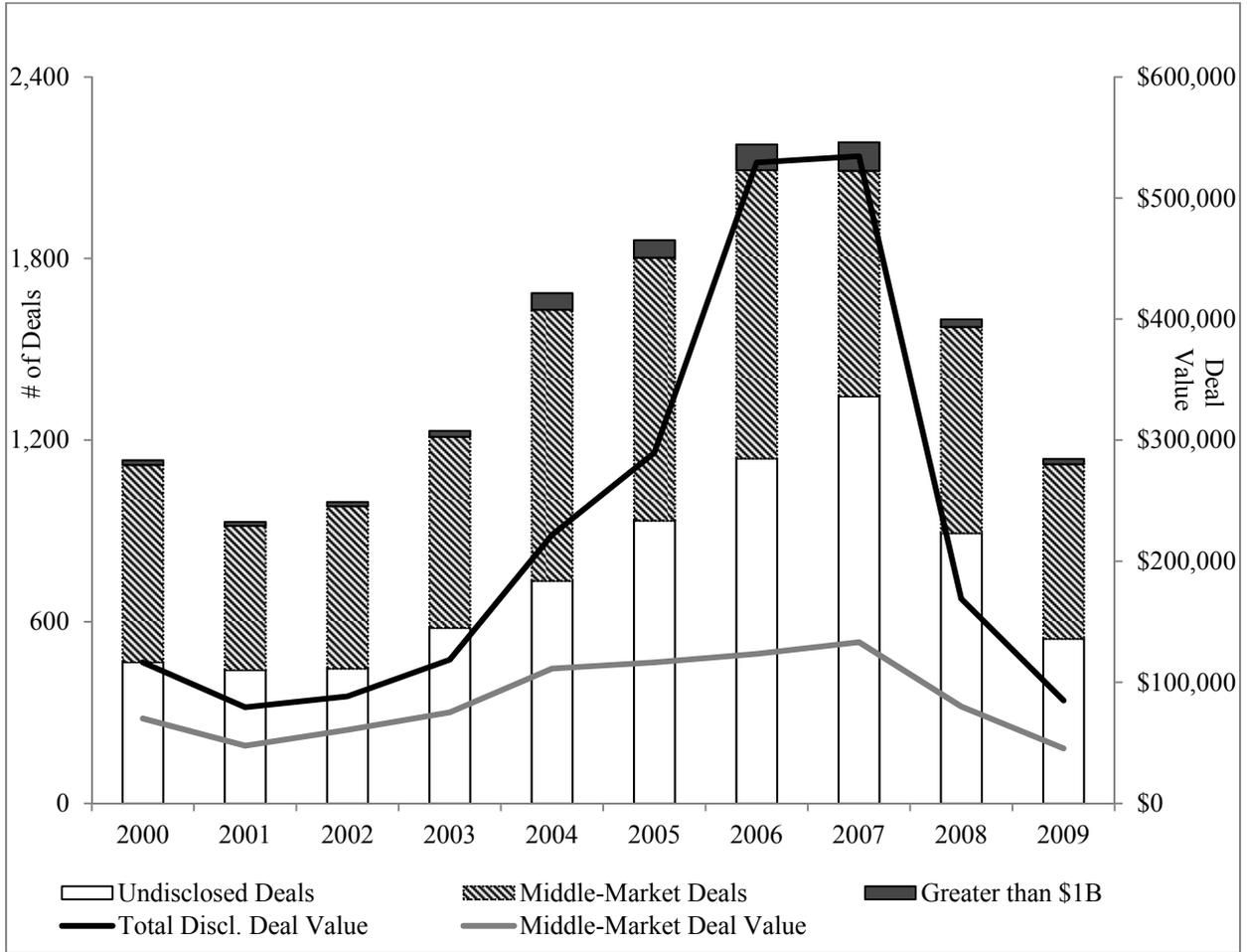
References

- Acharya, V. and C. Kehoe, “Corporate Governance and Value Creation: Evidence from Private Equity,” European Corporate Governance Institute, 2008, http://www.ecgi.org/competitions/rof/files/Acharya_Kehoe_v5.pdf.
- Axelson, U., T. Jenkinson, P. Strömberg, and M. Weisbach, “Why Are Buyouts Leveraged? The Financial Structure of Private Equity Funds,” *Journal of Finance* 64 (2009): 1,542–89.
- Brealey, R., S. Myers, and F. Allen, *Principles of Corporate Finance*, 8th ed. (Irving McGraw-Hill, 2006).
- Graham, J. and C. R. Harvey, “The Theory and Practice of Corporate Finance: Evidence from the Field,” *Journal of Financial Economics* 60 (2001): 187–243.
- Jensen, M., “Agency Costs of Free Cash Flow, Corporate Finance and Takeovers,” *American Economic Review* 76 (May 1986): 323–29.
- Kaplan, S. and S. Schoar, “Private Equity Returns: Persistence and Capital Flows,” *Journal of Finance* 60 (2005): 1,791–823.
- Kaplan, S. and P. Strömberg, “Leveraged Buyouts and Private Equity,” *Journal of Economic Perspectives* 22, no. 4 (2008).
- Ljungqvist, A., M. Richardson, and D. Wolfenzon, “The Investment Behavior of Buyout Funds: Theory and Evidence,” NYU working paper, June 2007.
- Rosenbaum, J. and J. Pearl, *Investment Banking: Valuation, Leveraged Buyouts, and Mergers & Acquisitions* (Hoboken, NJ: J. Wiley & Sons, 2009).

Exhibit 1

VALUATION OF LATE-STAGE COMPANIES AND BUYOUTS

U.S. Total Private Equity Activity



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Greater than \$1B	16	13	14	20	55	58	85	94	25	17
Middle-Market Deals	651	476	536	631	895	868	952	745	681	577
Undisclosed Deals	<u>467</u>	<u>441</u>	<u>446</u>	<u>580</u>	<u>736</u>	<u>935</u>	<u>1,140</u>	<u>1,345</u>	<u>893</u>	<u>544</u>
Total Deals	1,134	930	996	1,231	1,686	1,861	2,177	2,184	1,599	1,138

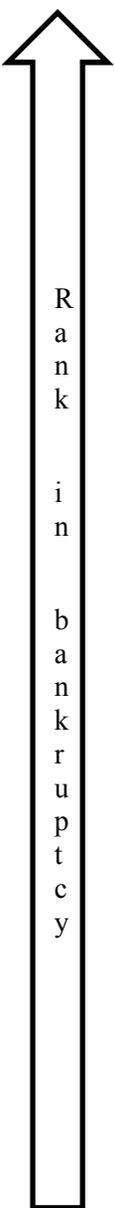
The chart shows the number of deals and the total disclosed deal value of all deals and middle-market deals. Middle-market deals are defined as deals less than \$1 billion in size. Undisclosed deals are deals without a disclosed deal size.

Data source: Standard & Poor's LCD.

Exhibit 2

VALUATION OF LATE-STAGE COMPANIES AND BUYOUTS

Selection and Mix of Primary LBO Capital Sources

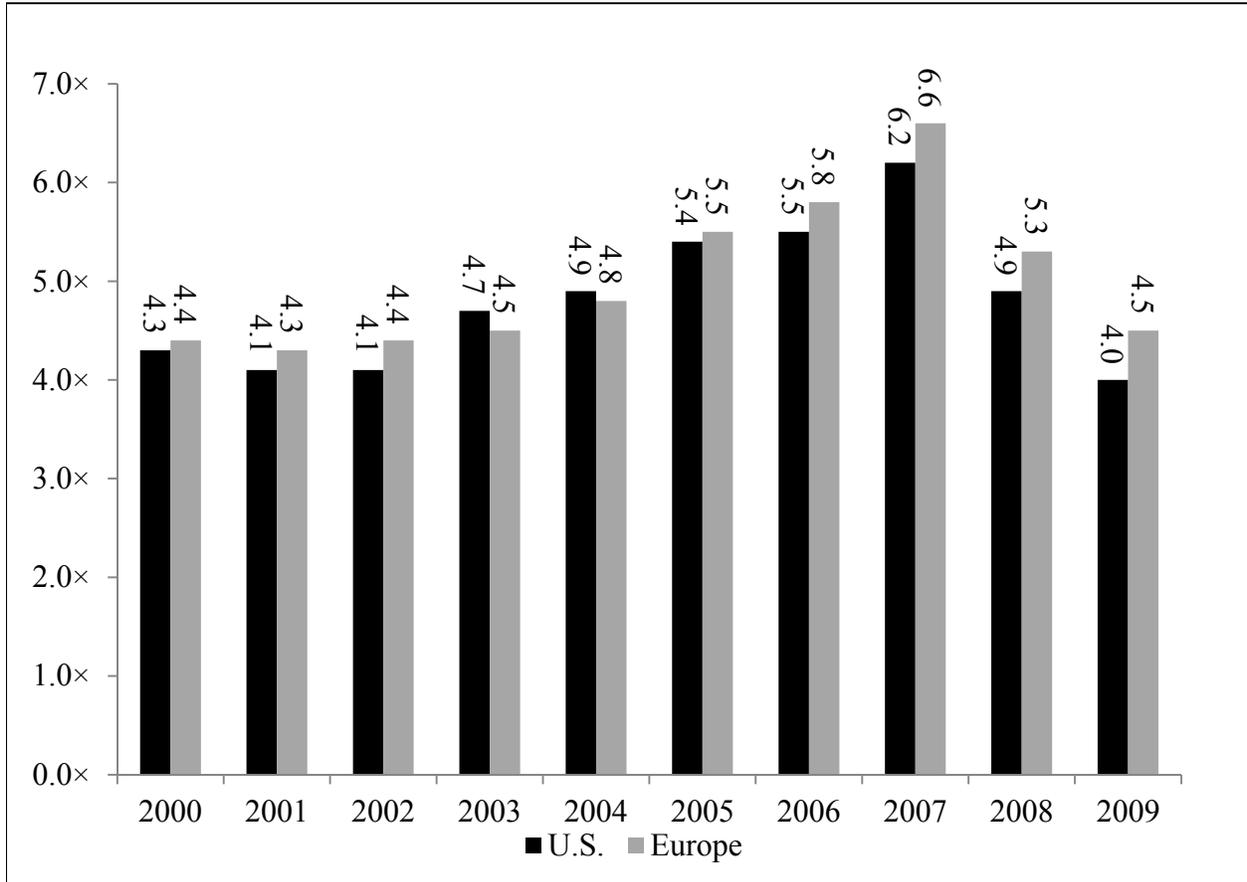
	Type of Capital	Key Features
 <p>R a n k i n b a n k r u p t c y</p>	Senior Debt Revolver	Drawn as needed; secured by first lien
	Term Loan (TL) A	Funded at closing; secured by first lien; amortizing 5- to 6-year tenor; carry maintenance covenants: total debt < MAX×, FLD < MAX×, interest coverage > MIN×
	Term Loan B, C, D	Institutional term loans; typically larger than TLAs; 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 TLAs 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; non-amortizing (bullet repayment); tenor 7–12 years, do not carry maintenance covenants; typically non-callable 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: Created by case writer.

Exhibit 3

VALUATION OF LATE-STAGE COMPANIES AND BUYOUTS

Average Total Debt-to-Pro Forma EBITDA Multiple



Average debt-to-EBITDA ratio (U.S.) 4.8×
Average debt-to-EBITDA ratio (Europe) 5.0×

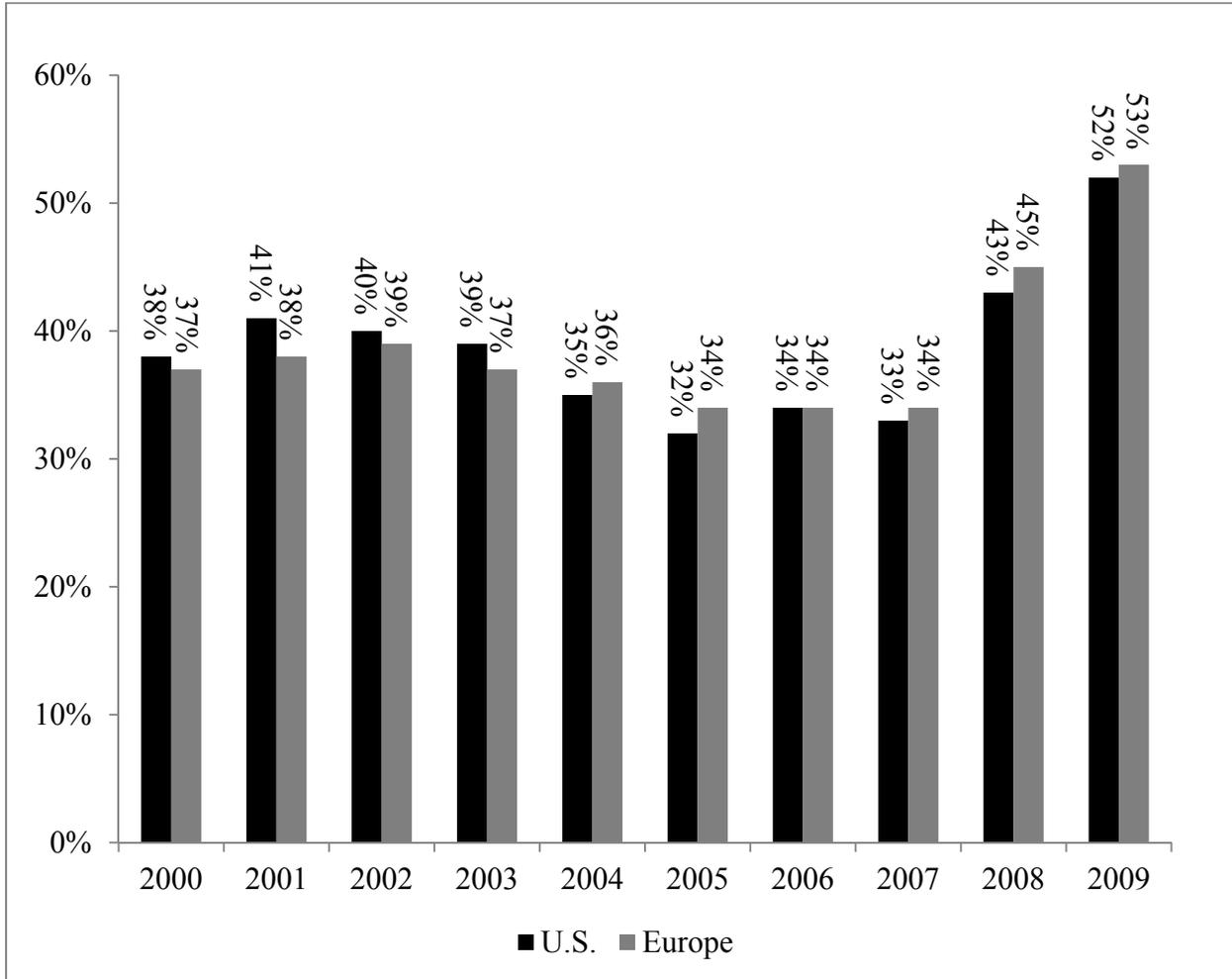
The credit statistics are for deals with greater than \$50 million (U.S.) or (euros) EUR50 million (Europe) in EBITDA.

Data source: Standard & Poor's LCD, LSTA.

Exhibit 4

VALUATION OF LATE-STAGE COMPANIES AND BUYOUTS

Average Equity Contribution (Including Rollover Equity)



Average equity contribution (U.S.) 39.7%
Average equity contribution (Europe) 39.7%

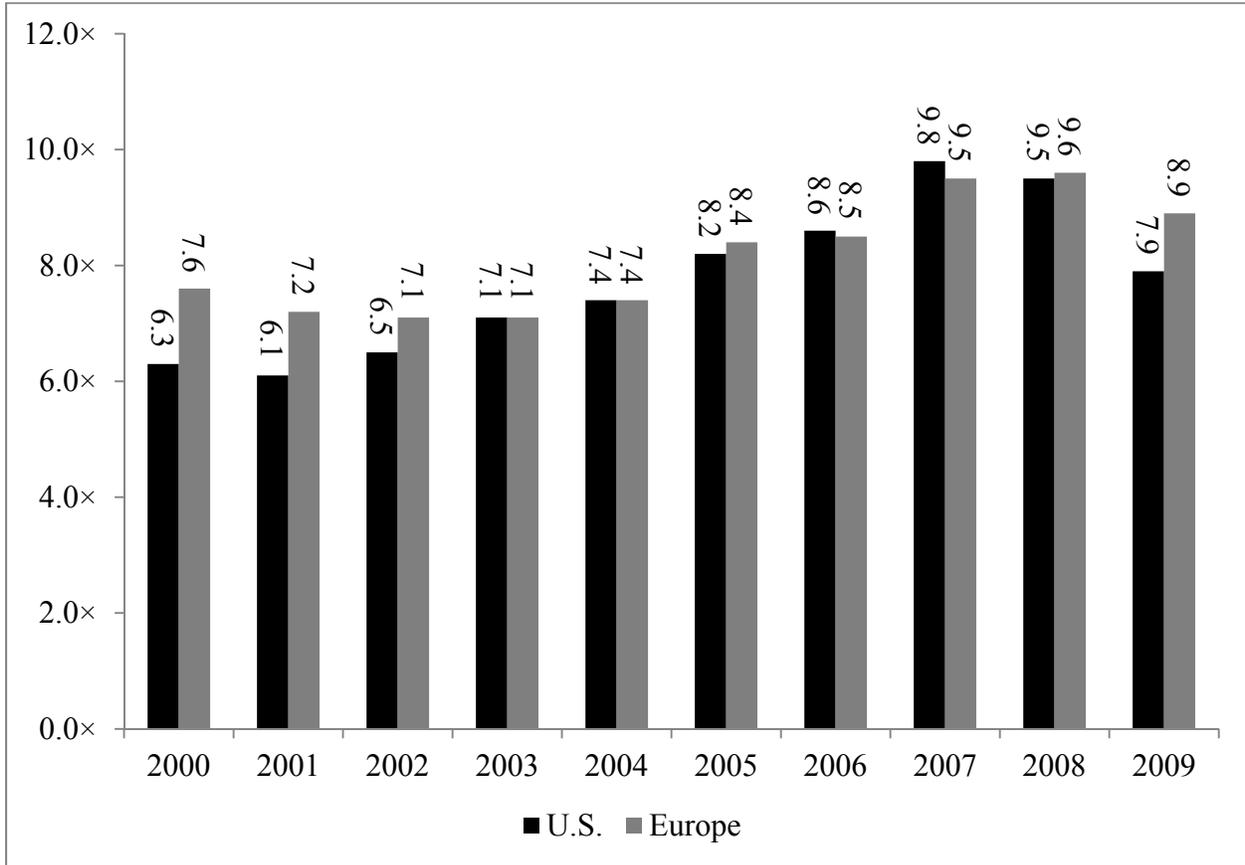
The credit statistics are for deals with greater than \$50 million (U.S.) or EUR50 million (Europe) in EBITDA.

Data source: Standard & Poor's LCD, LSTA.

Exhibit 5

VALUATION OF LATE-STAGE COMPANIES AND BUYOUTS

Average Purchase Price Multiple of Pro Forma Trailing EBITDA



Average PPM (U.S.) 7.7×
Average PPM (Europe) 8.1×

The credit statistics are for deals with greater than \$50 million (U.S.) or EUR50 million (Europe) in EBITDA.

Data source: Standard & Poor's LCD, LSTA.

Exhibit 6

VALUATION OF LATE-STAGE COMPANIES AND BUYOUTS

Sources and Uses for NewCo LBO
(in millions of U.S. dollars)

Sources		Uses	
Cash on hand	75	Repay existing term loan	300
Senior bank debt	500	Repurchase equity	985
Subordinated notes	350	Fees and expenses	40
Sponsors' equity	400		—
Total Sources	1,325	Total Uses	1,325

Pro Forma Balance Sheet

	Actual	Transaction Adjustments		Pro Forma
	Balance Sheet	(-)	(+)	Balance Sheet
<u>Assets</u>	0			0
Cash	75.0	(75.0)		0.0
Accounts receivable	14.4			14.4
Inventory	63.0			63.0
Other	94.3			94.3
Total Current Assets	246.7			171.7
Net PP&E	700.0			700.0
Goodwill ⁽¹⁾	220.0		200.0	420.0
Total Assets	1,166.7			1,291.7
<u>Liabilities & shareholders' equity</u>				
Accounts payable	41.7			41.7
Other	40.0			40.0
Total Current Liabilities	81.7			81.7
Existing term loan ⁽²⁾	300.0	(300.0)		—
Senior bank debt	—		500.0	500.0
Subordinated notes	—		350.0	350.0
Total Liabilities	381.7			931.7
Shareholders' equity ⁽³⁾	785.0	(785.0)	360.0	360.0
Total Liabilities & Equity	1,166.7			1,291.7

⁽¹⁾ Goodwill is equity purchase price (\$985 million) less the book value of equity (\$785 million).

⁽²⁾ Existing term loan is paid off and replaced by new LBO debt.

⁽³⁾ NewCo's existing equity of \$785 million is extinguished and replaced with sponsors' equity. Shareholders' equity is the sponsors' equity contribution of \$400 million less \$40 million in fees and expenses.

Source: Case writer estimates.

Exhibit 7

VALUATION OF LATE-STAGE COMPANIES AND BUYOUTSPro Forma Cash Flow Projections for NewCo LBO
(in millions of U.S. dollars)

	0	1	2	3	4	5
<u>Assumptions/Drivers</u>						
Revenue growth	3.0%	5.0%	5.0%	5.0%	5.0%	5.0%
EBIT margin	15.0%	19.0%	20.0%	22.0%	23.0%	24.0%
Depreciation and amortization (% of sales)	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Capital expenditures (% of sales)	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Income Statement						
Revenue	525.0	551.3	578.8	607.8	638.1	670.0
COGS		(325.2)	(335.7)	(346.4)	(357.4)	(368.5)
Gross profit		226.0	243.1	261.3	280.8	301.5
SG&A		(77.2)	(81.0)	(79.0)	(83.0)	(87.1)
EBITDA	131.3	148.8	162.1	182.3	197.8	214.4
Depreciation and amortization		(22.1)	(23.2)	(24.3)	(25.5)	(26.8)
EBIT		126.8	138.9	158.0	172.3	187.6
Net interest expense		(73.9)	(70.7)	(65.9)	(60.0)	(52.9)
Earnings before taxes		52.9	68.3	92.1	112.3	134.7
Taxes (35%)		(18.5)	(23.9)	(32.2)	(39.3)	(47.1)
Net income		34.4	44.4	59.9	73.0	87.5
Cash Flow Statement						
Net income		34.4	44.4	59.9	73.0	87.5
Plus: Depreciation and amortization		22.1	23.2	24.3	25.5	26.8
Less: Capital expenditures		(13.8)	(14.5)	(15.2)	(16.0)	(16.8)
Less: Increase in net working capital		(7.8)	(1.7)	(1.7)	(1.8)	(1.8)
(1) Cash available for debt paydown		34.9	51.4	67.3	80.8	95.7
FCF to total capital		82.9	97.3	110.1	119.8	130.2
Less: Net interest expense after tax		(48.0)	(45.9)	(42.8)	(39.0)	(34.4)
(2) Cash available for debt paydown		34.9	51.4	67.3	80.8	95.7

Source: Case writer estimates.

Exhibit 8

VALUATION OF LATE-STAGE COMPANIES AND BUYOUTSDebt Schedule for NewCo LBO
(in millions of U.S. dollars)

	0	1	2	3	4	5
Senior bank debt beginning balance		500.0	475.1	423.7	356.4	275.6
Mandatory amortization (3% of face value)		(15.0)	(15.0)	(15.0)	(15.0)	(15.0)
Optional amortization		(9.9)	(36.4)	(52.3)	(65.8)	(80.7)
Ending balance		475.1	423.7	356.4	275.6	179.9
Bank Debt Interest Expense	8% annually	39.0	36.0	31.2	25.3	18.2
Subordinated note beginning balance		350.0	350.0	350.0	350.0	350.0
Bullet amortization		—	—	—	—	—
Ending balance		350.0	350.0	350.0	350.0	350.0
Note Interest Expense	10% annually	35.0	35.0	35.0	35.0	35.0
Total Interest Expense		74.0	71.0	66.2	60.3	53.2
<u>Leverage Stats</u>						
Total debt	850.0	825.1	773.7	706.4	625.6	529.9
Cumulative debt retirement (%)		2.9%	9.0%	16.9%	26.4%	37.7%
Net debt		815.1	763.7	696.4	615.6	519.9
Total net debt/EBITDA		5.5×	4.8×	3.9×	3.2×	2.5×
EBITDA/Interest expense		2.0×	2.3×	2.8×	3.3×	4.1×
(EBITDA – CapEx)/Interest expense		1.8×	2.1×	2.5×	3.0×	3.7×

Source: Case writer estimates.

Exhibit 9

VALUATION OF LATE-STAGE COMPANIES AND BUYOUTS

Return Analysis for NewCo LBO
(in millions of U.S. dollars)

	0	1	2	3	4	5
EBITDA						214.4
Exit multiple						<u>9.2x</u>
Enterprise value						1,976.7
Less: Debt						529.9
Plus: Cash						<u>10.0</u>
Equity value						1,456.8
Cash flows to sponsors	(400.0)	-	-	-	-	1,456.8
Expected IRR	29.5%					
Cash-on-cash return (CoC)	3.6x					

Sensitivity Analysis

	IRR	Exit Multiple				
		6.0x	7.0x	8.0x	9.0x	10.0x
	171.5	4.9%	11.2%	16.3%	20.7%	24.5%
	193.0	9.8%	15.7%	20.7%	24.9%	28.7%
EBITDA	214.4	13.9%	19.7%	24.5%	28.7%	32.3%
	235.9	17.5%	23.1%	27.9%	32.0%	35.7%
	257.3	20.7%	26.2%	30.9%	35.0%	38.7%

	CoC	Exit Multiple				
		6.0x	7.0x	8.0x	9.0x	10.0x
	171.5	1.3x	1.7x	2.1x	2.6x	3.0x
	193.0	1.6x	2.1x	2.6x	3.0x	3.5x
EBITDA	214.4	1.9x	2.5x	3.0x	3.5x	4.1x
	235.9	2.2x	2.8x	3.4x	4.0x	4.6x
	257.3	2.6x	3.2x	3.8x	4.5x	5.1x

Source: Case writer estimates.