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PRIVATE EQUITY
FELLOWS PROGRAM

# Technical Note on LBO Valuation and Modeling

BY MARGARET CANNELLA*

*Note:* Please be sure to review the short-form LBO model spreadsheet and the instructional video (**Click here**, or go to **Private Equity Fellows Program website**) included in this case.

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## LBO Valuation and Modeling: An Overview

### WHAT IS AN LBO?

A leveraged buy-out ("LBO") is the acquisition of the stock of a company using a small amount of equity relative to the overall purchase price. The acquisition is largely debt-financed by a combination of loans, bonds, and/or mezzanine finance, in addition to equity contributed by the financial sponsor and company management. The transaction may be the leveraged acquisition of the stock of a public company (public-to-private transaction), the leveraged acquisition of a non-core business segment of a larger company, or the leveraged acquisition of a private company from another financial sponsor. An LBO can also be structured as a management buy-out if management, as opposed to a financial sponsor, is purchasing the equity of the company.

The equity contribution is most often made by a financial sponsor, also known as a private equity fund, or LBO fund. In addition to the investment rationale, the financial sponsor aims to add value to the company by improving top-line growth and/or increasing operating and EBITDA margin/dollars, while reducing leverage over the investment time horizon. An LBO analysis can also provide a "floor" valuation of a company, useful in determining what a financial sponsor can afford to pay for the target company while still realizing a return on investment above the financial sponsor's internal hurdle rate.

**Author affiliation**
**Administrative Director of the Private Equity Fellows Program, Columbia Business School*

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The financial sponsor has, as their transaction rationale and main objective, the sale of the firm at a higher EBITDA margin/dollars and/or a higher multiple than it was purchased in a timeframe of approximately five years. The performance of the investment is measured both in terms of internal rate of return ("IRR") and cash-on-cash returns.[1] In a simplified format, the effect of leverage on a transaction's returns is illustrated in Exhibit 1 (Example of the Effect of Leverage on Returns).

### WHO IS IN THE CAST OF CHARACTERS?

The parties in a leveraged buy-out are many and varied. (See Exhibit 2 for the basic structure of an LBO transaction.) Financial sponsors often differentiate themselves by specializing in investment approaches, such as large cap, middle market, and emerging markets buy-outs, as well as distressed principal investing and growth equity. Financial intermediaries of all types play a role in issuing debt instruments to finance the transaction. Fixed income institutional investors of all types, including mutual funds, hedge funds, insurance companies, and banks purchase the debt issued to finance a leveraged buy-out. Accountants, lawyers, rating agencies, valuation firms, and management consultants round out the cast of characters in a leveraged buy-out.

### WHAT COMPANIES MAKE GOOD LBO CANDIATES?

Financial sponsors evaluate companies with valid investment rationales, such as:

- Undervalued companies relative to peers
- Underperforming companies relative to peers
- Companies waiting for a catalyst to promote expansion
- Underleveraged companies relative to cash flow
- Companies with high cash balances
- Companies with high barriers to entry, and/or sustainable competitive advantages
- Companies with stable or strong operational cash flows
- Companies with monetizable assets
- Companies with moderate capex and R&D requirements
- Companies with a strong management team

### HOW DO PRIVATE EQUITY FIRMS ADD VALUE?

As part of the financial engineering of a leveraged buy-out transaction, private equity firms can increase the returns on their investment by:

- Reducing the purchase price
- Increasing the exit multiple ("multiple expansion")
- Increasing the leverage used to finance the transaction

Private equity firms can also add value to their investment by improving the company's operations, which ultimately increases the EBITDA margin/dollars ("margin expansion") during the sale year by:

- Increasing top-line growth (revenues)
- Decreasing costs (COGS or SG&A)
- Accelerating the cash conversion cycle

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### EXIT STRATEGIES

The private equity sponsor seeks to exit its investment in a reasonable time horizon (three to seven years, often modeled with a five-year time horizon), and a future liquidation event can include:

- An initial public offering ("IPO")
- A sale to a strategic investor
- A sale of the company to another private investor
- A recapitalization, where new debt is issued at a holding company level with the intention of using the proceeds to distribute returns to the equity investors

## Modeling a Leveraged Buy-Out: A Step-by-Step Approach

### SUMMARY OF STEPS

1. Determine the purchase price and amount of debt and equity required.
2. Assign percentage by tranche; assign coupons and repayment percentages to each tranche of debt.
3. Create a sources and uses table.
4. Build an income statement projection.
5. Calculate (levered) free cash flow for principal repayment.
6. Calculate the debt repayment schedule and determine mandatory and optional repayments.
7. Link the debt schedule, cash flow, and income statement.
8. Calculate investor returns and sensitivities.

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| *Note*: Please be sure to review the short-form LBO model included in the accompanying spreadsheet |

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### STEP ONE

**Determine the purchase price and amount of debt and equity required.**

See Appendix 1, Model Snapshot A: Transactions Assumptions.

The purchase price has three components:

1. Price of the equity
    a. If target is a public company, # diluted shares x price/share.
    b. If private, it may be calculated as enterprise value less debt, plus cash on balance sheet; sometimes the price of the equity can be an output of the LBO model, i.e. the price the financial sponsor pays and still generates a sufficient return.
2. Fees (advisory and financing)

a. Typically the advisory and financing fees are aggregated and estimated as a percentage of the transaction price.

    i. 1-2% is a reasonable estimate.

3. Debt assumed or refinanced

    a. Whether the existing debt is to be refinanced or assumed, the total amount must be included to calculate total enterprise value.
    b. Note any change of control provisions in existing debt for additional refinancing costs.

Calculating the amount of debt and equity required can be approached in one of two ways. In this section and beyond, terms are bracketed to indicate potential market variation:

1. Calculate the maximum debt the capital structure can support as a multiple of EBITDA. This will differ by industry, type and size of company and credit quality and may be dependent upon credit cycle.

    a. A starting point could be [3.0]x secured debt/EBITDA, with another [2.0]x unsecured debt/EBITDA, and [1.0]x subordinated debt/EBITDA for a total of [6.0]x total debt/EBITDA.

Once you have calculated the total debt figure, the remaining amount to be financed constitutes the equity required (equity "plug").

2. Calculate the amount of equity to be contributed based on a percentage of the total enterprise value (TEV). Again, this will differ by industry and the point in the credit cycle. Equity contributions as a percentage of TEV can range from 20% at the peak of the cycle to greater than 40% in bear credit markets. Once you have calculated the total equity contribution, the remaining amount constitutes the debt financing. The proportion of secured (bank) and unsecured (high yield bond) debt will again vary by transaction, and in certain market conditions can be financed with all secured loans. However, a good rule of thumb is to start with a 50%-50% split between secured and unsecured debt.

**STEP TWO**

**Assign percentage by tranche; assign coupons and repayment percentages to each tranche of debt.**

See Appendix 1, Model Snapshot B: Sources and Uses.

Each LBO transaction will have terms, structure, and pricing that reflects current credit markets.[2] Generally, LBO debt financing will include the following tranches of debt:

1. Revolver: This is the most senior portion of the capital structure, which is generally not drawn upon completion of the LBO but instead reserved for working capital financing. Typical maturity is five years.

2. Senior secured bank loans: These are typically issued in two tranches:

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a. A shorter-maturity, amortizing Term Loan A (typically 20%/year). Typical maturity [five] years or shorter, pre-payable at par at any time.
b. A longer-maturity Term Loan B with minimal amortization (typically 1%/year). Typical maturity [five to seven] years, pre-payable at par at any time (or at a slight premium to par for the first 6-12 months of the loan).

Depending on the point in the credit cycle and relative pricing in the bank versus bond market, the senior secured portion of the financing might be structured as a first-lien bond.

3. Senior unsecured bonds[3]: These are typically [eight-year] or longer maturity with a call feature in [four] years (e.g., 8NC4). The call price is typically [par plus ½ the coupon].

4. Subordinated bonds: These are typically a year or two longer than the senior unsecured bonds, again with a call feature halfway through the life of the bond (e.g., 10NC5). The call price is typically [par plus ½ the coupon].

Bank and bond pricing will be determined by current market conditions. Often the syndicate/underwriter will start with bank debt pricing and add incremental yield for subsequent securities ranking lower in the capital structure, due either to seniority of claims, or within the same classes of claims, security, e.g.:

- Revolver LIBOR +[200] bps
- Term Loan A LIBOR + [300] bps
- Term Loan B LIBOR + [350] bps
    - Can include a LIBOR floor of [0.75 - 1.00]%
- Senior unsecured bonds [7.0]%
    - OAS + [500] bps, incorporates ~[100] bps of incremental yield for security and another ~[50] bps for longer maturity
- Subordinated bonds [8.5]%
    - Incorporates ~[100] bps incremental yield for seniority and another ~[50] bps for longer maturity

**STEP THREE**

**Create a sources and uses table.**

See Appendix 1, Model Snapshot B: Sources and Uses.

This table will incorporate all sources of financing and uses of cash. The sources and uses must sum to the same amount (the total enterprise value of the transaction). Typically, sources and uses include the below terms:

Sources

- New debt financing (by tranche)
- Rollover debt/assumed debt
- Equity contribution (management equity and sponsor equity)

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- Excess cash on the balance sheet

Uses[4]

- Purchase price (payment to existing shareholders)
- Refinance existing debt
- Transaction fees and expenses

**STEP FOUR**

**Build an income statement projection.**

*For steps Four and Five, see Appendix 1, Model Snapshot C: Free Cash Flow Calculations and Projections.

Starting with the last several (three to five) years of financial statements for context, using a combination of management forecasts, equity analyst projections, and your own analysis, you will forecast income for the next several years. Typical inputs into income projections are revenue growth, gross margin expansion/contraction, and SG&A increase/decrease.

Calculation Notes:

- Revenue growth: assume a flat rate or discount to the historical growth rates, with decreasing growth into the future.
- Expense percentages (gross margin expansion/contraction): make this a percentage of revenue. You can use historical averages for the percentages or straight-line the most recent percentages.

**STEP FIVE**

**Calculate (levered) free cash flow for principal repayment.**

Use your income statement projections to derive free cash flow. Typically this formula will include the following inputs:

EBITDA (net income plus interest expense, taxes, and depreciation/amortization)

LESS: Maintenance capital expenditures (total capex reduced by growth capex—in many industries, this is estimated as a percentage of revenues)

Change in net working capital (in many industries, you can estimate this by growing at the same rate as revenues)

Cash interest expense (reduced by any PIK/non-cash interest)

Cash taxes

Calculation Notes:

- Capex and Change in Working Capital: Make both of these percentages of revenue, and use historical averages if possible or straight-line the most recent percentages. You can also use equity research analyst forecasts.

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- Tax Rate: Use the historical effective tax rates or what equity research analysts project.

**STEP SIX**

**Calculate the debt repayment schedule and determine mandatory and optional repayments.**

See Appendix 1, Model Snapshot E: Debt Repayment and Cash Sweep.

Generally, the only mandatory debt repayment for the first five years is 20%/year of the Term Loan A and 1%/year of the Term Loan B. The Term Loan facility likely contains a cash sweep requirement, meaning that the company has to apply any excess free cash flow to the paydown of the Term Loan A (and then the Term Loan B once all of the Term Loan A is paid down). Generally, you should assume that all free cash flow in excess of mandatory debt repayments will be applied to reducing the term loans (this might differ based on growth plans or other uses of cash articulated by company management and financial sponsors).

**STEP SEVEN**

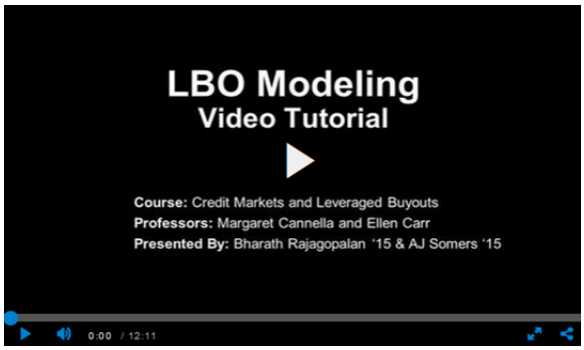
**Link the debt schedule, cash flow, and income statement.**

This is an iterative process that allows the cash flow to adjust based on the amount of debt paid down and associated interest expense reduction.

Example of the circularity in the model:

- Interest expense for the following year will be reduced by the amount of debt paydown x interest rate (of the debt paid down).
- In turn, this increases free cash flow.
- In turn, this increases the amount of debt paydown in the next year.

Make sure you turn on the "iterative" function in Excel to permit the model to function.

| | |
|---|---|
| *Note:* Please be sure to review the accompanying instructional video on LBO modeling. **Click here, or go to Columbia Business School Private Equity Fellows Program website to watch this video.** |  |

**STEP EIGHT**

**Calculate investor returns and sensitivity tables.**

See Appendix 1, Snapshot F: Sensitivity Tables.

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Calculate returns (IRR[5] and cash-on-cash returns) for a range of EBITDA forecasts and multiple assumptions. Generally, the tables will utilize transaction and operational inputs to reflect different drivers of value:

Transaction:

- Entry/exit multiples: Start with the LBO entry and exit multiples, and develop a range of multiple expansion/contraction scenarios. Generally, you should not assume multiple expansion or contraction in your base case exit IRR calculation, but in some cases, you can appropriately forecast multiple expansion as an investment rationale.
- Leverage scenarios: Start with the base case of leverage for the transaction and develop a range of lower and higher leverage scenarios (within reason). Leverage can be negotiated higher or lower depending on market conditions and deal terms, and will affect the returns to equity holders.

Operational:

- EBITDA forecasts: Start with a base case (using your earlier forecasts from the income statement) and develop a range of upside and downside cases. Present EBITDA either in margin format or in absolute values based on exit year's EBITDA.
- Revenue growth: Start with a base case growth rate, and develop a range of upside and downside cases. Present revenue growth either in percentage format or in absolute numbers based on exit year's revenue.

See Appendix 2 for LBO valuation and modeling FAQs.

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# Exhibits

## Exhibit 1

## Example of the Effect of Leverage on Returns

| | |
|---|---|
| Company Value: | *$100* |
| Sale Value: | *200* |

**Scenario 1: 100% Cash Acquisition**

| | | |
|---|---|---|
| Cash Used: | *100%* | $100 |
| Debt Used: | 0% | $0 |

| Purchase | Year 1 | Year 2 | Year 3 | Year 4 | Exit Year |
|---|---|---|---|---|---|
| ($100) | *$0* | *$0* | *$0* | *$0* | $200 |

| | |
|---|---|
| **Cash-on-Cash Return:** | **2.0x** |
| **IRR:** | **15%** |

**Scenario 2: 75% Cash Acquisition**

| | | |
|---|---|---|
| Cash Used: | *75%* | $75 |
| Debt Used: | 25% | $25 |

| Purchase | Year 1 | Year 2 | Year 3 | Year 4 | Exit Year |
|---|---|---|---|---|---|
| ($75) | *$0* | *$0* | *$0* | *$0* | $175 |

| | |
|---|---|
| **Cash-on-Cash Return:** | **2.3x** |
| **IRR:** | **18%** |

**Scenario 3: 50% Cash Acquisition**

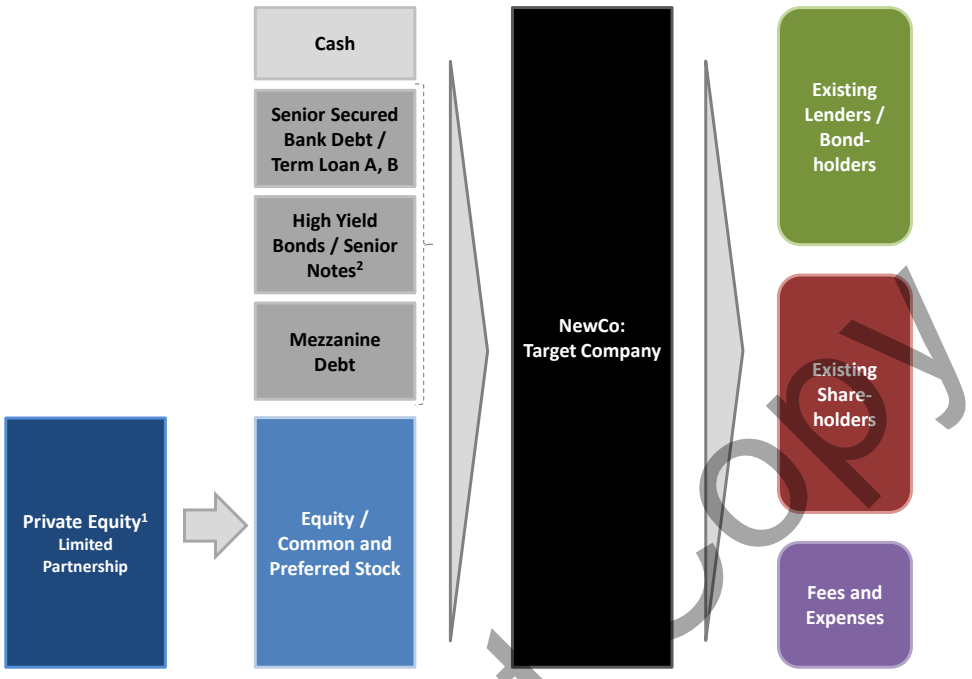
| | | |
|---|---|---|
| Cash Used: | *50%* | $50 |
| Debt Used: | 50% | $50 |

| Purchase | Year 1 | Year 2 | Year 3 | Year 4 | Exit Year |
|---|---|---|---|---|---|
| ($50) | *$0* | *$0* | *$0* | *$0* | $150 |

| | |
|---|---|
| **Cash-on-Cash Return:** | **3.0x** |
| **IRR:** | **25%** |

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## Exhibit 2
## Basic Structure of an LBO Transaction




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*Notes*:

1. The general partner (GP) and limited partners (LPs) enter into a limited partnership/private equity fund, where the limited partners provide the capital required for investments and the general partner charges fees for its services acquiring, financing, managing, and exiting highly leveraged companies, and earn a share of the profits (carried interest, or carry) above a certain minimum return (hurdle rate). Limited partners' only liability is the capital they commit to the fund. Limited partners do not take an active management role in LBO investments, have no authority within the private equity firm, and have contractually limited authority regarding the management of the fund (e.g., they may request to substitute the GP in case of exceptional events). Examples of limited partners include public pension funds, sovereign wealth, regulated financial institutions (banks and insurance companies), high net-worth individuals, family offices, foundations, and fund-of-funds.

2. Where there is no change-of-control provision requiring that debt instruments be refinanced in the case of a change-of-control, high yield bonds/senior notes may be rolled over from the pre-LBO capital structure. Bank debt is almost always refinanced.

# Appendices

## Appendix 1

## Snapshots from the Model

**(SEE ACCOMPANYING SPREADSHEET FOR SAMPLE AND BLANK MODELS)**

## Model Snapshot A

## Transaction Assumptions (in $000)

| | | | |
|---|---|---|---|
| Purchase Year | 2015 | Exit Year | 2020 |
| EBITDA Purchase Multiple | 8.5x | EBITDA Exit Multiple | 8.5x |
| Purchase Year EBITDA | 409.0 | Exit Year EBITDA | 445.9 |
| Purchase EV | 3,476.5 | Exit EV | 3,789.8 |
| | | Exit Year Net Debt | 1,669.1 |
| Less Existing Debt | - | Implied Equity Value | 2,120.7 |
| Add: Cash on balance sheet | - | Less: Mgmt Stake | - |
| Equity Purchase Price | 3,476.5 | Sponsor Equity at Exit | 2,120.7 |
| | | | |
| **Sponsor Equity Check** | **1,197.3** | **Sponsor IRR** | **12.1%** |
| **Sponsor Equity / Sources** | **33.9%** | **Sponsor Cash-on-Cash** | **1.8x** |

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## Model Snapshot B

## Sources and Uses (in $000)

| **Sources** | | | | | | **Uses** | | |
|---|---|---|---|---|---|---|---|---|
| | Cap | xEBITDA | Amount | Int. Rate | % of Total | | | Amount |
| Revolver | 500 | 0.0x | - | *4.5%* | *0.0%* | Purchase Price | | 3,476.5[1] |
| Term Loan A | | 0.0x | - | - | *0.0%* | Refinance Existing Debt | | - |
| Term Loan B | | 3.2x | 1,308.8 | *L + 2.3%* | *37.1%* | Transaction Fees and Expenses | *1.5%*[2] | 52.1 |
| Senior Notes | | 1.5x | 613.5 | *10.0%* | *17.4%* | Cash for Operations | | - |
| Junior/Subordinated Notes | | 1.0x | 409.0 | *12.0%* | *11.6%* | Other | | - |
| Other Debt | | 0.0x | - | - | *0.0%* | | | |
| | Debt/EBITDA | 5.7x | 2,331.3 | | *66.1%* | | | |
| Management Equity | | | - | | *0.0%* | | | |
| Sponsor Equity | | | 1,197.3 | | *33.9%* | | | |
| Excess Cash | | | - | | *0.0%* | | | |
| **Total Sources** | | | **3,528.6** | | ***100.0%*** | **Total Uses** | | **3,528.6** |

[1] Assumes debt free and excess cash free.
[2] 1.5% of TEV.

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## Model Snapshot C

## Free Cash Flow Calculations and Projections (in $000)

| | 2010 | 2011 | 2012 | 2013 | 2014 | *Purchase Year* 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Revenue | - | - | 2,672.3 | 3,216.0 | 3,612.7 | 3,941.0 | 4,167.0 | 4,083.7 | 4,083.7 | 4,206.2 | 4,458.5 |
| Adj. EBITDA | - | - | 327.3 | 284.0 | 298.5 | 283.5 | 409.0 | 408.4 | 408.4 | 420.6 | 445.9 |
| CapEx | - | - | (193.8) | (254.9) | (327.9) | (297.7) | (125.0) | (102.7) | (55.8) | (60.0) | (63.6) |
| Net WC Change | - | - | (6.7) | (64.3) | (22.0) | (41.0) | (11.3) | 4.2 | - | (6.1) | (12.6) |
| Interest Expense | | | | | | | (200.4) | (180.9) | (155.9) | (144.5) | (138.1) |
| Taxes | | | | | | | (16.9) | (28.1) | (36.9) | (43.6) | (51.6) |
| **Free Cash Flow before debt repayment** | | | | | | | **55.4** | **100.8** | **159.8** | **166.3** | **180.0** |
| *Tax Details* | | | | | | | | | | | |
| D&A | - | - | (85.1) | (104.8) | (127.8) | (151.6) | (160.3) | (147.0) | (147.0) | (151.4) | (160.5) |
| Pretax Profit/(Loss) | | | | | | | 48.3 | 80.4 | 105.4 | 124.7 | 147.3 |
| *Cash Flow Drivers* | | | | | | | | | | | |
| Revenue Growth (yoy%) | - | - | - | *20.3%* | *12.3%* | *9.1%* | *5.7%* | *(2.0%)* | - | *3.0%* | *6.0%* |
| EBITDA Margin | - | - | *12.2%* | *8.8%* | *8.3%* | *7.2%* | *9.8%* | *10.0%* | *10.0%* | *10.0%* | *10.0%* |
| D&A as % of Sales | - | - | *(3.2%)* | *(3.3%)* | *(3.5%)* | *(3.8%)* | *(3.8%)* | *(3.6%)* | *(3.6%)* | *(3.6%)* | *(3.6%)* |
| CapEx as % of Sales | - | - | *(7.3%)* | *(7.9%)* | *(9.1%)* | *(7.6%)* | *(3.0%)* | *(2.5%)* | *(1.4%)* | *(1.4%)* | *(1.4%)* |
| Δ NWC as % of Sales Change | - | - | *(0.3%)* | *(11.8%)* | *(5.5%)* | *(12.5%)* | *(5.0%)* | *(5.0%)* | *(5.0%)* | *(5.0%)* | *(5.0%)* |
| Tax % | | | | | | | *(35.0%)* | *(35.0%)* | *(35.0%)* | *(35.0%)* | *(35.0%)* |

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## Model Snapshot D

## Credit Statistics (in $000)

| | Purchase Year | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** |
| Net Debt / Adj. EBITDA | | | | | | | 5.56x | 5.33x | 4.94x | 4.40x | 3.74x |
| Senior Secured Debt/Adj. EBITDA | | | | | | | 3.06x | 2.82x | 2.43x | 1.97x | 1.45x |
| Adj. EBITDA / Interest | | | | | | | 2.04x | 2.26x | 2.62x | 2.91x | 3.23x |
| (Adj. EBITDA - CAPEX) / Interest | | | | | | | 1.42x | 1.69x | 2.26x | 2.49x | 2.77x |

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## Model Snapshot E

## Debt Repayment Schedule and Cash Sweep (in $000)

| | | | | | | Purchase Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| LIBOR (USD 6 month) - Year end values | | | | | | *5.3%* | *4.2%* | *3.0%* | *1.0%* | *0.8%* | *1.0%* |
| LIBOR - Average Values | | | Floor | *1.5%* | | | *4.8%* | *3.6%* | *2.0%* | *1.5%* | *1.5%* |
| **Debt Balances after Mandatory Debt Repayment** | | | | | | | | | | | |
| Term Loan A | | | | | | - | - | - | - | - | - |
| Term Loan B | | | | | | 1,308.8 | 1,295.7 | 1,240.3 | 1,139.6 | 979.8 | 813.5 |
| Senior Notes | | | | | | 613.5 | 613.5 | 613.5 | 613.5 | 613.5 | 613.5 |
| Junior/Subordinated Notes | | | | | | 409.0 | 409.0 | 409.0 | 409.0 | 409.0 | 409.0 |
| Other Debt | | | | | | - | - | - | - | - | - |
| **Excess FCF available for optional debt repayment** | | | | | | | **42.3** | **87.7** | **146.7** | **153.2** | **166.9** |
| **Debt Balances after Optional Debt Repayment** | | | | Cash Sweep | | | | | | | |
| Revolver | | | | 0 | | - | - | - | - | - | - |
| Term Loan A | | | | 1 | | - | - | - | - | - | - |
| Term Loan B | | | | 1 | | 1,308.8 | 1,253.4 | 1,152.7 | 992.9 | 826.6 | 646.6 |
| Senior Notes Including any Buyback | | | | 0 | | 613.5 | 613.5 | 613.5 | 613.5 | 613.5 | 613.5 |
| Junior/Subordinated Notes | | | | 0 | | 409.0 | 409.0 | 409.0 | 409.0 | 409.0 | 409.0 |
| Other Debt | | | | 0 | | - | - | - | - | - | - |
| **Total Debt** | | | | | | **2,331.3** | **2,275.9** | **2,175.2** | **2,015.4** | **1,849.1** | **1,669.1** |
| **Excess FCF after optional debt repayment** | | | | | | | **-** | **-** | **-** | **-** | **-** |
| Cash Balance after Optional Repayment | | | | | | - | - | - | - | - | - |
| **Net Debt** | | | | | | **2,331.3** | **2,275.9** | **2,175.2** | **2,015.4** | **1,849.1** | **1,669.1** |
| **Scheduled Amortization** | | | | | | | | | | | |
| Revolver | | | | | | | | | *N/A* | | |
| Term Loan A | | | | | | | *20.0%* | *20.0%* | *20.0%* | *20.0%* | *20.0%* |
| Term Loan B | | | | | | | *1.0%* | *1.0%* | *1.0%* | *1.0%* | *1.0%* |
| Senior Notes | | | | | | | - | - | - | - | - |
| Junior/Subordinated Notes | | | | | | | - | - | - | - | - |
| Other Debt | | | | | | | - | - | - | - | - |

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## Model Snapshot F

### Sample Sensitivity Tables

**Outputs and Sensitivity Analysis**

IRR Under Base Case - by Exit Year

| Exit Multiple | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|
| **7.5x** | (33.9%) | (13.9%) | (4.4%) | 2.2% | 6.9% |
| **8.0x** | (16.8%) | (4.5%) | 1.5% | 6.1% | 9.6% |
| **8.5x** | 0.3% | 4.0% | 6.7% | **9.6%** | **12.1%** |
| **9.0x** | 17.3% | 11.9% | 11.5% | 12.8% | 14.4% |
| **9.5x** | 34.4% | 19.3% | 15.9% | 15.7% | 16.5% |

Cash-on-Cash Returns Under Base Case - by Exit Year

| Exit Multiple | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|
| **7.5x** | 0.7x | 0.7x | 0.9x | 1.1x | 1.4x |
| **8.0x** | 0.8x | 0.9x | 1.0x | 1.3x | 1.6x |
| **8.5x** | 1.0x | 1.1x | 1.2x | **1.4x** | **1.8x** |
| **9.0x** | 1.2x | 1.3x | 1.4x | 1.6x | 2.0x |
| **9.5x** | 1.3x | 1.4x | 1.6x | 1.8x | 2.1x |

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# Appendix 2
# LBO Valuation and Modeling: Frequently Asked Questions

## I. Input Considerations

### 1) MAIN DRIVERS OF AN LBO MODEL

These inputs can have a significant impact on the transaction valuation, and can be manipulated to change valuation outcomes.

a. Purchase price
   - A lower purchase price creates higher returns.

b. Exit multiple
   - A higher exit multiple creates higher returns.

c. Transaction leverage
   - Increasing transaction leverage typically creates higher cash returns, but also increases the risk profile of the investment.

d. Revenue growth rate
   - Increasing revenue growth typically leads to higher returns.

e. EBITDA margin
   - Greater EBITDA margins typically increase returns.

### 2) SOURCES AND USES OF CASH

**a. What are possible uses of cash in an LBO model?**

In an LBO transaction, cash could be required to:

- Compensate pre-deal equity holders (all of them, or a portion of them): This may include buying the stock of a public company, paying deferred compensation at a change of control, or other compensation requirements to be paid at closing.
- Refinance existing debt either optionally or mandatorily for the deal to close.
- Pay transaction fees and expenses to debt arrangers, financial advisors, new owners, law firms, accountants, and others.

Total use of cash is calculated as the sum of each single item listed above.[6]

**b. How does "purchase price" reconcile with transaction sources and uses?**

Purchase price is included as the first line in the "Uses" section. This is usually the primary (and largest) use of cash, as it represents the proceeds paid to selling equity holders. Together with purchase price, debt, transaction fees, and expenses comprise the total amount of cash used in the transaction. Once the total uses of cash is calculated, the new owners seek financing, and fund the residual value (i.e., what is not paid for with debt) with equity.

**c. What are the possible sources of cash in a LBO model?**

Most common sources of cash in a LBO transaction are:

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- Excess cash on the balance sheet: Excess cash is the first source of cash readily available to finance an acquisition, and is what is left over after minimum cash is determined (see *Section D* below).
- Debt: Could be either in the form of revolvers, bank loans, or notes; debt can be either secured (first or second lien) or unsecured, senior or junior, amortizing or non-amortizing, have a pay-in-kind ("PIK") option (where the interest component can be elected not to be paid in cash but issued in new debt; so the principal amount of debt outstanding increases, rather than accrued interest), callable or non-callable, etc.
- Roll-over debt: Debt from an existing facility (pre-transaction), where the issuers either actively or passively have found their facilities as part of the pro forma company. Active rollover means that there may have been a change of control provision in the existing debt agreements (meaning the borrower must repay it immediately), and the existing lenders decided to invest in the pro forma company. Passive rollover means there was no change of control, and the facility remained outstanding.
- Equity from financial sponsor: This is the actual capital contribution from the private equity firm.
- Equity from management (or other existing equity-holders): Portion of equity rolled over or newly contributed from company management, alongside the financial sponsors. It has the double effect of reducing the contribution from the private equity firm, and also increasing financial/incentives alignment among financial sponsors and management.
- Other: Additional sources of financing could come from other categories of investors, for example contributors to the private equity fund itself, known as limited partners ("LPs"), who are allowed to co-invest. The additional capital can be contributed as equity, debt, or a hybrid structure.

**d. How should minimum cash be modeled? In which parts of the LBO model is it present?**

Minimum cash is the amount of cash that must always sit on the balance sheet in order for the business to operate normally. Minimum cash is a company-specific and industry-specific calculation. For example, inventory management procedures can vary from company to company within an industry, while seasonality, sensitivity to economic cycles, and capex needs may vary among sectors. Minimum cash is present in various sections of the LBO model:

- Purchase price calculation: The minimum cash is considered an operating asset, so is already part of the equity value and does not need to be added back to go from equity to enterprise value.
- Sources and uses of cash: The minimum cash restricts the amount of cash that can be used as a source of cash to pay selling shareholders.

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- Balance sheet: There must be at least the minimum cash on the balance sheet in order to guarantee the going concern of the business.
- Income statement: Other than some minor impacts to the non-operating section, there is no relevant impact; however, if the actual cash balance drops below the minimum cash balance, it could become impossible to keep the business going.

**e. What if there is a cash shortfall?**

Evaluated on a quarterly basis, the company must always be able to have enough cash on hand, plus cash readily available from external sources (e.g., revolving facility), in order to meet immediate liquidity needs. If the company is not able to guarantee this, it loses its financial viability (by breaching a covenant or becoming insolvent), and debt investors can pressure management/equity holders to take mitigating actions, and eventually file an involuntary bankruptcy.

## 3) TRANSACTION OVERVIEW

**a. In a public-to-private transaction, how do you make sure that you are using the correct offer price premium?**

The offer price premium (or multiple used to determine offer price) is most often determined by an assessment of recent precedent LBO transactions in the market; these transactions provide an indication of market-accepted terms related to unaffected public share price premium or EBITDA multiples. However, specific transaction dynamics, such as willingness to sell and financial state of the company, can affect the offer price premium.

After the calculation of the offer price, double-check the actual purchase premium, with the formula:

$$\frac{Offer\ price}{Unaffected\ price} - 1 = premium$$

Or alternatively, if only the EBITDA multiple is available:

$$\frac{Offer\ EBITDA\ multiple}{Unaffected\ EBITDA\ multiple} - 1 = premium$$

**b. How are transaction fees and expenses calculated?**

Transaction fees and expenses can have two components: the first one is proportional to the total amount of debt financing and/or commitment (1-2% of debt face value and revolver amount of available credit, original issue discount "OIDs"); the second is not proportional to deal volume and can vary by deal (e.g., investment banking fees, legal fees). Debt-related fees and expenses usually represent the largest component of the total amount of fees and expenses. Often, in short-form LBO modeling, transaction fees will be combined into a fixed percentage of the TEV, such as 2%.

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**c. How should transaction fees and expenses be reflected on the financial statements and model?**

Transaction fees and expenses are reflected in:

- Sources and uses of cash: They are a use of cash; in fact, they must be paid in cash at the moment the transaction is executed.
- Balance sheet: They can, in part or in total, be capitalized as an intangible asset; IRS states that costs must be capitalized only if they are facilitative of an acquisition, which can be determined on a case-by-case basis by lawyers; the portion that is not capitalized gets expensed immediately.
- Income statement: Capitalized transaction fees and expenses can be amortized over multiple reporting periods (usually five years), so they constitute a non-cash expense that reduces taxable income.
- Statement of cash flows: The portion of transaction fees and expenses that is amortized each year must be added back to net income in the operations section (indirect method) in order to arrive at the cash flow from operations (because it is a non-cash expense).

## 4) MAXIMUM LEVERAGE LEVELS

**a. How is the total amount of leverage calculated?**

Total amount of debt is calculated as the sum of all the available tranches of debt, such as total revolver (drawn portion), total senior secured, and total senior unsecured. Maximum amount of debt varies significantly by transaction, market conditions, and the credit cycle. For these reasons, it is not possible to provide a general rule that can be applied to LBO models. A good starting point can be provided by determining leverage used in recent transactions in similar sectors, or with similar transaction features. In today's environment, regulators prefer leverage not to exceed six times EBITDA and provide additional guidance that companies be able to repay at least [50%] of debt in a [seven] year time.

**b. In which section is the amount of leverage an input for the LBO model? Where else is it reflected?**

Leverage is an input of the "Sources and Uses" section. For each tranche of debt, the dollar amount is provided and the model displays how many turns of EBITDA it represents (or vice versa), as well as showing the percentage of overall capital structure. The same amount is also reflected in the balance sheet and in the schedule of debt repayment. Leverage directly impacts the returns of the LBO. See Exhibit 1 and Appendix 1, Model Snapshot B: Sources and Uses.

**c. Why do we look at total debt leverage multiples? How do they differ from purchase price multiples?**

Total debt leverage multiples indicate the amount of debt used to finance the transaction. We look at each tranche of debt to see the exposure of different classes of lenders. Purchase price multiples are the sum of debt leverage multiples

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and equity contribution multiples. High purchase price multiples are often seen in conjunction with a high debt leverage multiple.

# II. Model Outputs/Analysis

## 1) SENSITIVITY TABLES

### a. Why are sensitivity tables used?

Sensitivity tables are used to evaluate the robustness of various financial outputs (e.g., IRR, ROI) for changes in certain inputs (e.g., entry/exit multiple, EBITDA margin, revenue growth, leverage, investment horizon). In other words, sensitivity tables show how output values change around marginal changes in the input assumptions. For example, we could use sensitivity tables to answer the question: "How would IRR change if the average EBITDA margin over the life of the investment were higher or lower by 25 basis points (and at certain other incremental values)?" Sensitivity tables should not be confused with "scenario analyses." Scenario analysis is when, with the press of a button, or changing of an input value in a single cell, the entire model (not just an output cell), becomes reflective of an entirely new set of assumptions. Typically, in scenario analysis, we see an upside case, base case, and downside case. In each of these cases, many variables could differ.

### b. What are the most commonly used sensitivity tables?

Most commonly, sensitivity tables have on one side an input dimension, and on the other side an output dimension. It is common to sensitize both transaction inputs, as well as operational inputs. Transaction inputs can include: EV/EBITDA exit multiple, sale year, purchase price premium, leverage level. Operational inputs typically sensitize EBITDA margin and sales growth since those two metrics are highly variable in the last forecast year. Outputs are usually either IRR or cash-on-cash multiple.

### c. What are some best practices?

One best practice is to provide a range of three to five different exit multiple assumptions because valuation is uncertain five years in the future.

Another best practice while creating sensitivity tables is to circle or highlight the range of output values (e.g., IRR) and the corresponding input values (e.g., exit year multiple) that we most strongly believe will happen. Doing so makes the sensitivity tables less of a "data dump;" instead, it gives the investment committee the opportunity to have an informed debate about what they would need to believe in order for the investment to make sense.

## 2) CREDIT STATISTICS

### a. Why are credit statistics important?

Credit statistics shine light on the viability of the proposed capital structure, relative debt levels ("leverage"), and sufficiency of the cash flow to meet future

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obligations ("coverage"). They are calculated on an annual or quarterly basis and show changes in the capital structure over time.

**b. What are the most commonly used credit statistics?**

While there are many credit statistics, they can generally be grouped into three categories:

- Leverage: Intended to guarantee that debt does not comprise too large a share of the capital structure. For simplicity, debt quantum is typically observed as a multiple of EBITDA, free cash flow, or free cash flow less capex (trailing or forecasted). These multiples can be tested at different levels in the capital structure, and can be compared over time, and across comparable companies within an industry.
- Coverage: Checks whether the operating business is able to pay mandatory cash outlays, such as interest, maintenance capex, or rents/lease payments. EBITDA less capex is typically used as a proxy for free cash flow.
- Liquidity: Tests whether the business has sufficient cash on hand, or ability to draw on its revolver over the forecasted period. Cash on hand and cash potentially available must be equal to or greater than the actual business need for working capital and mandatory debt repayment. (The short-term LBO model usually does not provide liquidity statistics, however an example of a liquidity assessment in shown in Appendix 1, Model Snapshot D: Credit Statistics.

Credit ratios can include:

- Total (or Net) Debt/Adj. EBITDA
- Total (or Net) Debt/Adj. EBITDA-Capex
- Senior Secured Debt/Adj. EBITDA
- Adj. EBITDA/Interest expense
- Adj. EBITDA-Capex/Interest expense

**c. What are some best practices?**

Credit ratios should be tailored to the specific sector. For example, credit statistics should be adjusted for rent expense and lease payments whenever applicable to treat these fixed payments as debt. To do this, one would need to apply a multiple to the fixed payments and add that balance to the debt line on a company's balance sheet. A multiple of 6-8x is typically used for rent payments. (Note: the multiple implies an annual interest rate in the amount of the inverse of the multiple. For example, an 8x capitalization multiple would imply an annual interest rate of 1/8, or 12.5%)

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## III. Financial Statements

**a. How are the financial statements linked together in an LBO model?**

The income statement's output is net income, which is also the first row of the cash flow from operations sections (using the indirect method). Free cash flow available for debt repayment is calculated based on various line items from the cash flow statement. Free cash flow then flows into the debt section of the balance sheet (reducing total debt). Debt balance at the end of the year is used as an input to calculate interest expenses in the income statement—which is how the 'loop' is closed.

Another link between statements is PP&E, capex, and depreciation: Capex decreases the cash flow available for debt repayment (cash flow section), and increases the PP&E item in the balance sheet; PP&E is reduced through depreciation, which is an item of both the income statement (it is a non-cash expense) and the operating section of the cash flow statement (it is added back to EBITDA because it is a non-cash expense).

**b. In what order should financial statements be modeled?**

Although all the financial statements in a LBO model are linked together, and there is not a single mono-directional stream of statements, there are some best practices that can be implemented. The first element to be completed should be the "operating section" of the income statement to forecast revenue and EBITDA, which is typically the "core" part of the private equity intervention in the business. Next would follow the free cash flow section, which is the part of the model where cash flow to service debt is calculated. Lastly, the balance sheet would need to be completed—in the simplified short-form LBO model, it has been redacted. To reiterate, all statements are interlinked and adjustments in one statement would need to flow into others.

**c. Which elements are required (at a minimum) for the balance sheet to be completed?**

A basic LBO model does not require an exhaustive balance sheet to be completed (although it is needed for other things, such as tax forecasts). Items that must always be present are:

- Cash (and short term securities);
- Net working capital—although this is not a "real" component of the balance sheet, accounts receivable, inventory, and accounts payable could be collapsed into this item;
- Capitalized transaction fees and expenses; and
- Debt—differently that a "normal" balance sheet, a dedicated section must be provided for each different tranche of debt.

A slightly more complete balance sheet would also contain:

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- Accounts receivable, accounts payable, inventory
- PP&E (gross and net)
- Goodwill
- Adjustments to equity (wipe out existing equity, add new equity from sponsors and management)

**d. What is the first thing to check in a balance sheet?**

A balance sheet is comprised of three sections: assets, liabilities, and shareholders' equity. According to the basic accounting equation it must always hold true that assets are equal to liabilities plus shareholders' equity. If they do not match, then there is a mistake (or more than one).

**e. If assets do not match liabilities, what could be the cause?**

There must be some mistake in some part of the model. Possible mistakes could be due to wrong signs (e.g., interest expenses calculated as income), wrong debt dynamic, incomplete cash generation estimate, miscalculated depreciation, etc.

**f. Which elements are required (at a minimum) for the income statement to be completed?**

A basic LBO model's income statement should have at least:

- Revenue
- EBITDA
- Depreciation and amortization
- EBIT
- Interest expense
- Tax
- Net income

Additional elements that could be useful include:

- Revenue breakdown by business unit/segment/geography
- Cost of goods sold ("COGS")
- Selling, general and administrative expenses ("SG&A")

**g. Which elements are required (at a minimum) for the statement of cash flows to be completed?**

The statement of cash flows is a core element of the LBO model, because it is the link between economically generated profit – reported in the income statement, and the financial engineering operation that the financial sponsor is putting in place – represented mainly by the liability side of the balance sheet. A minimal statement of cash flows must contain:

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- EBITDA or adjusted EBITDA[7]: A standard statement of cash flows starts from net income—however in the LBO model interest expense and taxes are also an output of the statement of cash flows, so they are listed explicitly.
- Capex: If possible, capex should be differentiated between "maintenance capex," which represents the minimum level of investment needed to keep the business revenue generation potential intact (e.g., new trucks needed to replace aging ones, current maintenance to facilities), and "growth capex," which is the cash required to finance the growth of the business; in a downside scenario "growth capex" can be deferred or scrapped.
- Change in net working capital: Calculated as working capital needed for the current year less the working capital of the previous year (e.g., if this year's working capital is $10 million and last year it was $8 million, there is a net increase in working capital of $2 million, which is a use of cash).
- Cash interest expense: Like EBITDA, cash interest expense is not an element of a standard cash flow statement, but it is key for the LBO model; it is equal to the actual amount of cash needed to pay debt interests in a given year; in fact there are several types of debt, such as "zero coupon bonds" or "PIK bonds," which do not require an actual cash outlay to pay interest (however they still generate an interest expense that must be accounted for in the income statement).
- Cash taxes: Similar to interest expense, they are not explicitly stated in an indirect method GAAP statement of cash flows (they are netted out in net income); cash taxes might be different from income statement taxes due to differences between IRS and GAAP tax rules (e.g., some companies use accelerated depreciation for tax purposes, to minimize cash taxes, while using a straight line method for income statement reporting, to maximize reported profit).
- Free cash flow before debt repayment: This is one of the most important outputs of the entire LBO model, because it is the actual amount of cash that the business is able to produce after future growth has been financed; it is the amount of cash that at the end of the year is available to service debt principal or increase the cash balance on the balance sheet.
- Cash used to pay down principal of debt: This is the most relevant part of the cash flow from financing activity—it is replicated for each tranche of debt in the balance sheet. Note that principal paydown is divided into mandatory paydown (for Term Loan A/B) and optional paydown on term loans with any excess cash flow.
- Net variation of cash: this is the net-net generation or use of cash that the overall business activity has generated during the year.

**h. Goodwill**

- How is the generation of goodwill calculated? Goodwill is an intangible asset that is created when a company acquires another and pays a price higher than

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the fair market value of its assets. It is calculated as price paid less net assets recognized (plus amount of non-controlling interests and fair value of previously owned equity interests).

- How is goodwill treated in the three Financial Statements after the initial transaction? Goodwill is recognized in the balance sheet. Every year, management must value goodwill—in case fair market goes below book value, the decrease must be immediately recognized and passed to the income statement. No impact is realized on the generation of cash flow, other than a possible reduction in cash taxes. The yearly valuation process is called an "impairment test."

**i. Equity**

- How should "retained earnings" be adjusted after the transaction? Retained earnings are wiped out together with old shareholders' equity. However, due to a provision of the tax code, some transaction expenses other than financing expenses might not be able to be capitalized; in this case they flow directly to retained earnings, and reduce them to a negative value.
- How should "equity" be modeled after the transaction? "New equity" replaces "old equity" in the equity section of the balance sheet. After every accounting period, if net income is positive, the amount of profit that does not get distributed through dividends flows to the "retained earnings" line, otherwise that value is deducted by the same amount as the loss.
- What happens to "minority interest" during and after the transaction? The treatment of minority interests depends on deal-by-deal negotiations. Minority investors can either sell their interests during the transaction or keep their non-controlling interest. In the first scenario, minority interests are "bought out," so they show up as a "use" of cash and are then removed from the balance sheet (the book value of "minority interest" may be different than the cash proceeds owed to the minority investor); in the second case, minority investors are carried over to the post-LBO balance sheet.

# IV. Debt Repayment Considerations

## 1) DEBT PAYDOWN SCHEDULE

### a. How is the mandatory senior secured debt principal repayment calculated?

Senior secured debt is usually divided in two categories that have different amortization profiles:

- Term Loan A: The most senior tranche of debt in the balance sheet (could be either junior or *pari passu* with the Revolver); it typically amortizes in equal installments until maturity, which usually can be up to [seven] years. For example, if the total amount is $90 million and the maturity is three years, each year amortization of principal would be $30 million.

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- Term Loan B: This tranche of debt is junior to the Term Loan A and to the Revolver; it has a maturity usually at least one to two years longer than the Term Loan A, but tends to have a different amortization schedule—typically only 1% each year, and the remaining principal is paid back with a balloon installment at maturity. For example, if the total amount is $100 million and the maturity is four years, at the end of years one to three the company has to pay $1 million of principal and $97 million at the end of year four.

On top of "base" mandatory repayments, banks usually require that a given portion of the excess free cash flow (after all mandatory debt repayments have been performed) be used to further reduce Term Loan A.

**b. How is mandatory debt principal repayment for notes/bonds calculated?**

Notes usually do not require principal amortization; the entire face value is paid back at maturity ("bullet" payment).

**c. How is mandatory debt principal repayment for PIK notes calculated?**

PIK notes do not require principal amortization before maturity (structured like the principal payment in a "bullet" maturity). The coupon payments on PIK notes can be paid either in cash or "in-kind" (i.e., by issuing new securities whose face value is equal to the amount of the coupon payment due). The decision to pay cash or in-kind is the option of the borrower. When the PIK notes are paid back (assuming no cash interest was paid), the borrower must pay back the entire face value plus accrued coupons.

**d. How are discretionary debt repayments modeled?**

Some credit agreements can give the company the right to pre-pay debt liabilities ahead of schedule. This operation is called "cash sweep" and can be modeled in the LBO model adding a "discretionary debt repayment" on top of the mandatory debt repayment.

Cash sweep is not allowed by notes' debentures; however the company might use excess cash to "call" its bonds ahead of schedule (along with prepayment penalties or make-whole provisions). Similar to bank loan pre-payment, this feature can be modeled adding a specific row in the debt schedule section.[8]

**2) INTEREST CALCULATIONS**

**a. How are fixed rate interest expenses calculated?**

Fixed rate interest expense is calculated as the product of the interest rate and average outstanding debt amount (for amortizing tranches of debt, it is approximated as the average of beginning-of-year debt outstanding and end-of-year debt outstanding). Senior notes/bonds are usually issued at a fixed rate.

**b. How are floating rate interest expenses calculated?** [9]

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The floating rate introduces a layer of complication to the interest expense calculation, because the "all-in" interest rate must be re-calculated before each interest payment. It is usually equal to some index, such as three-month LIBOR, plus a fixed spread. Once the interest rate is computed, the interest rate expense is calculated with the same process used for fixed-rate interest expense. Bank debt is usually issued at a floating rate.

**c. How does interest calculation differ between an amortizing and a non-amortizing debt instrument?**

The only significant difference between amortizing and non-amortizing debt instruments is that the outstanding debt principal decreases over time in an amortizing debt instrument, while it stays flat in a non-amortizing debt instrument. Therefore, the interest calculation decreases over time in an amortizing debt instrument and remains constant in a non-amortizing debt instrument.

**d. Does interest calculation in the LBO model require any particular settings in Excel?**

In the LBO model, interest rate expenses are an output of debt repayment because they require as an input the amount of debt outstanding at the end of the year; however, interest rates are also an input of debt repayment, because they are a use of cash senior to principal repayment. In order to allow Microsoft Excel to perform the entire interest expense calculation, the "circular reference" feature must be allowed. In MS Excel 2010 this can be done pressing the key combination "Alt+T+O" (or selecting "Options" from the "File" menu), going to the "Formulas" section, and selecting the box in the upper-right side beside the phrase "Enable iterative calculation."

**e. How can the interest expense calculation be restored if the LBO model "breaks" or stops working?**

Sometimes Excel encounters errors performing the iterative calculations, resulting in cells displaying "#VALUE!", "#NUM!" or "#N/A!" errors. A simple (but effective in most cases) way to restore the correct interest expense calculation is to copy interest expense cells from the income statement, paste them into free cells (e.g., next to the model, in a space not used by other formulas), delete the interest rate row in the income statement, then go back to the pasted cells and copy and paste them back in the original cells. This simple process forces Excel to restart from the beginning of the iterative calculation, and is often able to solve the broken calculation. If this doesn't work, you will need to delete the interest expense calculation row, and then relink the formula in each cell for interest calculation.

**3) INTEREST FLOOR**

**a. Why is there sometimes a "floor" to interest rates?**

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"Floors" were introduced into loan term sheets when interest rates declined in the mid-2000s, in order to protect banks' profitability. They are often provisions in term sheets in current market conditions, and can be expressed as percentages or basis points.

b. **How is the "interest rate floor" factored into the calculation of expected floating-rate interest expenses?**

Floating-rate interest expenses are usually calculated using forward rates as an estimate of the future level of interest rates. In the event a debt tranche has an interest rate floor provision, forecasted all-in interest rates are always equal to the greater of the floor value and the interest rate calculated with the standard formula.

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## Endnotes

[1] Most often, management teams are incentivized using the stock of the company, which is illiquid. It is only upon exit that management realizes their incentive compensation.
[2] Terms listed are bracketed to indicate potential market variation.
[3] The "USFI" Bloomberg screen can be used as a proxy for senior unsecured indicative bond pricing for BB or B rated securities. The screen allows for industry selection, with the "Industrials" category representing non-financial corporations, e.g., utilities and oil & gas. An additional source of market pricing may be found in research reports focused on the high yield and leveraged loan markets.
[4] Cash uses can also sometimes include minority interest payouts, and refinancing existing debt costs can potentially include change-of-control costs as indicated in the underlying indentures.
[5] IRRs serve as hurdle rates for the private equity sponsors, reflecting the risk of their investment, as well as market conditions.
[6] Cash uses can also sometimes include minority interest payouts and debt refinancing costs based on change-of-control provisions.
[7] Adjusted EBITDA can incorporate company-specific adjustments, such as the add-back of stock-based compensation.
[8] For a company's existing debt instruments, you can use Bloomberg and Sec.gov to look up the underlying indenture and publicly available loan documents for terms and conditions, including pricing.
[9] LIBOR forwards are typically used in models to forecast future floating rate loan interest rates, and can be found on the Bank of England's website, downloadable to Excel: http://www.bankofengland.co.uk/statistics/pages/yieldcurve/default.aspx.

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