



ROBERT H. SMITH  
SCHOOL OF BUSINESS

## Advanced Financial Management

### *High Debt and Leveraged Buyouts (LBOs)*

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## Outline

1. Financing Corporations and LBOs:
  - A. Security characteristics and LBOs
  - B. Why do a LBO? Debt characteristics and Benefits
  - C. Potential Problems with high-debt and LBOs
  - D. Strategic Effects of LBOs
2. Valuation of LBOs
  - A. Adjusted Present Value (APV)
  - B. Capital Cash Valuation Method (CCV)
  - C. Valuation of Stock & Risky Debt in LBOs:  
The Option Approach

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## 1. Long-term Financing

- **Several features of long-term financing:**
  - Internally generated funds have been the dominant source of funds.
    - 85% of corporate funding is from current or past profits.
  - The primary use of such funds is capital spending.
  - Corporations have been net issuers of securities.
    - Issues have exceeded repurchases.
  - However, recently they have been buying back stock and issuing large amounts of debt.

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- **LBO:** The acquisition by a small group of investors of a public or private company, financed primarily with debt.
  - “Taking the company private.”
  - Shares in “pure” LBO no longer trade on the open market. There have been some public LBOs called leveraged recapitalizations.
  - For most LBOs, remaining equity in the LBO is usually privately held by a small group of investors (usually institutional, or management).
- Types of companies going private:
  - Targets for LBO takeovers are usually mature “cash cows” businesses.
    - Established markets for their products, but ...
    - Few high NPV growth opportunities.
- A large fraction of debt that finances LBO transactions tends to be “junk” debt (below investment grade).

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## A. Security Characteristics

### *5 Fundamental Characteristics of all Financial Instruments: Can Help Explain LBOs and Debt Choice*

1. FLEXIBILITY (High Debt is not very flexible, however, flexibility not important for firms choosing high debt. Why?)
2. RISK & RETURN (Includes order of priority in bankruptcy) (For LBO's, High risk, high return but business risk of LBO's typically low.)
3. INFORMATION - (for LBO's information not important, typically mature businesses)
4. CONTROL (For LBO's HIGH debt gives high control over managers, reduces FCF under control of management, concentrates voting and equity control by LBO equity investors),
5. TAXES (For Lbo's - reduce taxes)

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## B. Why go through an LBO?

- **Financial Flexibility is lessened: Is this bad?**
  - This may have a benefit if firms have invested too much:
    - A. Why might investment be too high?
      - Conflicts between Managers and Shareholders
      - Serious examples include the incentives of executives to build "empires". A possible example: ATT's takeover of NCR.
      - McConnell and Muscarella, Journal of Financial Economics, 1985, OIL EXPLORATION.
      - Debt can be a mechanism that "ties the manager's hands".
      - LBO's are often "MBO's" (management buyouts): May provide better incentives for management when they own the firm.

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## Role of Debt in LBO

Diamond (Journal of Finance, 1991, Journal of Financial Economics 1993):

- Role of financial structure is to set limits on opportunistic behavior by siphoning out excess cash flow and to provide incentives for outside monitoring.
- Short-term debt / long term debt. Short-term debt provides for earlier evaluation of investments.
- Additional benefits from borrowing from a financial intermediary who has a comparative advantage in monitoring (watching, evaluating) the investment decisions of management.

## Types of Debt Contracts

Hart and Moore (American Economic Review, 1995):

- Start with the premise that managers always want to continue even if liquidation is optimal.
- LBOs typically financed with a combination of short-term and long-term debt.
- Short-term debt provides a trip-wire that elicits a review and termination of unprofitable projects.
- Senior long-term debt prevents insiders from escaping capital market oversight - controls management's ability to finance future investments. \* Debt Overhang \* (Also Grossman and Hart (1982))

## Are any of these benefits “real”?

- Cash flow improvements: A number of studies have documented that cash flows improve after an LBO.
  - Kaplan (Journal of Financial Economics, (JFE) 1989) finds that, on average, cash flow increases by 20.1% after an LBO. Capital expenditures decrease.
- Productivity increases: Labor productivity (based on measures like sales per employee) increases after an LBO. Additionally, some researchers (e.g. Smith, JFE, 1990) find that working capital also tends to be reduced after an LBO.
- Old shareholders tend to benefit as they are bought out at a premium.

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## C. Potential Problems

1. *Bankruptcy risk (discussed later)*
2. *Leverage can induce firms to choose overly risky projects:*

### (Over simplistic) Example:

- Firm can take on one of two projects, project A or B.
- Project A can pay off either \$50 or \$150, each with probability 1/2.
- Project B always pays off \$110.
- Neither project costs anything to invest ==> NPV of project A is \$100, NPV of project B is \$110.
  - Project B is higher NPV and should be chosen.
- However, suppose that the firm has *pre-existing*, outstanding debt with face value of \$100. Which project will the owners of the firm choose?

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### Example continued

- If choose project B, payment to shareholders will be \$10 with certainty, after paying off debt.
  - If choose project A, shareholders receive \$150 - \$100 = \$50 in good state, which occurs with prob.  $1/2$  ==> shareholders receive expected value of \$25.
- Owners would choose project A, the *riskier* one (and lower return), gambling with “other people’s money” i.e. “bag the bondholder.”

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### D. Strategic effects of LBOs

- There is a good deal of evidence that a firm’s capital structure can affect its operations and investment decisions.
  - High leverage can increase costs of financial distress, impact firm’s ability to invest.
- Debt (and capital structure more generally) can also affect the way competing firms interact (strategic interaction). Firms should therefore take this into account in making their capital structure decisions.

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## Leverage and Competitive Strategy

- Several possibilities may arise:
  - High debt firms may invest less. This may have a positive effect on industry profits if overall production goes down.
  - Increasing leverage may cause a firm to pursue more aggressive pricing strategies in order to capture a larger market share.
    - This in turn may deter potential competitors from entering, or may force them to cut back on production
  - But if leverage is too high, it may also encourage competitor firms to react aggressively in order to force leveraged firm into market exit.

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- **Caveat:** High leverage increases the probability of financial distress. To the extent that managers (or owners) are concerned about *avoiding* bankruptcy, managers may become more cautious and thus pursue *less* aggressive output and pricing strategies.
- Also, an increased probability of bankruptcy implies that managers will probably care less about the future, since there is a reduced probability that the firm will continue to be around.
  - This may make managers less willing to invest in long term product market strategies, such as building market share by either offering low prices.
- These are indeed the findings of academic research (Phillips (1995), Kovenock and Phillips (1997), Chevalier (1995).)

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## Conclusion of these studies:

- Debt acts as a commitment to decrease output & raise prices by decreasing excess funds necessary to advertise, invest, and expand output.
- Industry profits generally increase.

### KEY FACTORS:

- Whether rivals are also highly leveraged.
- Ease of Expansion and Entry.

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## 2. Valuation of LBO's

- To value LBO's, several methodologies can be used:
- **Free Cash Flow:** Calculate FCF and discount by the WACC. This method accounts for any benefits of debt by adjusting the discount rate. Typically LBO firm will offer various types of debt in addition to cash. The debt may be secured by the firm being taken over. Preferred stock and bridge loans may also be used + Payment in Kind Debt (PIK).
  - Problem: LBO's are highly leveraged transactions in which we expect the capital structure to change rapidly.
    - Investors are usually expected to pay off outstanding principal according to a specific timetable ==> The firm's debt/equity ratio falls over time, in a predictable way.
    - WACC approach is better for valuing situations where the debt/equity ratio remains constant.

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## A. Adjusted Present Value Approach (APV):

Calculate NPV of the all-equity financed firm and add the value of the tax benefits of debt.

- Forecast a firm's or project's after-tax cash flows (assuming firm or project is financed entirely by equity)
- Value these cash flows, again assuming the firm or project is all-equity financed.
- Add the value generated as a result of the tax shield (and any other benefits) from debt financing.

$$\sum_{t=1}^{\infty} \frac{CF_t}{(1+r)^t} + TSD - I$$

Where  $TSD$  = present value of tax shields of debt,  $I$  = initial investment, and  $r$  = cost of capital for project in an unlevered form.

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- **Advantage:** This method calculates separately the value created by the project and the value created by the financing.
  - For this reason, it is easy to apply to a firm whose capital structure is changing over time.

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- Example: Viacom Enterprises is considering a project to sell videos that has a cost of capital of 12% if it is financed entirely by equity.
- The project should generate \$1.8 million of after-tax cash flows (including depreciation, assuming depreciation=additional capx and no increase in NWC) for the next 10 years. This project requires a \$10 million initial investment.
- The NPV of the project, assuming it is all-equity financed, is?

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- However, suppose that VCOM has a 50% target debt ratio (wants to limit debt to 50% of assets) - if it invests more, it must borrow more.
  - Therefore, let us assume that of the \$10 million required for the project, DD decides to borrow \$5 million (since the \$10 million investment effectively implies that assets have increased by \$10 million).
  - Assume that the \$5 million is repaid in equal annual installments.
  - Suppose that the interest rate on the loan is 8%. Also assume the tax rate is 34%.
  - What are the value of the tax shields?

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## Solution: Click when ready



Microsoft Office  
Excel Worksheet

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- We can now calculate the NPV of the entire project, using the APV method:

$$\begin{aligned} \text{APV} &= \text{base-case NPV} + \text{PV}(\text{tax shield}) \\ &= 170,000 + 559,290 = \$729,290 \end{aligned}$$

- Potential problem: We treated the tax shields as a “safe” cash flow. In reality, a firm would probably never be sure to use its tax shields (you can’t use them unless you actually pay taxes, for which you need to make money).
  - Might have to incorporate the probability that the firm will actually be profitable.
- Any other benefits from debt can be incorporated in the same way (such as government subsidized financing).

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## B. Capital Cash Valuation Method.

### Capital Cash Valuation Method.

1. Take Net Income of firm with actual debt (builds in tax shields directly)
2. add depreciation and special charges,
3. add interest
4. subtract change in NWC and
- 5 subtract incremental investment.

### **Value at all equity discount rate.**

- Advantage: easy, gives “similar” answer as APV  
However different value of tax shields.

Avoids calculation of “debt” discount rate. Does assume tax shields are at similar risk as whole firm.

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## Example Continued

- Value the firm in the previous example using the capital cash flow:
  - Hints:
    - find EBIT first,
    - Subtract interest
    - Subtract taxes
    - Get new NI (proceed as outlined in prev. slide.)
- Solution on next slide: Just click ICON

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## Solution



Microsoft Office  
Excel Worksheet

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## C. Valuation: Option Approach

- Noting that stockholders have limited liability we can view stock as a call option on the underlying value of the firm - where:
- $\$K$  = Amount of Corporate Debt outstanding
- Debt can be viewed as a combination of riskless debt less a value of a put option that the stockholders have to walk away from the liabilities of the firm.
- We can then use Put-Call Parity condition to value the firm's securities.

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Put - Call parity says:

$$S = C(K) + Ke^{-rt} - P(K)$$

where  $S$  = value of the firm's cash flows,

- $K$  is the face value of the firm's liabilities,
  - $t$  is the time to maturity of the options,
  - $r$  the riskless rate of interest,
  - $C(K)$  is the market value of the levered stock,
  - $Ke^{-rt}$  is the value of the firm's debt, if riskless.
- Of course, the debt is not riskless. If the value of the cash flows,  $S$ , is less than  $K$  the stockholders will invoke limited liability and put the firm back to the creditors. The actual market value of the debt is thus:  
 $Ke^{-rt} - P(K)$ ; the riskless debt less the default option.

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- Thus: Value of a risky bond = riskless bond - value of default option.
- Value of Option to Default = Value of Stockholders' Put Option on the Underlying Value of the Firm.
- Remember, the options value increases with the risk - so if stockholders can increase the variance of the underlying assets their value will increase in TWO ways.
  1. The put option will increase in value.
  2. The call option on the upside potential will increase in value.

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## EXAMPLE

- \* Current Value of Assets: \$20 Million. Beta of Assets = 1.
- \* Annual standard deviation of assets (oil) = .41.
- \* There are 1,000,000 shares of stock outstanding.
- \* Face Value of Debt = \$20 Million. All Zero Coupon Debt.
- \* Time to Debt repayment = 4 years.
- \* Instantaneous risk free rate of interest = 10%.

Question: What is the Market Value of Debt and Common Stock?

Assume that Black -Scholes Option Pricing Formula Holds.

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## Answer

The Total Value of the Stock is like a Call Option with a strike price of \$20 Million (debt repayment).

The Value of the Debt is the PV of riskless - the default Option:  $P(K)$ .

Use Put Call Parity:

$$S = C(K) + Ke^{-rt} - P(K)$$

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## Answer - 2

- In this case  $S = \text{Value of Assets} = \$20 \text{ Million}$
- The present value of the debt if riskless is: \$13.406 Million
- The value of the Call,  $C(K)$ , is analogous to the **stock value** for this highly leverage firm. We figure out this using Black -Scholes for a call option. The value is: \$9.19 Million
- The value of the risky debt is thus:  $20 - \$9.19 \text{ Million} = \$10.81 \text{ Mill.}$  with the Default Option worth: \$2.59 Million to the shareholders.

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## High Debt and LBOs: Key Points to Remember

- High debt can help promote economic efficiency.
- Important to understand risk of the company and affect on competitors.
  - High debt may force companies to sell assets to raise cash to meet principal reduction. Answer to the question: “What mechanisms promote transfers of assets from inefficient firms to efficient ones?” is important.
  - What happens if deal does not work out? Have to have backup plan. Can I raise cash and/or restructure the debt?