Module 12

VALUING AND ACQUIRING A BUSINESS

Background

- Objective of Module
  - How to value a business
    - Either that of its assets or of its equity
- The focus is on the methods most commonly used in valuing firms:
  - Valuation by *comparables*
  - Valuation by *discounting the cash flows from the firm's assets*
  - Valuation using the *adjusted present value approach*
- OS Distributors is used to illustrate the methods
  - Firm was also analyzed in Modules 3-5

Background

- After reading this Module, students should understand:
  - The alternative methods used to value businesses and how to apply them in practice to estimate the value of a company
  - Why some companies acquire other firms
  - How to value a potential acquisition
  - Why a high proportion of acquisitions usually fail to deliver value to the shareholders of the acquiring firm
- **Leveraged buyout** (*LBO*) deals and how they are put together

Alternative Valuation Methods

- Most common approaches to valuing a business:
  - **Valuation by comparables**
    - Comparing a business to similar firms in its sector,
  - **Discounted cash flow** or **DCF valuation**
    - Based on discounting a business' future cash-flow stream at a required rate of return
- Other measures of a business' value:
  - **Liquidation value**
  - **Replacement value**

Valuing A Firm's Equity Using Comparables

- The valuation by comparables method is applied to the estimation of OS Distributors' equity
- OS Distributors is an unlisted, privately owned firm,
  - Financial statements are presented in **Exhibits 12.1** and **12.2**.
- The equity value that matters to investors is the market value, not the book value
  - Book value is only relevant to the extent that it provides some useful information about the firm's *future* performance.

EXHIBIT 12.1a:
OS Distributors' Balance Sheets.

Figures in millions of dollars

	DEC. 31, 1998		DEC. 31, 1999		DEC. 31, 2000	
ASSETS						
CURRENT ASSETS		**$104.0**		**$119.0**		**$137.0**
Cash[1]	$6.0		$12.0		$8.0	
Accounts receivable	44.0		48.0		56.0	
Inventories	52.0		57.0		72.0	
Prepaid expenses[2]	2.0		2.0		1.0	
NONCURRENT ASSETS		**56.0**		**51.0**		**53.0**
Financial assets & intangibles		0.0		0.0		0.0
Property, plant, & equip. (net)						
Gross value[3]	$90.0		$90.0		$93.0	
Accumulated depreciation	(34.0)	56.0	(39.0)	51.0	(40.0)	53.0
TOTAL ASSETS		**$160.0**		**$170.0**		**$190.0**

EXHIBIT 12.1b:
OS Distributors' Balance Sheets.

Figures in millions of dollars

	DEC. 31, 1998	DEC. 31, 1999	DEC. 31, 2000
LIABILITIES AND OWNER'S EQUITY			
CURRENT LIABILITIES	**$54.0**	**$66.0**	**$75.0**
Short-term debt	$15.0	$22.0	$23.0
Owed to banks	$7.0	$14.0	$15.0
Current portion of long-term debt	8.0	8.0	8.0
Accounts payable	37.0	40.0	48.0
Accrued expenses[4]	2.0	4.0	4.0
NONCURRENT LIABILITIES	**42.0**	**34.0**	**38.0**
Long-term debt[5]	42.0	34.0	38.0
Owners' equity[6]	**64.0**	**70.0**	**77.0**
TOTAL LIABILITIES AND OWNERS' EQUITY	**$160.0**	**$170.0**	**$190.0**

EXHIBIT 12.2a:
OS Distributors' Income Statements.

Figures in millions of dollars

	1998		1999		2000	
Net sales	**$390.0**	***% of Sales***	**$420.0**	***% of Sales***	**$480.0**	***% of Sales***
Cost of goods sold	**($328.0)**		**($353.0)**		**($400.0)**	
Gross profit	**62.0**	***15.9%***	**67.0**	***15.9%***	**80.0**	***16.7%***
Selling, general, & administrative expenses	**(39.8)**		**(43.7)**		**(48.0)**	
Depreciation expenses	**(5.0)**		**(5.0)**		**(8.0)**	
Operating profit	**17.2**	***4.4%***	**18.3**	***4.4%***	**24.0**	***5.0%***
Extraordinary items	**0**		**0**		**0**	
Earnings before interest & tax (EBIT)	**17.2**	***4.4%***	**18.3**	***4.4%***	**24.0**	***5.0%***
Net interest expenses[1]	**(5.5)**		**(5.0)**		**(7.0)**	

[1] There is no interest income, so net interest expenses are equal to interest expenses.

EXHIBIT 12.2b:
OS Distributors' Income Statements.

Figures in millions of dollars

	1998		1999		2000	
Earnings before tax (EBT)	11.7	3.0%	13.3	3.2%	17.0	3.5%
Income tax expense	(4.7)		(5.3)		(6.8)	
Earnings after tax (EAT)	$7.0	1.8%	$8.0	1.9%	$10.2	2.1%
Dividends	$2.0		$2.0		$3.2	
Retained Earnings	$5.0		$6.0		$7.0	

Estimating The Comparable Value Of OS Distributors' Equity

- Comparable company for OS Distributors
  - General Equipment and Supplies (GES)
    - **Exhibit 12.3** shows accounting and financial market data for the two companies
- Value of OS Distributors is estimated from comparable market multiples on the premise that
  - Comparable firms should trade at the same market multiples (**historical** or **expected**)
    - The value varies between $146 million to $160 million depending upon the multiple used

EXHIBIT 12.3a:
Accounting and Financial Market Data for OS Distributors and GES, a Comparable Firm.

	GES	OS DISTRIBUTORS
Accounting data (2000)		
1. Earnings after tax (EAT)	$63.5 million	$10.2 million
2. "Cash earnings" = EAT + depreciation expenses	$63.5 + $57.5 = $121 million	$10.2 + $8 = $18.2 million
3. Book value of equity	$526 million	$77 million
4. Number of shares outstanding	50 million shares	10 million shares
5. Earnings per share or EPS [(1)/(4)]	$1.27	$1.02
6. "Cash earnings" per share [(2)/(4)]	$2.42	$1.82
7. Book value per share [(3)/(4)]	$10.52	$7.70

EXHIBIT 12.3b:
Accounting and Financial Market Data for OS Distributors and GES, a Comparable Firm.

	GES	OS DISTRIBUTORS
Financial Market data (January 2001)		
8. Share price	$20	Not available
Multiples		
9. Price-to-earnings ratio [(8)/(5)]	15.7 times	Not available
10. Price-to-cash earnings ratio [(8)/(6)]	8.3 times	Not available
11. Price-to-book value ratio [(8)/(7)]	1.9 times	Not available

Factors That Determine Earnings And Cash-flow Multiples

- Earnings and cash earnings multiples are affected by
  - General market environment
    - Such as the prevailing level of interest rates
  - Factors unique to companies
    - Such as their expected growth and perceived risk
- DCF formula is used to explain why
  - Companies with *high* expected rates of growth and *low* perceived risk usually have *high* multiples
  - Multiples increase in an environment of declining interest rates

Factors That Determine Earnings And Cash-flow Multiples

- When comparing values of firms in different countries (and even in different industries within the same country)
  - Cash earnings multiples should be used rather than accounting earnings multiples
    - Neutralizes some of the distortions introduced by differences in accounting rules across countries (and across industries within a country)

EXHIBIT 12.4:
Multiples for Three Markets.

MULTIPLE[1]	UNITED STATES (New York Stock Exchange)	UNITED KINGDOM (London Stock Exchange)	JAPAN (Toyko Stock Exchange)
Price-to-earnings	**29.1**	**21.5**	**57.1**

[1] Datastream, 4th quarter 2000.

Valuing A Firm's Assets And Equity Using The Discounted Cash Flow Approach

- **Estimating the DCF value of a firm's assets**
  - According to the DCF method, the value of an asset is determined by
    - Capacity of that asset to generate future cash flows
  - Starting with the case of a company with no expected growth, we
    - Examine the impact of factors such as expected growth and risk
    - Provide general formulas to value assets, cash flows and cost of capital

Valuing A Firm's Assets And Equity Using The Discounted Cash Flow Approach

- **The impact of the growth of cash flows on their DCF value**
  - The faster the growth rate in cash flows, the higher is their discounted value
- **The impact of the risk associated with cash flows on their DCF value**
  - The higher the risk of a cash-flow stream, the lower is its discounted value

Valuing A Firm's Assets And Equity Using The Discounted Cash Flow Approach

- **A general formula to calculate the DCF value of a firm's assets**
  - Equation 12.3 is the formula to use in calculating the DCF value of a firm's assets

$$DCF_{value} = \frac{CFA_1}{(1+k)^1} + \frac{CFA_2}{(1+k)^2} + \ldots + \frac{CFA_t}{(1+k)^t} + \ldots$$

  - To estimate the DCF value of a company's assets
    - Expected cash flows from these assets should be estimated first and
    - Then discounted at a required rate of return that reflects their risk
      - With riskier expected cash flows discounted at a higher rate

Valuing A Firm's Assets And Equity Using The Discounted Cash Flow Approach

- **Estimating the cash flows generated by assets**
  - The net cash flow from assets, called **cash flow from assets** or **CFA** (often referred to as **free cash flow**) is the cash flow generated by the firm's *operating* and *investing* activities
    - Any items related to the firm's *financing* activities are excluded
  - Expected CFA and operating margin from the firm's assets (earnings before interest and tax, or EBIT) are related

$$\text{CFA} = \text{EBIT}(1 - T_C) + \text{Depreciation expenses} - \Delta\text{WCR} - \text{Net capital expenditures}$$

Valuing A Firm's Assets And Equity Using The Discounted Cash Flow Approach

- **Estimating the rate of return required to discount the cash flows**
  - The *minimum* required rate of return used to discount the cash flows generated by assets must be at least equal to the cost of financing the assets
    - Weighted average cost of capital (WACC) is the relevant discount rate

$$\text{WACC} = \frac{\text{equity}}{\text{equity + debt}} \times k_E + \frac{\text{debt}}{\text{equity + debt}} \times k_D \left(1\text{-tax rate}\right)$$

    - Capital asset pricing model (CAPM) is an approach to estimating the cost of equity financing

$$k_E = R_F + \text{market risk premium} \times \beta$$

Estimating The DCF Value Of A Firm's Equity

- Buying the firm's *assets* is not the same as buying that firm's *equity*
  - If we buy a firm's equity from its existing owners, we will own the firm's assets and we will also assume the firm's existing debt
- The estimated DCF value of a *firm's equity* is the difference between the DCF value of its assets and the value of its outstanding debt

Estimating The DCF Value Of OS Distributors' Assets And Equity

- Example: Conducting a DCF valuation using the valuation of OS Distributors' assets and equity
  - Assumed that the firm will stay **as is**, *i.e.* its operating efficiency remains the same as in 2000
  - **Stand-alone value** is estimated in a four-step procedure

Estimating The DCF Value Of OS Distributors' Assets And Equity

- Step 1: Estimation of OS Distributors' cash flow from assets
  - When estimating the DCF value of a firm's assets, the usual forecasting period is five years,
    - In the case of OS Distributors from 2001 to 2006
  - When a firm is valued as a **going concern**, we also need to estimate the **terminal** (or **residual**) DCF value of its assets, *at the end of the forecasting period*
    - Value is based on the cash flows the firm's assets are expected to generate *beyond the forecasting period*

Estimating The DCF Value Of OS Distributors' Assets And Equity

- **Estimating the cash flows from assets up to year 2006**
  - The forecast of OS Distributors' cash flows and their DCF value are shown in **Exhibit 12.5**
    - Assumed that the growth rate will drop from 10 percent to a residual level of 3 percent at the end of the forecast period
    - After the growth rates are estimated, expenses are calculated as a percentage of sales
    - Since OS Distributors is valued as is, no major investments are expected beyond the *maintenance of existing assets*
    - Maintenance costs are assumed to be exactly the same as the annual depreciation expenses
    - Issue of consistency in making forecasts
      - For example, if the firm's activities are assumed to slow down, so should its capital expenditure and depreciation expenses

Estimating The DCF Value Of OS Distributors' Assets And Equity

- **Estimating the residual value of assets at the end of year 2005**
  - Use the constant growth formula to estimate the residual value of OS Distributors' assets at the end of year 2005
    - The firm's rate of growth in perpetuity *after* the year 2006 is the residual level of 3 percent, the estimated secular growth rate of the entire economy
    - WACC is the one estimated in step 2

Estimating The DCF Value Of OS Distributors' Assets And Equity

- Step 2: Estimation of OS Distributors' weighted average cost of capital
  - The relevant rate at which to discount the cash flows from the business' assets is the business' WACC
    - The appropriate proportions of equity and debt financing must be based on *market values* of equity and debt, not their accounting values
      - Because OS Distributors is not a listed company, the comparable firm's (GES) debt ratio is used (70 percent of equity and 30 percent of debt)
    - The cost of debt is the after-tax cost of *new* borrowing, or 4.5 percent
    - The cost of equity is estimated using the CAPM
      - The GES beta of 1.14 is used as a proxy of OS Distributors' beta. The market risk premium over the government bond rate is 6.2 percent and the risk free rate is 6 percent
    - The estimated value of OS Distributors' WACC is 10.5 percent, with a cost of equity of 13.07 percent

Estimating The DCF Value Of OS Distributors' Assets And Equity

- Step 3: Estimation of the DCR value of OS Distributors' assets
  - The general valuation formula is used to estimate the value of OS Distributors' assets
    - Calculated value: $217 million
      - High proportion of the residual value in comparison to the yearly OS Distributors' cash-flow estimates is not that unusual
        - Particularly in cases where the growth rates during the forecasting period are not exceptionally high and are assumed to decline steadily toward their perpetual level
- Step 4: Estimation of the DCF value of OS Distributors' equity
  - The estimated value of OS Distributors' *equity* ($156 million) is found as
    - Estimated value of its assets ($217 million) less the book value of its outstanding debt at the end of 2000 ($61 million)

EXHIBIT 12.5a:
Discounted Cash Flow (DCF) Valuation of OS Distributors' Equity at the Beginning of Jan. 2001.

Figures in millions of dollars; historical data from Exhibits 12.1 and 12.2

		HISTORICAL DATA		
		1998	1999	2000
1.	Sales growth rate		7.7%	14.3%
2.	COGS[1] in percent of sales	84.10%	84.05%	83.33%
3.	SG&A[1] in percent of sales	10.21%	10.40%	10.00%
4.	WCR[1] in percent of sales	15.13%	15.00%	16.04%
5.	Sales	$390.0	$420.0	$480.0
6.	*less COGS*	*(328.0)*	*(353.0)*	*(400.0)*
7.	*less SG&A*	*(39.8)*	*(43.7)*	*(48.0)*
8.	*less depreciation expenses*	*(5.0)*	*(5.0)*	*(8.0)*
9.	equals EBIT[1]	17.2	18.3	24.0
10.	EBIT × (1 – Tax rate of 40%)	$10.3	$11.0	$14.4
11.	plus depreciation expenses	5.0	5.0	8.0
12.	*WCR at year-end*	*59.0*	*63.0*	*77.0*
13.	less Δ WCR (change in (12))		(4.0)	(14.0)
14.	less net capital expenditures		(0.0)	(10.0)
15.	equals cash flow from assets			–$1.6
16.	Residual value of assets at the end of year 2005			

EXHIBIT 12.5b:
Discounted Cash Flow (DCF) Valuation of OS Distributors' Equity at the Beginning of Jan. 2001.

Figures in millions of dollars; historical data from Exhibits 12.1 and 12.2

		ESTIMATED CASH FLOWS TO YEAR 2006		
		2001	2002	2003
1.	Sales growth rate	10%	8%	7%
2.	COGS[1] in percent of sales	83.33%	83.33%	83.33%
3.	SG&A[1] in percent of sales	10.00%	10.00%	10.00%
4.	WCR[1] in percent of sales	16.04%	16.04%	16.04%
5.	Sales	$528.0	$570.2	$610.1
6.	*less COGS*	*(440.0)*	*(475.2)*	*(508.4)*
7.	*less SG&A*	*(52.8)*	*(57.0)*	*(61.0)*
8.	*less depreciation expenses*	*(8.0)*	*(8.0)*	*(7.0)*
9.	equals EBIT[1]	27.2	30.0	33.7
10.	EBIT × (1 – Tax rate of 40%)	$16.3	$18.0	$20.2
11.	plus depreciation expenses	8.0	8.0	7.0
12.	*WCR at year-end*	*84.7*	*91.5*	*97.9*
13.	less Δ WCR (change in (12))	(7.7)	(6.8)	(6.4)
14.	less net capital expenditures	(8.0)	(8.0)	(7.0)
15.	equals cash flow from assets	$8.6	$11.2	$13.8
16.	Residual value of assets at the end of year 2005			

EXHIBIT 12.5c:
Discounted Cash Flow (DCF) Valuation of OS Distributors' Equity at the Beginning of Jan. 1998.

Figures in millions of dollars; historical data from Exhibits 12.1 and 12.2

		ESTIMATED CASH FLOWS TO YEAR 2006		
		2004	2005	2006
1.	Sales growth rate	5%	4%	3%
2.	COGS[1] in percent of sales	83.33%	83.33%	83.33%
3.	SG&A[1] in percent of sales	10.00%	10.00%	10.00%
4.	WCR[1] in percent of sales	16.04%	16.04%	16.04%
5.	Sales	$640.7	$666.3	$686.3
6.	*less COGS*	*(553.9)*	*(555.2)*	*(571.9)*
7.	*less SG&A*	*(64.1)*	*(66.6)*	*(68.6)*
8.	*less depreciation expenses*	*(6.0)*	*(6.0)*	*(6.0)*
9.	equals EBIT[1]	36.7	38.5	39.8
10.	EBIT × (1 – Tax rate of 40%)	$22.0	$23.1	$23.9
11.	plus depreciation expenses	6.0	6.0	6.0
12.	*WCR at year-end*	*102.8*	*106.9*	*110.1*
13.	less Δ WCR (change in (12))	(4.9)	(4.1)	(3.2)
14.	less net capital expenditures	(6.0)	(6.0)	(6.0)
15.	equals cash flow from assets	$17.1	$19.0	$20.7
16.	Residual value of assets at the end of year 2005		$276.0	

EXHIBIT 12.5d:
Discounted Cash Flow (DCF) Valuation of OS Distributors' Equity at the Beginning of Jan. 1998.

Figures in millions of dollars; historical data from Exhibits 12.1 and 12.2

		HISTORICAL DATA
		BEGINNING 2001
17.	**WACC[1]**	**10.5%**
18.	**DCF[1] value of assets at 11.25%**	**$217**
19.	***less book value of debt (short-term and long-term***	***$61***
20.	**equals DCF value of equity**	**$156**

[1] COGS = Cost of goods sold, SG&A = Selling, general, and administrative expenses, EBIT = Earning before interest & tax, WCR = Working capital requirement, WACC = Weighted average cost of capital, DCF = Discounted cash flow.

Comparison Of DCF Valuation And Valuation By Comparables

- The DCF value of OS Distributors' equity is lower than any of the values estimated from comparable multiples
  - The fair value of OS Distributors is probably closer to the DCF value than to any of its comparable values
    - Because DCF valuation is based on the projected cash flows from OS Distributors' own assets
      - Rather than on a mix of financial market and accounting data from another company (GES)

Estimating The Acquisition Value Of OS Distributors

- The DCF equity value determined *as is* does not take into account any potential improvement in managing the firm
  - Such improvements—usually expected when the firm is acquired by another one—result in potential value creation
- When a firm acquires another one, the potential value creation is shared between the acquirer and the target
  - If we call **takeover premium** the portion going to the target
    - Then the net present value of the investment made by the acquirer is the difference between the potential value creation and the takeover premium
- To estimate the acquisition value of a firm, must first identify the potential sources of value creation in an acquisition
  - If those sources are not present, such as in a **conglomerate merger**, an acquisition is not likely to create value

Identifying The Potential Sources Of Value Creation In An Acquisition

- In order to create value an acquisition must achieve one of the following:
  - Increase the cash flows generated by the target firm's assets
  - Raise the growth rate of the target firm's sales
  - Lower the WACC of the *target* firm
- **Inefficient management** and **synergy** provide the most powerful reasons to justify an acquisition
  - Other reasons
    - **Undervaluation hypothesis**
    - **Market power hypothesis**

Identifying The Potential Sources Of Value Creation In An Acquisition

- Specific sources of value creation in an acquisition
  - **Increasing the cash flows generated by the target firm's assets**
    - A reduction in a firm's cost of goods sold or in its selling, general, and administrative expenses will increase its operating profits, thus increasing the firm's cash flows
      - A reduction in tax expenses will have the same effect
    - Another way to increase the target firm's cash flows is to use its assets more efficiently
      - A more efficient use of assets can be achieved by reducing any over-investment (*e.g*. in cash, working capital requirement or in fixed assets)

Identifying The Potential Sources Of Value Creation In An Acquisition

- **Raising the sales growth rate**
  - All other things being equal, faster growth in sales will create additional value
    - Can be achieved by increasing the volume of goods or services sold and/or by raising their price using superior marketing skills and strategies
- **Lowering the cost of capital**
  - If the target firm's capital structure is currently not close to its optimal level, then changing the firm's capital structure when the firm is acquired should lower its WACC and raise its value

Identifying The Potential Sources Of Value Creation In An Acquisition

- A merger is unlikely to lead to a reduction in the cost of equity
  - Often argued that if the merged firms are perceived by their creditors to be less likely to fail as a combination than as separate entities
    - Then their post-merger cost of debt could be lower (**coinsurance effect)**

Why Conglomerate Mergers Are Unlikely To Create Lasting Value Through Acquisition

- Conglomerate merger may increase the conglomerate's earnings per share (EPS)
  - But the growth in EPS is unlikely to be accompanied by a permanent rise in shareholder value
    - **Acquiring unrelated businesses is unlikely to create lasting value**
      - May make sense from the perspective of the acquirer's managers, but it is unlikely to create value
        - Since investors can generate the same value by combining shares of the two companies in their personal portfolios (**homemade diversification**)
        - Only types of mergers that are likely to create lasting value are those that result in managerial improvements or synergistic gains (i.e. **horizontal** or **vertical mergers**)

Why Conglomerate Mergers Are Unlikely To Create Lasting Value Through Acquisition

- **Raising earnings per share through conglomerate mergers is unlikely to create lasting value**
  - Some conglomerates grow rapidly by continuously buying firms that have a *lower* price-to-earnings (P/E) ratio than the P/E of the conglomerate firm, on the premise that
    - Market will value the combination for more than the sum of the pre-merger firms

EXHIBIT 12.6a:
Data for a Conglomerate Merger Based on Raising EPS.

	THE ACQUIRING FIRM	THE TARGET FIRM
1. Earnings after tax	$300 million	$200 million
2. Number of shares	150 million	100 million
3. Price-to-earnings ratio (P/E)	20	10
4. Earnings per share (EPS) = (1)/(2)	$2.00	$2.00
5. Share price = (3) × (4)	$40	$20
6. Total value = (2) × (5)	$6,000 million	$2,000 million

Exhibit 12.6 demonstrates that if such an acquisition is a simple combination that does not create any value and the market is not fooled, the share price will remain unchanged. If, on the other hand, the market is fooled, the acquirer could then use its higher share price to make another acquisition and continue to do so, until the bubble bursts.

EXHIBIT 12.6b:
Data for a Conglomerate Merger Based on Raising EPS.

	VALUE OF THE MERGED FIRM IF THE MARKET ASSIGNS THE COMBINATION A P/E THAT	
	IS VALUE NEUTRAL	EXCEEDS VALUE NEUTRALITY
1. Earnings after tax	$500 million	$500 million
2. Number of shares	200 million	200 million
3. Price-to-earnings ratio (P/E)	16	18
4. Earnings per share (EPS) = (1)/(2)	$2.50	$2.50
5. Share price = (3) × (4)	$40	$45
6. Total value = (2) × (5)	$8,000 million	$9,000 million

The Acquisition Value Of OS Distributors' Equity

- To consider OS Distributors an acquisition target
  - Potential acquirer first would have to determine that OS Distributors' performance could be improved
- Assume that a prospective acquirer of OS Distributors has identified four separate improvements that would result in a potential value creation
  - Reduction in cost of goods sold
  - Reduction in administrative and selling expenses
  - More efficient management of the operating cycle
  - Faster growth
    - The value impact of those improvements is presented in **Exhibits 12.7, 12.8,** and **12.9**
- Overconfidence about the acquirer's ability to realize the full potential of a target often leads to paying too much for the target
  - Almost all of the gains from the acquisition end up in the pockets of the target company's shareholders

EXHIBIT 12.9:
Summary of Data in Exhibits 12.7 and 12.8.

SOURCES OF VALUE CREATION	POTENTIAL VALUE CREATION	
1. Reduction in the cost of goods sold to 82.33% of sales	$42 million	(39%)
2. Reduction in overheads to 9.50% of sales	$21 million	(20%)
3. Reduction of working capital requirement to 13% of sales	$22 million	(21%)
4. Faster growth in sales (2 percentage points higher)	$14 million	(13%)
5. Interaction of growth and improved operations	$8 million	(7%)
Total potential value creation	$107 million	(100%)

Estimating The Leveraged Buyout Value Of OS Distributors

- In a typical **leveraged buyout** (**LBO**)
  - Group of investors purchases a presumably underperforming firm by raising an unusually large amount of debt relative to equity funding
- Assume that the top managers of OS Distributors buy the firm from the current owner for $200 million
  - Financed by $160 million of debt and $40 million of equity
- **Exhibit 12.10** compares OS Distributors' balance sheets before and after the LBO
  - Key issues regarding the LBO of OS Distributors are:
    - Whether the acquisition is a value-creating investment
    - Whether the acquired assets will generate sufficient cash to service the LBO loan

EXHIBIT 12.10:
Comparison of OS Distributors' Balance Sheet Before and After the LBO.

Figures in millions of dollars; before-LBO figures from Exhibit 12.1

BALANCE SHEET	BEFORE THE LBO		AFTER THE LBO	
Cash	8	(6%)	8	(4%)
Working capital requirement	77	(56%)	77	(39%)
Net fixed assets	53	(38%)	115	(57%)
Net assets	$138		$200	
Total debt	61	(44%)	160	(80%)
Equity	77	(56%)	40	(20%)
Total capital	$138		$200	

Estimating The Leveraged Buyout Value Of OS Distributors Equity

- DCF approach assumes that the WACC will remain constant
  - Not the case in an LBO, where a large portion of the corresponding loan is repaid over just a few years
    - This problem is circumvented using the **adjusted present value (APV)** method
      - **The adjusted present value method**
        - DCF value of a firm's assets is first estimated *assuming they are not financed with debt*
        - Then DCF value of future tax savings due to borrowing, estimated by discounting the future stream of tax savings at the cost of debt, is added

Estimating The Leveraged Buyout Value Of OS Distributors Equity

- **The leveraged buyout value of OS Distributors' equity**
  - Note that in a merger, some of the performance improvements are expected to come from synergistic gains resulting from combining the two businesses
  - In an LBO, all the improved performance must come from better management of the firm
- **OS Distributors' unlevered cost of equity**
  - First, OS Distributors' *asset beta* is calculated
  - Then CAPM is used to estimate the firm's *unlevered* cost of equity (12.2 percent)
- **OS Distributors' equity value**
  - APV valuation steps are described in **Exhibit 12.11**
    - At a purchase price of $200 million, the LBO has the potential to create $82 million of value

EXHIBIT 12.11a:
Estimated Leveraged Buyout (LBO) Value of OS Distributors' Assets at the Beginning of January 2001.

Figures in millions of dollars.

	2001	2001	2002	2003	2004	2005	2006
Value of unlevered assets **Unlevered cost of equity = 11.6%**							
1. Cash flow from assets (Exhibit 12.8)		$28.7	$17.2	$20.5	$24.3	$26.9	$30.5
2. Residual value of assets at end of year 2005						$354.6	
3. DCF value of unlevered assets	$290.0						
Value of tax savings on additional depreciation expenses **Discount rate = 9.5%**							
4. Additional depreciation expenses for 10 years		$10.0	$10.0	$10.0	$10.0	$10.0	$10.0
5. Tax savings on depreciation (tax rate = 40%)		$4.0	$4.0	$4.0	$4.0	$4.0	$4.0
6. Residual value of tax savings						$15.4	
7. DCF value of tax savings from deprecation	$25.1						

EXHIBIT 12.11a:
Estimated Leveraged Buyout (LBO) Value of OS Distributors' Assets at the Beginning of January 2001.

Figures in millions of dollars.

	2001	2001	2002	2003	2004	2005	2006
Value of tax savings on interest expenses Cost of debt = 9.5%							
8. Debt outstanding at the beginning of the year		$160.0	$145.0	$130.0	$115.0	$100.0	$85.0
9. Debt repayment		$15.0	$15.0	$15.0	$15.0	$15.0	
10. Debt outstanding at the end of the year		$145.0	$130.0	$115.0	$100.0	$85.0	$87.6
11. Interest Expenses (interest rate = 9.5%)		$15.2	$13.2	$12.4	$10.9	$9.5	$8.3
12. Tax savings on interest expenses (tax rate = 40%)		$6.1	$5.5	$5.0	$4.4	$3.8	$3.3
13. Residual value of tax savings						$50.8	
14. DCF value of tax savings from interest expenses	**$51.7**						
15. DCF value of overall tax savings (7+14)	**$76.8**						
16. DCF value of levered assets 3+15	**$366.8**						

EXHIBIT 12.12a:
Financing OS Distributors' Leveraged Buyout.

Figures in millions of dollars.

	2001	2001	2002	2003	2004	2005	2006
I. Cash flow implications							
1. Total cash flows from assets							
1.1 Cash flow from assets		$28.7	$17.2	$20.5	$24.3	$26.9	$30.5
1.2 Tax savings on additional depreciation		4.0	4.0	4.0	4.0	4.0	4.0
1.3 Total cash flow from assets		$32.7	$21.2	$24.5	$28.3	$30.9	$34.5
2. Cash flow to debtholders							
2.1 Debt outstanding at the end of the year		$145.0	$130.0	$115.0	$100.0	$85.0	$87.6
2.2 Aftertax interest payment		9.1	8.3	7.4	6.5	5.7	5.0
2.3 Debt repayment		15.0	15.0	15.0	15.0	15.0	Zero
2.4 Total aftertax cash flow to debtholders		$24.1	$23.3	$22.4	$21.5	$20.7	$5.0
3. Cash flow to equity holders		$8.6	($2.1)	$2.1	$6.8	$10.2	$29.5
4. Cumulative cash flow to equity holders		$8.6	$6.5	$8.6	$15.4	$25.6	$55.1

Part I of **Exhibit 12.12** reports the impact on cash flows of the LBO deal.

EXHIBIT 12.12b:
Financing OS Distributors' Leveraged Buyout.

Figures in millions of dollars.

	2001	2001	2002	2003	2004	2005	2006
II. Pro forma income statements							
Earnings before interest and tax (EBIT)	$24.0	$35.9	$40.3	$45.7	$50.4	$53.7	$55.5
Additional depreciation	(0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
Interest expenses	(7.0)	(15.2)	(13.8)	(12.4)	(10.9)	(9.5)	(8.3)
Earnings before tax (EBT)	$17.0	$10.7	$16.5	$23.3	$29.5	$34.2	$37.2
Tax (40%)	(6.8)	(4.3)	(6.6)	(9.3)	(11.8)	(13.7)	(14.9)
Earnings after tax (EAT)	$10.2	$6.4	$9.9	$14.0	$17.7	$20.5	$22.3
III. Capital and debt ratios							
Debt outstanding (from above)	$61.0	$145.0	$130.0	$115.0	$100.0	$85.0	$87.6
Equity capital	$77.0	$46.4	$56.3	$70.3	$88.0	$108.5	$130.8
Total capital	$138.0	$191.4	$186.3	$185.3	$188.0	$193.5	$218.4
Ratio of debt to total capital	44%	76%	70%	62%	53%	44%	40%

Part II presents the proforma income statements of OS Distributors based on current expectations. Part III estimates the impact of the LBO on the firm's debt ratio from 1998 to 2003. The analysis shows that if the management team is confident that it can rapidly improve the firm's performance, it should go ahead with the deal.

Will OS Distributors Be Able to Service Its Debt?

- Although the LBO deal makes sense from a value-creation perspective
  - OS management must still meet the challenge of servicing an inordinate amount of debt
    - Particularly the heavy burden of early and rapid principal repayment
- Good candidates for an LBO acquisition
  - Underperforming firms in *stable and predictable* industries
  - Ultimately, the key to a successful LBO is a rapid restructuring of the firm's assets

EXHIBIT 12.13:
Alternative Equity Valuation Models.