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CORPORATE FINANCE

Chapter 19

Valuation and
Financial Modeling:
A Case Study

Chapter Outline

19.1 Valuation Using Comparables

19.2 The Business Plan

19.3 Building the Financial Model

19.4 Estimating the Cost of Capital

19.5 Valuing the Investment

19.6 Sensitivity Anlaysis

Learning Objectives

1. Describe the use of comparables as a preliminary way to estimate firm value.

2. Identify the primary factors to consider when estimating the firm's future cash flows.

3. Describe the use of a financial model in projecting future cash flows from an investment.

4. Use the CAPM to estimate the equity cost of capital for a proposed project, using betas of comparable firms.

5. Use a valuation multiple to estimate the continuation value for a firm or a project.

19-3

Learning Objectives (cont'd)

6. Use the discounted cash flow method to estimate a continuation value for a firm or a project.

7. Use the valuation methods described in Chapter 18 to calculate firm value.

8. Discuss the use of IRR and cash multiples as alternative valuation metrics, and discuss the drawbacks of those methods.

9. Calculate IRR and cash multiples for a given firm or project.

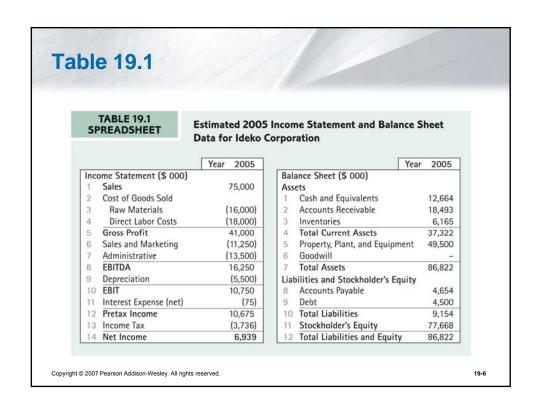10. Describe the use of sensitivity analysis in evaluating the uncertainty of the value of the deal.

19-4

19.1 Valuation Using Comparables

- Consider Ideko Corporation, a privately held firm. The owner has decided to sell the business.

- Your job, as a partner in PKK Investments, is to evaluate purchasing the company, implementing operational and financial improvements, and selling the business at the end of five years.

19-5

Table 19.1

TABLE 19.1 SPREADSHEET — Estimated 2005 Income Statement and Balance Sheet Data for Ideko Corporation

Income Statement ($ 000)	Year 2005		Balance Sheet ($ 000)	Year 2005
1 Sales	75,000		Assets	
2 Cost of Goods Sold			1 Cash and Equivalents	12,664
3 Raw Materials	(16,000)		2 Accounts Receivable	18,493
4 Direct Labor Costs	(18,000)		3 Inventories	6,165
5 Gross Profit	41,000		4 Total Current Assets	37,322
6 Sales and Marketing	(11,250)		5 Property, Plant, and Equipment	49,500
7 Administrative	(13,500)		6 Goodwill	–
8 EBITDA	16,250		7 Total Assets	86,822
9 Depreciation	(5,500)		Liabilities and Stockholder's Equity	
10 EBIT	10,750		8 Accounts Payable	4,654
11 Interest Expense (net)	(75)		9 Debt	4,500
12 Pretax Income	10,675		10 Total Liabilities	9,154
13 Income Tax	(3,736)		11 Stockholder's Equity	77,668
14 Net Income	6,939		12 Total Liabilities and Equity	86,822

19-6

2013/9/2

Table 19.2

TABLE 19.2	Ideko Financial Ratios Comparison, Mid-2005			
Ratio	Ideko (Proposed)	Oakley, Inc.	Luxottica Group	Nike, Inc.	Sporting Goods Industry
P/E	21.6×	24.8×	28.0×	18.2×	20.3×
EV/Sales	2.0×	2.0×	2.7×	1.5×	1.4×
EV/EBITDA	9.1×	11.6×	14.4×	9.3×	11.4×
EBITDA/Sales	21.7%	17.0%	18.5%	15.9%	12.1%

19-7

19.1 Valuation Using Comparables (cont'd)

- A price of $150 million for Ideko's equity has been suggested.

  - The data in the previous slide provides some reassurance that the acquisition price of $150 million is reasonable as the ratios are about or better than the industry averages.

  - However, to assess whether this investment is attractive, the operational aspects of the firm and of the ultimate cash flows the deal is expected to generate needs to be analyzed.

19-8

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Example 19.1

Valuation by Comparables

Problem

What range of acquisition prices for Ideko is implied by the range of multiples for P/E, EV/Sales, and EV/EBITDA in Table 19.2?

19-9

Example 19.1 (cont'd)

Solution

For each multiple, we can find the highest and lowest values across all three firms and the industry portfolio. Applying each multiple to the data for Ideko in Table 19.1 yields the following results:

Multiple	Range		Price ($ million)	
	Low	High	Low	High
P/E	18.2×	28.0×	126.3	194.3
EV/Sales	1.4×	2.7×	107.0	204.5
EV/EBITDA	9.3×	14.4×	153.1	236.0

For example, Nike has the lowest P/E multiple of 18.2. Multiplying this P/E by Ideko's earnings of $6.94 million gives a value of $18.2 \times 6.94 = \$126.3$ million. The highest multiple of enterprise value to sales is 2.7 (Luxottica); at this multiple, Ideko's enterprise value is $2.7 \times 75 = \$202.5$ million. Adding Ideko's excess cash and subtracting its debt implies a purchase price of $202.5 + 6.5 - 4.5 = \$204.5$ million. The above table demonstrates that while comparables provide a useful benchmark, they cannot be relied upon for a precise estimate of value.

19-10

19.2 The Business Plan

- Operational Improvements
  - By cutting administrative costs immediately and redirecting resources to new product development, sales, and marketing, you believe Ideko can increase its market share from 10% to 15% over the next five years.

19-11

19.2 The Business Plan (cont'd)

- Operational Improvements
  - The increased sales demand can be met in the short run using the existing production lines. Once the growth in volume exceeds 50%, however, Ideko will need to undertake a major expansion to increase its manufacturing capacity.

19-12

19.2 The Business Plan (cont'd)

- Operational Improvements

  - Ideko's average selling price is forecast to increase 2% each year.

  - Raw materials are forecast to increase at a 1% rate.

  - Labor costs are forecast to increase at a 4% rate.

19-13

Table 19.3

TABLE 19.3 SPREADSHEET	Ideko Sales and Operating Cost Assumptions							
		Year	2005	2006	2007	2008	2009	2010
Sales Data	Growth/Year							
1 Market Size	(000 units)	5.0%	10,000	10,500	11,025	11,576	12,155	12,763
2 Market Share		1.0%	10.0%	11.0%	12.0%	13.0%	14.0%	15.0%
3 Average Sales Price	($/unit)	2.0%	75.00	76.50	78.03	79.59	81.18	82.81
Cost of Goods Data								
4 Raw Materials	($/unit)	1.0%	16.00	16.16	16.32	16.48	16.65	16.82
5 Direct Labor Costs	($/unit)	4.0%	18.00	18.72	19.47	20.25	21.06	21.90
Operating Expense and Tax Data								
6 Sales and Marketing	(% sales)		15.0%	16.5%	18.0%	19.5%	20.0%	20.0%
7 Administrative	(% sales)		18.0%	15.0%	15.0%	14.0%	13.0%	13.0%
8 Tax Rate			35.0%	35.0%	35.0%	35.0%	35.0%	35.0%

19-14

Example 19.2

Production Capacity Requirements

Problem
Based on the data in Table 19.3, what production capacity will Ideko require each year? When will an expansion be necessary?

19-15

Example 19.2 (cont'd)

Solution
Production volume each year can be estimated by multiplying the total market size and Ideko's market share in Table 19.3:

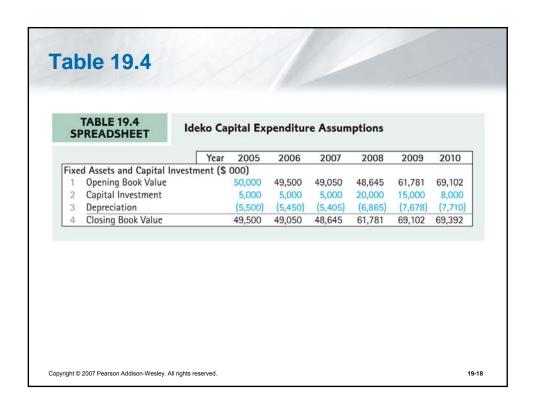|	Year	2005	2006	2007	2008	2009	2010
Production Volume (000 units)							
1 Market Size		10,000	10,500	11,025	11,576	12,155	12,763
2 Market Share		10.0%	11.0%	12.0%	13.0%	14.0%	15.0%
3 Production Volume (1 × 2)		1,000	1,155	1,323	1,505	1,702	1,914

Based on this forecast, production volume will exceed its current level by 50% by 2008, necessitating an expansion then.

19-16

Capital Expenditures:
A Needed Expansion

- In 2008, a major expansion will be necessary, leading to a large increase in capital expenditures in 2008 and 2009.

Table 19.4

TABLE 19.4 SPREADSHEET	Ideko Capital Expenditure Assumptions						
	Year	2005	2006	2007	2008	2009	2010
Fixed Assets and Capital Investment ($ 000)							
1 Opening Book Value		50,000	49,500	49,050	48,645	61,781	69,102
2 Capital Investment		5,000	5,000	5,000	20,000	15,000	8,000
3 Depreciation		(5,500)	(5,450)	(5,405)	(6,865)	(7,678)	(7,710)
4 Closing Book Value		49,500	49,050	48,645	61,781	69,102	69,392

Working Capital Management

- Ideko's Accounts Receivable Days is:

$$\text{Accounts Receivable Days} = \frac{\text{Accounts Receivable (\$)}}{\text{Sales Revenue (\$ / yr)}} \times 365 \text{ days/yr}$$

$$= \frac{18,493}{75,000} \times 365 \text{ days} = 90 \text{ days}$$

- While the industry average is 60 days
- You believe that Ideko can tighten its credit policy to achieve the industry average without sacrificing sales.

19-19

Working Capital Management (cont'd)

- Ideko's inventory figure on its balance sheet includes $2 million of raw materials. Given raw material expenditures of $16 million for the year, Ideko currently holds 45.6 days worth of raw material inventory.
  - (2 ∕ 16) × 365 = 45.6
- You believe that, with tighter controls of the production process, 30 days worth of inventory will be adequate.

19-20

Capital Structure Changes: Levering Up

- You believe Ideko is significantly underleveraged so you plan to increase the firm's debt. The debt will have an interest rate of 6.8% and Ideko will only pay interest during the next five years.

- The firm will seek additional financing in 2008 and 2009 associated with the expansion.
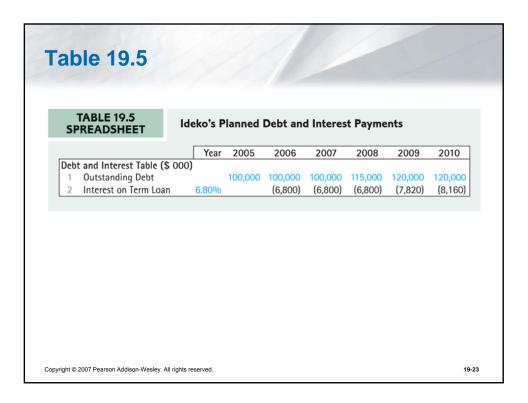
19-21

Capital Structure Changes: Levering Up (cont'd)

- The forecasted interest expense each year is computed as:

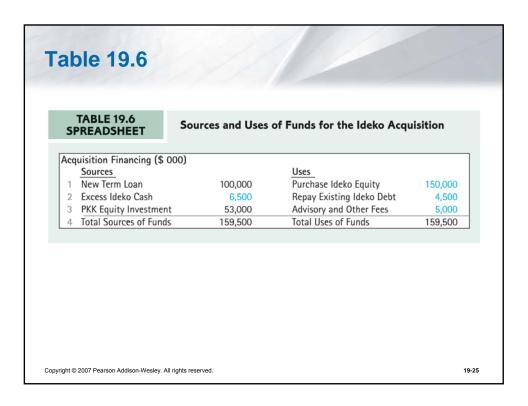Interest in Year t = Interest Rate × Ending Balance in Year $(t - 1)$

19-22

Table 19.5

TABLE 19.5 SPREADSHEET	Ideko's Planned Debt and Interest Payments					
Year	2005	2006	2007	2008	2009	2010
Debt and Interest Table ($ 000)						
1 Outstanding Debt		100,000	100,000	100,000	115,000	120,000	120,000
2 Interest on Term Loan	6.80%		(6,800)	(6,800)	(6,800)	(7,820)	(8,160)

19-23

Capital Structure Changes: Levering Up (cont'd)

- In addition to the $150 million purchase price for Ideko's equity, $4.5 million will be used to repay Ideko's existing debt.

  - With $5 million in transaction fees, the acquisition will require $159.5 million in total funds.

  - PKK's sources of funds include the new loan of $100 million as well as Ideko's own excess cash (which PKK will have access to). Thus PKK's required equity contribution to the transaction is $53 million.

19-24

Table 19.6

TABLE 19.6 SPREADSHEET	Sources and Uses of Funds for the Ideko Acquisition		

Acquisition Financing ($ 000)

	Sources		Uses	
1	New Term Loan	100,000	Purchase Ideko Equity	150,000
2	Excess Ideko Cash	6,500	Repay Existing Ideko Debt	4,500
3	PKK Equity Investment	53,000	Advisory and Other Fees	5,000
4	Total Sources of Funds	159,500	Total Uses of Funds	159,500

19-25

19.3 Building the Financial Model

- Forecasting Earnings
  - Pro Forma
    - Describes a statement that is not based on actual data but rather depicts a firm's financials under a given set of hypothetical assumptions

19-26

19.3 Building the Financial Model (cont'd)

- Forecasting Earnings
    - To build the pro forma income statement, begin with Ideko's sales. Each year, sales can be calculated as:

$$\text{Sales} = \text{Market Size} \times \text{Market Share} \times \text{Average Sales Price}$$

    - The raw materials cost can be calculated from sales as:

$$\text{Raw Materials} = \text{Market Size} \times \text{Market Share} \times \text{Raw Materials per Unit}$$

19-27

19.3 Building the Financial Model (cont'd)

- Forecasting Earnings
    - Sales, marketing, and administrative costs can be computed directly as a percentage of sales.

$$\text{Sales and Marketing} = \text{Sales} \times (\text{Sales and Marketing \% of Sales})$$

    - The corporate income tax is computed as:

$$\text{Income Tax} = \text{Pretax Income} \times \text{Tax Rate}$$

19-28

Table 19.7

TABLE 19.7 SPREADSHEET	Pro Forma Income Statement for Ideko, 2005–2010						
	Year	2005	2006	2007	2008	2009	2010
Income Statement ($ 000)							
1 Sales		75,000	88,358	103,234	119,777	138,149	158,526
2 Cost of Goods Sold							
3 Raw Materials		(16,000)	(18,665)	(21,593)	(24,808)	(28,333)	(32,193)
4 Direct Labor Costs		(18,000)	(21,622)	(25,757)	(30,471)	(35,834)	(41,925)
5 **Gross Profit**		41,000	48,071	55,883	64,498	73,982	84,407
6 Sales and Marketing		(11,250)	(14,579)	(18,582)	(23,356)	(27,630)	(31,705)
7 Administrative		(13,500)	(13,254)	(15,485)	(16,769)	(17,959)	(20,608)
8 **EBITDA**		16,250	20,238	21,816	24,373	28,393	32,094
9 Depreciation		(5,500)	(5,450)	(5,405)	(6,865)	(7,678)	(7,710)
10 **EBIT**		10,750	14,788	16,411	17,508	20,715	24,383
11 Interest Expense (net)		(75)	(6,800)	(6,800)	(6,800)	(7,820)	(8,160)
12 **Pretax Income**		10,675	7,988	9,611	10,708	12,895	16,223
13 Income Tax		(3,736)	(2,796)	(3,364)	(3,748)	(4,513)	(5,678)
14 **Net Income**		6,939	5,193	6,247	6,960	8,382	10,545

19-29

Example 19.3

Forecasting Income

Problem
By what percentage is Ideko's EBITDA expected to grow over the five-year period? By how much would it grow if Ideko's market share remained at 10%?

19-30

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Example 19.3 (cont'd)

Solution
EBITDA will increase from $16.25 million to $32.09 million, or (32.09 / 16.25) − 1 = 97%, over the five years. With a 10% market share rather than a 15% market share, sales will be only (10% / 15%) = 66.7% of the forecast in Table 19.7. Because Ideko's operating expenses are proportional to its sales, its expenses and EBITDA will also be 66.7% of the current estimates. Thus EBITDA will grow to 66.7% × 32.09 = $21.40 million, which is an increase of only (21.40 / 16.25) − 1 = 32%.

19-31

Working Capital Requirements

- The working capital forecast should include the plans to tighten Ideko's credit policy, speed up customer payments, and reduce Ideko's inventory of raw materials.

  - Accounts Receivable in 2006 is calculated as:

$$\text{Accounts Receivable} = \text{Days Required} \times \frac{\text{Annual Sales}}{365 \text{ days/yr}}$$

$$= 60 \text{ days} \times \frac{\$88.358 \text{ million/yr}}{365 \text{ days/yr}} = \$14.525 \text{ million}$$

19-32

Working Capital Requirements (cont'd)

- The minimum cash balance is the minimum level of cash needed to keep the business running.

  - Firms typically earn little or no interest on these balances. As a consequence, the opportunity cost of holding cash is accounted for by including the minimal cash balance as part of the firm's working capital.

19-33

Table 19.8

TABLE 19.8 SPREADSHEET	Ideko's Working Capital Requirements		
	Year	2005	>2005
Working Capital Days			
Assets	Based on:	Days	Days
1 Accounts Receivable	Sales Revenue	90	60
2 Raw Materials	Raw Materials Costs	45	30
3 Finished Goods	Raw Materials + Labor Costs	45	45
4 Minimum Cash Balance	Sales Revenue	30	30
Liabilities			
5 Wages Payable	Direct Labor + Admin Costs	15	15
6 Other Accounts Payable	Raw Materials + Sales and Marketing	45	45

19-34

Table 19.9

TABLE 19.9 SPREADSHEET	Ideko's Net Working Capital Forecast					
Year	2005	2006	2007	2008	2009	2010
Working Capital ($ 000)						
Assets						
1 Accounts Receivable	18,493	14,525	16,970	19,689	22,709	26,059
2 Raw Materials	1,973	1,534	1,775	2,039	2,329	2,646
3 Finished Goods	4,192	4,967	5,838	6,815	7,911	9,138
4 Minimum Cash Balance	6,164	7,262	8,485	9,845	11,355	13,030
5 Total Current Assets	30,822	28,288	33,067	38,388	44,304	50,872
Liabilities						
6 Wages Payable	1,294	1,433	1,695	1,941	2,211	2,570
7 Other Accounts Payable	3,360	4,099	4,953	5,938	6,900	7,878
8 Total Current Liabilities	4,654	5,532	6,648	7,879	9,110	10,448
Net Working Capital						
9 Net Working Capital (5 − 8)	26,168	22,756	26,419	30,509	35,194	40,425
10 Increase in Net Working Capital		(3,412)	3,663	4,089	4,685	5,231

19-35

Forecasting Free Cash Flow

- Using the data from the previous tables, Ideko's free cash flows over the next five years can be forecasted.

- The after-tax interest expense is calculated as:

$$\text{After - Tax Interest Expense} =$$
$$(1 - \text{Tax Rate}) \times (\text{Interest on Debt} - \text{Interest on Excess Cash})$$

- Net Borrowing is calculated as:

$$\text{Net Borrowing in Year } t = \text{Net Debt in Year } t - \text{Net Debt in Year } (t - 1)$$

19-36

Table 19.10

TABLE 19.10 SPREADSHEET	Ideko's Free Cash Flow Forecast							
	Year	2005	2006	2007	2008	2009	2010
Free Cash Flow ($ 000)							
1 Net Income			5,193	6,247	6,960	8,382	10,545
2 Plus: After-Tax Interest Expense			4,420	4,420	4,420	5,083	5,304
3 Unlevered Net Income			9,613	10,667	11,380	13,465	15,849
4 Plus: Depreciation			5,450	5,405	6,865	7,678	7,710
5 Less: Increases in NWC			3,412	(3,663)	(4,089)	(4,685)	(5,231)
6 Less: Capital Expenditures			(5,000)	(5,000)	(20,000)	(15,000)	(8,000)
7 Free Cash Flow of Firm			13,475	7,409	(5,845)	1,458	10,328
8 Plus: Net Borrowing			—	—	15,000	5,000	—
9 Less: After-Tax Interest Expense			(4,420)	(4,420)	(4,420)	(5,083)	(5,304)
10 Free Cash Flow to Equity			9,055	2,989	4,735	1,375	5,024

19-37

Example 19.4

Leverage and Free Cash Flow

Problem
Suppose Ideko does not add leverage in 2008 and 2009, but instead keeps its debt fixed at $100 million until 2010. How would this change in its leverage policy affect its expected free cash flow? How would it affect the free cash flow to equity?

19-38

Example 19.4 (cont'd)

Solution

Because free cash flow is based on unlevered net income, it will not be affected by Ideko's leverage policy. Free cash flow to equity will be affected, however. Net borrowing will be zero each year, and the firm's after-tax interest expense will remain at the 2006 level of $4.42 million:

	Year	2005	2006	2007	2008	2009	2010
Free Cash Flow ($ 000)							
1 Free Cash Flow of Firm			13,475	7,409	(5,845)	1,458	10,328
2 Plus: Net Borrowing			—	—	—	—	—
3 Less: After-Tax Interest Expense			(4,420)	(4,420)	(4,420)	(4,420)	(4,420)
4 Free Cash Flow to Equity			9,055	2,989	(10,265)	(2,962)	5,908

In this case, Ideko will have a negative free cash flow to equity in 2008 and 2009. That is, without additional borrowing, PKK will have to invest additional capital in the firm to fund the expansion.

19-39

The Balance Sheet and Statement of Cash Flows

- The information calculated so far can be used to project Ideko's balance sheet and statement of cash flows:

  - On the balance sheet:
    - Current assets and liabilities come from the net working capital spreadsheet.
    - Inventory figures includes both raw materials and finished goods.
    - Property, plant, and equipment figures come from the capital expenditure spreadsheet.

19-40

The Balance Sheet
and Statement of Cash Flows (cont'd)

- Debt figures come from the planned debt and interest payments spreadsheet.

- New Goodwill is calculated as:

$$\text{New Goodwill} = \text{Acquisition Price} - \text{Existing Book Value of Equity}$$

19-41

TABLE 19.11 SPREADSHEET	Pro Forma Balance Sheet for Ideko, 2005–2010					
Year	2005	2006	2007	2008	2009	2010
Balance Sheet ($ 000)						
Assets						
1 Cash and Cash Equivalents	6,164	7,262	8,485	9,845	11,355	13,030
2 Accounts Receivable	18,493	14,525	16,970	19,689	22,709	26,059
3 Inventories	6,165	6,501	7,613	8,854	10,240	11,784
4 Total Current Assets	30,822	28,288	33,067	38,388	44,304	50,872
5 Property, Plant, and Equipment	49,500	49,050	48,645	61,781	69,102	69,392
6 Goodwill	72,332	72,332	72,332	72,332	72,332	72,332
7 Total Assets	152,654	149,670	154,044	172,501	185,738	192,597
Liabilities						
8 Accounts Payable	4,654	5,532	6,648	7,879	9,110	10,448
9 Debt	100,000	100,000	100,000	115,000	120,000	120,000
10 Total Liabilities	104,654	105,532	106,648	122,879	129,110	130,448
Stockholder's Equity						
11 Starting Stockholder's Equity		48,000	44,138	47,396	49,621	56,628
12 Net Income		5,193	6,247	6,960	8,382	10,545
13 Dividends	(2,000)	(9,055)	(2,989)	(4,735)	(1,375)	(5,024)
14 Capital Contributions	50,000	—	—	—	—	—
15 Stockholder's Equity	48,000	44,138	47,396	49,621	56,628	62,149
16 Total Liabilities and Equity	152,654	149,670	154,044	172,501	185,738	192,597

TABLE 19.12 SPREADSHEET	Pro Forma Statement of Cash Flows for Ideko, 2005–2010					
Year	2005	2006	2007	2008	2009	2010
Statement of Cash Flows ($ 000)						
1 Net Income		5,193	6,247	6,960	8,382	10,545
2 Depreciation		5,450	5,405	6,865	7,678	7,710
3 Changes in Working Capital						
4 Accounts Receivable		3,968	(2,445)	(2,719)	(3,020)	(3,350)
5 Inventory		(336)	(1,112)	(1,242)	(1,385)	(1,544)
6 Accounts Payable		878	1,116	1,231	1,231	1,338
7 **Cash from Operating Activities**		15,153	9,211	11,095	12,885	14,699
8 Capital Expenditures		(5,000)	(5,000)	(20,000)	(15,000)	(8,000)
9 Other Investment		—	—	—	—	—
10 **Cash from Investing Activities**		(5,000)	(5,000)	(20,000)	(15,000)	(8,000)
11 Net Borrowing		—	—	15,000	5,000	—
12 Dividends		(9,055)	(2,989)	(4,735)	(1,375)	(5,024)
13 Capital Contributions		—	—	—	—	—
14 **Cash from Financing Activities**		(9,055)	(2,989)	10,265	3,625	(5,024)
15 **Change in Cash** (7 + 10 + 14)		1,098	1,223	1,360	1,510	1,675

19.4 Estimating the Cost of Capital

- CAPM-Based Estimation
  - Since Ideko is not publicly traded, comparable firms must be used to estimated the firm's beta. The beta for comparable firms is calculated as:

$$\underbrace{R_S - r_f}_{\substack{\text{Excess return} \\ \text{of stock } s}} = \alpha_s + \beta_s \underbrace{(R_{mkt} - r_f)}_{\substack{\text{Excess return} \\ \text{of market portfolio}}} + \varepsilon_s$$

Table 19.13

TABLE 19.13	Equity Betas with Confidence Intervals for Comparable Firms			
	Monthly Returns		**Ten-Day Returns**	
Firm	Beta	95% C.I.	Beta	95% C.I.
Oakley	1.99	1.2 to 2.8	1.37	0.9 to 1.9
Luxottica	0.56	0.0 to 1.1	0.86	0.5 to 1.2
Nike	0.48	−0.1 to 1.0	0.69	0.4 to 1.0

19-45

Unlevering Beta

- Given an estimate of each firm's equity beta, the "unlevered" beta must be calculated, based on the firm's capital structure.

$$\beta_U = \left(\frac{\text{Equity Value}}{\text{Enterprise Value}} \right)\beta_E + \left(\frac{\text{Net Debt Value}}{\text{Enterprise Value}} \right)\beta_D$$

19-46

Table 19.14

TABLE 19.14	Capital Structure and Unlevered Beta Estimates for Comparable Firms				
Firm	$\dfrac{E}{E + D}$	$\dfrac{D}{E + D}$	β_E	β_D	β_U
Oakley	1.00	0.00	1.50	—	1.50
Luxottica	0.83	0.17	0.75	0	0.62
Nike	1.05	−0.05	0.60	0	0.63

Ideko's Unlevered Cost of Capital

- The data from the comparable firms provides guidance for estimating Ideko's unlevered cost of capital.
  - Ideko's products are not as high end as Oakley's eyewear, so Ideko's sales are unlikely to vary as much with the business cycle as Oakley's sales do.
  - Ideko does not have a prescription eyewear division, as Luxottica does.
  - Ideko's products are fashion items rather than exercise items.

Ideko's Unlevered Cost of Capital (cont'd)

- Given the above analysis, Ideko's cost of capital is likely to be closer to Oakley's than to Nike's or Luxottica's. You decide to use 1.20 as your preliminary estimate for Ideko's unlevered beta.

  - Your estimate of Ideko's unlevered cost of capital is:

$$r_U = r_f + \beta_U(E[R_{mkt}] - r_f) = 4\% + 1.20(5\%)$$
$$= 10\%$$

19-49

Example 19.3

Estimating the Unlevered Cost of Capital

Problem
Using the monthly equity beta estimates for each firm in Table 19.13, what range of unlevered cost of capital estimates is possible?

19-50

Example 19.3 (cont'd)

Solution

Oakley has the highest equity beta of 1.99, which is also its unlevered beta (it has no debt). With this beta, the unlevered cost of capital would be $r_U = 4\% + 1.99(5\%) = 13.95\%$. At the other extreme, given its capital structure, Luxottica's equity beta of 0.56 implies an unlevered beta of $(0.56)(0.83) = 0.46$. With this beta, the unlevered cost of capital would be $r_U = 4\% + 0.46(5\%) = 6.3\%$.

As with any analysis based on comparables, experience and judgment are necessary to come up with a reasonable estimate of the unlevered cost of capital. In this case, our choice would be guided by industry norms, an assessment of which comparable is closest in terms of market risk, and possibly knowledge of how cyclical Ideko's revenues have been historically.
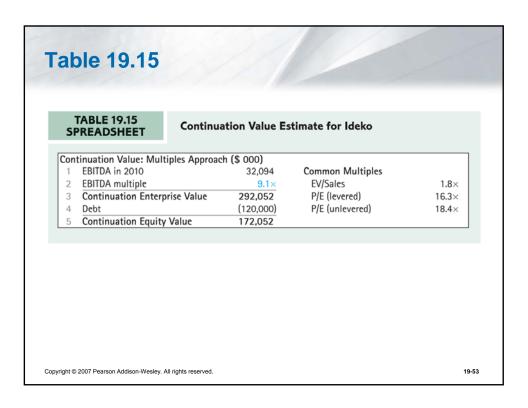
19-51

19.5 Valuing the Investment

- The Multiples Approach to Continuation Value
  - Practitioners generally estimate a firm's continuation value (also called the terminal value) at the end of the forecast horizon using a valuation multiple, with the EBITDA multiple being the multiple most often used in practice.

Continuation Enterprise Value at Forecast Horizon =

$\quad\quad\quad$ EBITDA at Horizon $\times$ EBITDA Multiple at Horizon

19-52

Table 19.15

TABLE 19.15 SPREADSHEET	Continuation Value Estimate for Ideko			

Continuation Value: Multiples Approach ($ 000)

			Common Multiples	
1	EBITDA in 2010	32,094		
2	EBITDA multiple	9.1×	EV/Sales	1.8×
3	Continuation Enterprise Value	292,052	P/E (levered)	16.3×
4	Debt	(120,000)	P/E (unlevered)	18.4×
5	Continuation Equity Value	172,052		

19-53

19.5 Valuing the Investment (cont'd)

- The Multiples Approach to Continuation Value
  - The continuation value is 1.8 times Ideko's 2010 sales, and the equity value is 16.3 times Ideko's 2010 earnings.
    - These ratios are lower than the peer ratios estimated earlier.

19-54

19.5 Valuing the Investment (cont'd)

- The Multiples Approach to Continuation Value
  - Unlevered P/E Ratio
    - The enterprise value of a firm divided by its unlevered net income in a particular year
      - Ideko's unlevered P/E ratio is 18.4 times unlevered net income.

19-55

19.5 Valuing the Investment (cont'd)

- The Multiples Approach to Continuation Value
  - One difficulty with relying on comparables when forecasting a continuation value is that *future* multiples of the firm are being compared with *current* multiples of its competitors.

19-56

The Discounted Cash Flow Approach to Continuation Value

- The enterprise value in year T, using the WACC valuation method, is calculated as:

$$\text{Enterprise Value in Year } T = V_T^L = \frac{FCF_{T+1}}{r_{wacc} - g}$$

- Free cash flow in year $T + 1$ is computed as:

$$FCF_{T+1} = \text{Unlevered Net Income}_{T+1} + \text{Depreciation}_{T+1}$$
$$- \text{Increases in NWC}_{T+1} - \text{Capital Expenditures}_{T+1}$$

19-57

The Discounted Cash Flow Approach to Continuation Value (cont'd)

- If firm's sales are expected to grow at a nominal rate g and the firm's operating expenses remain a fixed percentage of sales, then its unlevered net income will also grow at rate g.

  - Similarly, the firm's receivables, payables, and other elements of net working capital will grow at rate g.

19-58

The Discounted Cash Flow Approach to Continuation Value (cont'd)

- If capital expenditures are defined as:

$$\text{Capital Expenditures}_{T+1} = \text{Depreciation}_{T+1} + g \times \text{Fixed Assets}_T$$

- Then free cash flows, given g, can be estimated as:

$$\text{F}CF_{T+1} = (1 + g) \times \text{Unlevered Net Income}_T - g \times \text{Net Working Capital}_T$$
$$- g \times \text{Fixed Assets}_T$$

19-59

Example 19.6

A DCF Estimate of the Continuation Value

Problem

Estimate Ideko's continuation value in 2010 assuming a future expected growth rate of 5%, a future debt-to-value ratio of 40%, and a debt cost of capital of 6.8%.

19-60

Example 19.6 (cont'd)

Solution

In 2010, Ideko's unlevered net income is forecasted to be $15.849 million (Table 19.10), with working capital of $40.425 million (Table 19.9). It has fixed assets of $69.392 million (Table 19.4). From Eq. 19.16, we can estimate Ideko's free cash flow in 2011:

$$FCF_{2011} = (1.05)(15.849) - (5\%)(40.425) - (5\%)(69.392) = \$11.151 \text{ million}$$

This estimate represents nearly an 8% increase over Ideko's 2010 free cash flow of $10.328 million. It exceeds the 5% growth rate of sales due to the decline in the required additions to Ideko's net working capital as its growth rate slows.

With a debt-to-value ratio of 40%, Ideko's WACC can be calculated from Eq. 18.11:

$$r_{wacc} = r_U - d\,\tau_c\,r_D = 10\% - 0.40(0.35)\,6.8\% = 9.05\%$$

Given the estimate of Ideko's free cash flow and WACC, we can estimate Ideko's continuation value in 2010:

$$V^L_{2010} = \frac{11.151}{9.05\% - 5\%} = \$275.33 \text{ million}$$

This continuation value represents a terminal EBITDA multiple of 275.33 / 32.09 = 8.6.

The Discounted Cash Flow Approach to Continuation Value (cont'd)

- Both the multiples approach and the discounted cash flow approach are useful in deriving a realistic continuation value estimate.

- It is recommended to combine both approaches.

Table 19.16

TABLE 19.16 SPREADSHEET	Discounted Cash Flow Estimate of Continuation Value, with Implied EBITDA Multiple

Continuation Value: DCF and EBITDA Multiple ($ 000)

1	Long-Term Growth Rate	5.3%		
2	Target $D/(E + D)$	40.0%		
3	Projected WACC	9.05%		
Free Cash Flow in 2011				
4	Unlevered Net Income	16,695	Continuation Enterprise Value	292,052
5	Less: Increase in NWC	(2,158)		
6	Less: Increase in Fixed Assets*	(3,705)	Implied EBITDA Multiple	9.1×
7	Free Cash Flow	10,832		

*The increase in fixed assets equals the difference between capital expenditures and depreciation, and so subtracting this amount is equivalent to adding back depreciation and subtracting capital expenditures.

19-63

The Discounted Cash Flow Approach to Continuation Value (cont'd)

- The projected EBITDA multiple of 9.1 can be justified according the discounted cash flow method with a nominal long-term growth rate of about 5.3%.

  - Given an inflation rate of 2%, this nominal rate represents a real growth rate of about 3.3%.

    - If this implied growth rate is much higher than the expectations of long-run growth for the industry as a whole, you should be more skeptical of the estimate being used.

19-64

APV Valuation of Ideko Equity

- The estimate of Ideko's continuation value can be combined with the forecasts for free cash flow through 2010 to estimate Ideko's value today using the APV valuation model.

19-65

APV Valuation of Ideko Equity (cont'd)

- The first step is to compute Ideko's unlevered value.

$$V_{t-1}^{U} = \frac{FCF_t + V_t^{U}}{1 + r_U}$$

- Next, the interest tax shield needs to be computed.

$$T_{t-1}^{s} = \frac{\text{Interest Tax Shield}_t + T_t^{s}}{1 + r_D}$$

19-66

APV Valuation of Ideko Equity (cont'd)

- Using the APV valuation model, the estimate for Ideko's initial enterprise value is $213 million, with an equity value of $113 million (as shown on the following slide).

  - Given that PKK's initial cost to acquire Ideko's equity is $53 million, the deal looks attractive with an NPV $60 million.

    - $113 million − $53 million = $60 million

19-67

Table 19.17

TABLE 19.17 SPREADSHEET	APV Estimate of Ideko's Initial Equity Value					
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
APV Method ($ 000)						
1 Free Cash Flow		13,475	7,409	(5,845)	1,458	10,328
2 Unlevered Value V^u	202,732	209,530	223,075	251,227	274,891	292,052
3 Interest Tax Shield		2,380	2,380	2,380	2,737	2,856
4 Tax Shield Value T^s	10,428	8,757	6,972	5,067	2,674	—
5 APV: $V^L = V^u + T^s$	213,160	218,287	230,047	256,294	277,566	292,052
6 Debt	(100,000)	(100,000)	(100,000)	(115,000)	(120,000)	(120,000)
7 Equity Value	113,160	118,287	130,047	141,294	157,566	172,052

19-68

A Reality Check

- At this point, it is wise to step back and assess whether the valuation results make sense.

  - Does an initial enterprise value of $213 million for Ideko seem reasonable compared to the values of other firms in the industry?

    - Compute the initial valuation multiples that would be implied by our estimated enterprise value of $213 million and compare them to Ideko's closest competitors.

19-69

Table 19.18

TABLE 19.18	Ideko Financial Ratios Comparison, Mid-2005, Based on Discounted Cash Flow Estimate Versus Proposed Purchase Price					
Ratio	Ideko (Estimated Value)	Ideko (Purchase Price)	Oakley, Inc.	Luxottica Group	Nike, Inc.	Sporting Goods
P/E	31.0×	21.6×	24.8×	28.0×	18.2×	20.3×
EV/Sales	2.8×	2.0×	2.0×	2.7×	1.5×	1.4×
EV/EBITDA	13.1×	9.1×	11.6×	14.4×	9.3×	11.4×

19-70

A Reality Check (cont'd)

- The multiples are now at the top end or somewhat above the range of the values of the other firms used for comparison.

    - While these multiples are not unreasonable given the operational improvements that PKK plans to implement, they indicate that the forecast may be somewhat optimistic and depend critically on PKK's ability to achieve the operational improvements it plans.

19-71

IRR and Cash Multiples

- Practitioners often use IRR and the cash multiple as alternative valuation metrics.

- To compute the IRR, PKK's cash flows over the life of the transaction must be computed.

    - Assuming PKK will sell its equity share in Ideko at the end of five years, the IRR for the transaction is 33.3%, as shown on the following slide.

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Table 19.19

TABLE 19.19 SPREADSHEET		IRR and Cash Multiple for PKK's Investment in Ideko					
Year	2005	2006	2007	2008	2009	2010
IRR and Cash Multiple						
1 Initial Investment	(53,000)					
2 Free Cash Flow to Equity		9,055	2,989	4,735	1,375	5,024
3 Continuation Equity Value						172,052
4 PKK Cash Flows	(53,000)	9,055	2,989	4,735	1,375	177,077
5 IRR	33.3%					
6 Cash Multiple	3.7×					

IRR and Cash Multiples

- Cash Multiple
  - The ratio of the total cash received to the total cash invested
  - The cash multiple is computed as:

$$\text{Cash Multiple} = \frac{\text{Total Cash Received}}{\text{Total Cash Invested}}$$

$$= \frac{9055 + 2989 + 4735 + 1375 + 177{,}077}{53{,}000} = 3.7$$

  - PKK expects to receive a return that is 3.7 times its investment in Ideko.
  - The cash multiple has an obvious weakness.
    - It does not depend on the amount of time it takes to receive the cash, nor does it account for the risk of the investment. It is therefore useful only for comparing deals with similar time horizons and risk.

19.6 Sensitivity Analysis

- It is important to assess the uncertainty of the forecasts and to determine their potential impact on the value of the deal.

- Sensitivity analysis can show the sensitivity of the estimates of the value of PKK's investment to changes in the assumptions regarding the exit EBITDA multiple that PKK obtains when Ideko is sold, as well as Ideko's unlevered cost of capital.

19-75

Table 19.20

TABLE 19.20 SPREADSHEET	Sensitivity Analysis for PKK's Investment in Ideko					
Exit EBITDA Multiple	6.0	7.0	8.0	9.1	10.0	11.0
Implied Long-Run Growth Rate	1.60%	3.43%	4.53%	5.34%	5.81%	6.21%
Ideko Enterprise Value ($ million)	151.4	171.3	191.2	213.2	231.1	251.0
PKK Equity Value ($ million)	51.4	71.3	91.2	113.2	131.1	151.0
PKK IRR	14.8%	22.1%	28.0%	33.3%	37.1%	40.8%
Unlevered Cost of Capital	9.0%	10.0%	11.0%	12.0%	13.0%	14.0%
Implied Long-Run Growth Rate	3.86%	5.34%	6.81%	8.29%	9.76%	11.24%
Ideko Enterprise Value ($ million)	222.1	213.2	204.7	196.7	189.1	181.9
PKK Equity Value ($ million)	122.1	113.2	104.7	96.7	89.1	81.9

19-76

19.6 Sensitivity Analysis (cont'd)

- The table in the previous slide shows that each 1.0 increase in the EBITDA multiple represents about $20 million in initial value.

  - PKK will break even on its $53 million investment in Ideko with an exit multiple of slightly more than 6.0.

  - The table also shows, however, that an exit multiple of 6.0 is consistent with a future growth rate for Ideko of less than 2%, which is even less than the expected rate of inflation and probably unrealistically low.

19-77

19.6 Sensitivity Analysis (cont'd)

- The table also indicates that a higher unlevered cost of capital reduces the value of PKK's investment.

  - However, even with a rate as high as 14%, the equity value exceeds PKK's initial investment.

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Questions?

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