Seminář 5

Dividendové diskontní modely – prohloubení

11. *CFA Examination Level I* (adapted)
Mulroney recalled from her CFA studies that the constant-growth dividend discount model (DDM) was one way to arrive at a valuation for a company's common stock. She collected current dividend and stock price data for Eastover and Southampton, shown in Table 2.
   a. Using 11 percent as the required rate of return (i.e., discount rate) and a projected growth rate of 8 percent, compute a constant-growth DDM value for Eastover's stock and compare the computed value for Eastover to its stock price indicated in Table 2. Show calculations. [10 minutes]

   Mulroney's supervisor commented that a two-stage DDM may be more appropriate for companies such as Eastover and Southampton. Mulroney believes that Eastover and Southampton could grow more rapidly over the next three years and then settle in at a lower but sustainable rate of growth beyond 2004. Her estimates are indicated in Table 3.

   b. Using 11 percent as the required rate of return, compute the two-stage DDM value of Eastover's stock and compare that value to its stock price indicated in Table 2. Show calculations. [15 minutes]

13. *CFA Examination Level I*
At year-end 1991, the Wall Street consensus was that Philip Morris' earnings and dividends would grow at 20 percent for five years after which growth would fall to a market-like 7 percent. Analysts also projected a required rate of return of 10 percent for the U.S. equity market.
   a. Using the data in Table 6 and the multistage dividend discount model, calculate the intrinsic value of Philip Morris stock at year-end 1991. Assume a similar level of risk for Philip Morris stock as for the typical U.S. stock. Show all work. [7 minutes]
   b. Using the data in Table 6, calculate Philip Morris' price/earnings ratio and the price/earnings ratio relative to the S&P Industrials Index as of December 31, 1991. [3 minutes]
   c. Using the data in Table 6, calculate Philip Morris' price/book ratio and the price/book ratio relative to the S&P Industrials Index as of December 31, 1991. [3 minutes]

15. *CFA Examination Level II*
Your supervisor has asked you to evaluate the relative attractiveness of the stocks of two very similar chemical companies: Litchfield Chemical Corp. (LCC) and Aminochem Company (AOC). AOC also has a June 30 fiscal year end. You have compiled the data in Table 7 for this purpose. Use a one-year time horizon and assume the following:

   - Real gross domestic product is expected to rise 5 percent;
   - S&P Industrials expected total return of 20 percent;
   - U.S. Treasury bills yield 5 percent; and
   - 30-year U.S. Treasury bonds yield 8 percent.

   a. Calculate the value of the common stock of LCC and AOC using the constant-growth dividend discount model. Show your work. [5 minutes]

   b. Calculate the expected return over the next year of the common stock of LCC and AOC using the capital asset pricing model. Show your work. [5 minutes]
   c. Calculate the internal (implied, normalized, or sustainable) growth rate of LCC and AOC. Show your work. [5 minutes]

20. *CFA Examination Level II*

Janet Ludlow's firm requires all its analysts to use a two-stage dividend discount model (DDM) and the capital asset pricing model (CAPM) to value stocks. Using the CAPM and DDM, Ludlow has valued QuickBrush Company at $63 per share. She now must value SmileWhite Corporation.

a. Calculate the required rate of return for SmileWhite using the information in Table 14 and the CAPM. Show your work. [6 minutes]

Ludlow estimates the following EPS and dividend growth rates for SmileWhite:

First 3 years:	12 percent per year
Years thereafter:	9 percent per year

b. Estimate the intrinsic value of SmileWhite using the data from Table 13 and Table 14 and the two-stage DDM. Show your work. [12 minutes]

c. Recommend QuickBrush or SmileWhite stock for purchase by comparing each company's intrinsic value with its current market price. Show your work. [6 minutes]

22. *CFA Examination Level II*

An analyst expects a risk-free return of 4.5 percent, a market return of 14.5 percent, and the returns for Stocks A and B that are shown in Table 15.

a. Show on a graph

   (1) where Stocks A and B would plot on the security market line (SML) if they were fairly valued using the capital asset pricing model (CAPM).

   (2) where Stocks A and B actually plot on the same graph according to the returns estimated by the analyst and shown in Table 15. [6 minutes]

b. State whether Stock A and Stock B are undervalued or overvalued if the analyst uses the SML for strategic investment decisions. [4 minutes]

23. *CFA Examination Level II*

Scott Kelly is reviewing MasterToy's financial statements in order to estimate its sustainable growth rate. Using the information presented in Table 16,

a. (1) Identify and calculate the *three* components of the DuPont formula.

   (2) Calculate the *ROE* for 1999 using the three components of the DuPont formula.

   (3) Calculate the sustainable-growth rate for 1999. [13 minutes]

Kelly has calculated actual and sustainable growth for each of the past four years and finds in each year that its calculated sustainable-growth rate substantially exceeds its actual growth rate.

25. *CFA Examination Level II*

Helen Morgan, CFA, has been asked by Carroll to determine the potential valuation for Sundanci, Inc., using the dividend discount model (DDM). Morgan anticipates that Sundanci's earnings and dividends will grow at 32 percent for two years and 13 percent thereafter.

Calculate the current value of a share of Sundanci stock using a two-stage dividend discount model and the data from Tables 17 and 18. Show your work. [8 minutes]

26. *CFA Examination Level II*

Abbey Naylor, CFA, has been directed by Carroll to determine the value of Sundanci's stock using the free cash flow to equity (FCFE) model. Naylor believes that Sundanci's FCFE will grow at 27 percent for two years and 13 percent thereafter. Capital expenditures, depreciation, and working capital are all expected to increase proportionately with FCFE.

a. Calculate the amount of FCFE per share for the year 2000, using the data from Table 17. Show your work. [6 minutes]

b. Calculate the current value of a share of Sundanci stock based on the two-stage FCFE model. Show your work. [8 minutes]

27. *CFA Examination Level II*

Christie Johnson, CFA, has been assigned by Carroll to analyze Sundanci using the constant-growth dividend price/earnings (*P*/*E*) ratio model. Johnson assumes that Sundanci's earnings and dividends will grow at a constant rate of 13 percent.

a. Calculate the P/E ratio based on information in Tables 17 and 18 and on Johnson's assumptions for Sundanci. Show your work. [4 minutes]

TABLE 2 *CURRENT INFORMATION*

	Current Share Price	Current Dividends per Share	2002 EPS Estimate	Current Book Value per Share
Eastover (EO)	$ 28	$ 1.20	$ 1.60	$ 17.32
Southampton (SHC)	48	1.08	3.00	32.21
S&P Industrials	1100	16.00	48.00	423.08

TABLE 3 *PROJECTED GROWTH RATES*

	Next 3 Years (2002, 2003, 2004)	Growth Beyond 2004
Eastover (EO)	12%	8%
Southampton (SHC)	13%	7%

TABLE 6 *PHILIP MORRIS CORPORATION: SELECTED FINANCIAL STATEMENT AND OTHER DATA—YEARS ENDING DECEMBER 31 ($ MILLIONS EXCEPT PER-SHARE DATA)*

	1991	1981
Income Statement		
Operating revenue	$56,458	$10,886
Cost of sales	25,612	5,253
Excise taxes on products	8,394	2,580
Gross profit	$22,452	$ 3,053
Selling, general, and administrative expenses	13,830	1,741
Operating income	$ 8,622	$ 1,312
Interest expense	1,651	232
Pretax earnings	$ 6,971	$ 1,080
Provision for income taxes	3,044	420
Net earnings	$ 3,927	$ 660
Earnings per share	$4.24	$0.66
Dividends per share	$1.91	$0.25
Balance Sheet		
Current assets	$12,594	$ 3,733
Property, plant, and equipment, net	9,946	3,583
Goodwill	18,624	634
Other assets	6,220	1,230
Total assets	$47,384	$ 9,180
Current liabilities	$11,824	$ 1,936
Long-term debt	14,213	3,499
Deferred taxes	1,803	455
Other liabilities	7,032	56
Stockholders' equity	12,512	3,234
Total liabilities and stockholders' equity	$47,384	$ 9,180
Other Data		
Philip Morris:		
Common shares outstanding (millions)	920	1,003
Closing price common stock	$80.250	$6.125
S&P Industrials Index:		
Closing price	417.09	122.55
Earnings per share	16.29	15.36
Book value per share	161.08	109.43

TABLE 7

	Litchfield Chemical (LCC)	Aminochem (AOC)
Current stock price	$50	$30
Shares outstanding (millions)	10	20
Projected earnings per share (fiscal 1996)	$4.00	$3.20
Projected dividend per share (fiscal 1996)	$0.90	$1.60
Projected dividend growth rate	8%	7%
Stock beta	1.2	1.4
Investors' required rate of return	10%	11%
Balance sheet data (millions)		
Long-term debt	$100	$130
Stockholders' equity	$300	$320

TABLE 12

QUICKBRUSH COMPANY: FINANCIAL STATEMENTS—YEARLY DATA ($000 EXCEPT PER-SHARE DATA)

	December 1995	December 1996	December 1997
Income Statement			
Revenue	$3,480	$5,400	$7,760
Cost of goods sold	2,700	4,270	6,050
Selling, general, and admin. expense	500	690	1,000
Depreciation and amortization	30	40	50
Operating income (EBIT)	$ 250	$ 400	$ 660
Interest expense	0	0	0
Income before taxes	$ 250	$ 400	$ 660
Income taxes	60	110	215
Income after taxes	$ 190	$ 290	$ 445
Diluted EPS	$ 0.60	$ 0.84	$ 1.18
Average shares outstanding (000)	317	346	376

	December 1995	December 1996	December 1997	3-Year Average
Financial Statistics				
COGS as % of sales	77.59%	79.07%	77.96%	78.24%
SG&A as % of sales	14.37	12.78	12.89	13.16
Operating margin	7.18	7.41	8.51	
Pretax income/EBIT	100.00	100.00	100.00	
Tax rate	24.00	27.50	32.58	

	December 1995	December 1996	December 1997
Balance Sheet			
Cash and cash equivalents	$ 460	$ 50	$ 480
Accounts receivable	540	720	950
Inventories	300	430	590
Net property, plant, and equipment	760	1,830	3,450
Total assets	$2,060	$3,030	$5,470
Current liabilities	$ 860	$1,110	$1,750
Total liabilities	$ 860	$1,110	$1,750
Stockholders' equity	1,200	1,920	3,720
Total liabilities and equity	$2,060	$3,030	$5,470
Market price per share	$21.00	$30.00	$45.00
Book value per share	$ 3.79	$ 5.55	$ 9.89
Annual dividend per share	$ 0.00	$ 0.00	$ 0.00

TABLE 13 *SMILEWHITE CORPORATION: FINANCIAL STATEMENTS—YEARLY DATA ($000 EXCEPT PER-SHARE DATA)*

	December 1995	December 1996	December 1997
Income Statement			
Revenue	$104,000	$110,400	$119,200
Cost of goods sold	72,800	75,100	79,300
Selling, general, and admin. expense	20,300	22,800	23,900
Depreciation and amortization	4,200	5,600	8,300
Operating income	$6,700	$6,900	$7,700
Interest expense	600	350	350
Income before taxes	$6,100	$6,550	$7,350
Income taxes	2,100	2,200	2,500
Income after taxes	$4,000	$4,350	$4,850
Diluted EPS	$2.16	$2.35	$2.62
Average shares outstanding (000)	1,850	1,850	1,850

	December 1995	December 1996	December 1997	3-Year Average
Financial Statistics				
COGS as % of sales	70.00%	68.00%	66.53%	68.10%
SG&A as % of sales	19.52	20.64	20.05	20.08
Operating margin	6.44	6.25	6.46	
Pretax income/EBIT	91.04	94.93	95.45	
Tax rate	34.43	33.59	34.01	

	December 1995	December 1996	December 1997
Balance Sheet			
Cash and cash equivalents	$ 7,900	$ 3,300	$ 1,700
Accounts receivable	7,500	8,000	9,000
Inventories	6,300	6,300	5,900
Net property, plant, and equipment	12,000	14,500	17,000
Total assets	$33,700	$32,100	$33,600
Current liabilities	$ 6,200	$ 7,800	$ 6,600
Long-term debt	9,000	4,300	4,300
Total liabilities	$15,200	$12,100	$10,900
Stockholders' equity	18,500	20,000	22,700
Total liabilities and equity	$33,700	$32,100	$33,600
Market price per share	$23.00	$26.00	$30.00
Book value per share	$10.00	$10.81	$12.27
Annual dividend per share	$1.42	$1.53	$1.72

TABLE 14 *VALUATION INFORMATION: DECEMBER 1997*

	QuickBrush	SmileWhite
Beta	1.35	1.15
Market price	$45.00	$30.00
Intrinsic value	$63.00	?

Notes:

Risk-free rate	4.50%
Expected market return	14.50%

TABLE 15 *STOCK INFORMATION*

Stock	Beta	Analyst's Estimated Return
A	1.2	16%
B	0.8	14%

TABLE 16 *MASTERTOY, INC.: ACTUAL 1998 AND ESTIMATED 1999 FINANCIAL STATEMENTS FOR FISCAL YEAR ENDING DECEMBER 31 ($ MILLIONS, EXCEPT PER-SHARE DATA)*

	1998	1999e	Change (%)
Income Statement			
Revenue	$4,750	$5,140	7.6
Cost of goods sold	$2,400	$2,540	
Selling, general, and administrative	1,400	1,550	
Depreciation	180	210	
Goodwill amortization	10	10	
Operating income	$ 760	$ 830	8.4
Interest expense	20	25	
Income before taxes	$ 740	$ 805	
Income taxes	265	295	
Net income	$ 475	$ 510	
Earnings per share	$ 1.79	$ 1.96	8.6
Average shares outstanding (millions)	265	260	
Balance Sheet			
Cash	$ 400	$ 400	
Accounts receivable	$ 680	$ 700	
Inventories	$ 570	$ 600	
Net property, plant, and equipment	$ 800	$ 870	
Intangibles	$ 500	$ 530	
Total assets	$2,950	$3,100	
Current liabilities	$ 550	$ 600	
Long-term debt	$ 300	$ 300	
Total liabilities	$ 850	$ 900	
Stockholders' equity	$2,100	$2,200	
Total liabilities and equity	$2,950	$3,100	
Book value per share	$ 7.92	$ 8.46	
Annual dividend per share	$ 0.55	$ 0.60	

TABLE 17 *SUNDANCI ACTUAL 1999 AND 2000 FINANCIAL STATEMENTS FOR FISCAL YEARS ENDING MAY 31 ($ MILLION, EXCEPT PER-SHARE DATA)*

	1999	2000
Income Statement		
Revenue	$474	$598
Depreciation	20	23
Other operating costs	368	460
Income before taxes	86	115
Taxes	26	35
Net income	60	80
Dividends	18	24
Earnings per share	$0.714	$0.952
Dividend per share	$0.214	$0.286
Common shares outstanding (millions)	84.0	84.0
Balance Sheet		
Current assets	$201	$326
Net property, plant and equipment	474	489
Total assets	675	815
Current liabilities	57	141
Long-term debt	0	0
Total liabilities	57	141
Shareholders' equity	618	674
Total liabilities and equity	675	815
Capital expenditures	34	38

TABLE 18 *SELECTED FINANCIAL INFORMATION FOR SUNDANCI*

Required rate of return on equity	14%
Growth rate of industry	13%
Industry *P/E* ratio	26