CHAPTER FOURTEEN

Simple Forecasting and Simple Valuation

Concept Questions

C14.1 Book values give a good forecast when they are reviewed at their fair value: applying the required return to book value gives a good forecast of earnings from the net assets. So, for a bond measured at market value, one gets a good forecast of the expected name from the bond by applying the expected return on the bond to the book value. But net operating assets are seldom carried at their fair value; indeed many operating assets (lite knowledge assets) are not on the balance sheet.

C14.2 Yes, this is correct. The following two valuations are equivalent (using a 10% required return for operations):

$$\text{Value of Operations}_0 = \text{NOA}_0 + \frac{\overline{\text{ReOI}_1}}{0.10}$$

$$\text{Value of Operations}_0 = \frac{\overline{\text{OI}}}{0.10}$$

(compare valuations 14.2 and 14.2a in the chapter).

If there is no growth in residual operating, abnormal operating income growth must be zero. The valuation here is for the case of abnormal operating income growth of zero (an SF2 valaution).

C14.3 An SF2 forecast projects that new investment will earn at the required rate of return. An SF3 forecast forecasts that new investment will earn at the same rate of return (RNOA) as the investments in the current period.

C14.4 If current core operating income is appropriately purged of transitory items the forecast is a good forecast if:

(1) Profitability of the net operating assets (RNOA) will be the same, and

(2) There is no growth in net operating assets.

A forecast should adjust for growth. So a sound forecast based on current operating income (an SF2 forecast) is:

Core $\overline{\text{OI}}_1$ = Core OI_0 + (Required return × ΔNOA)

C14.5 The growth rate for sales is the same as the growth rate in residual operating income when RNOA is constant, the required return is constant, and asset turnovers are constant. (if RNOA is constant and ATO is constant, profit margins (PM) must also be constant.)

C14.6 A firm with high expected growth in sales is probably a firm that can grow residual earnings. But sales have to be profitable: a firm might grow sales, but with declining profit margins and increasing asset turnovers, that is, with rising expenses per dollar of sales and increasing investment to get a dollar of sales.

C14.7 This statement is generally correct. But RNOA must be greater than the required return on operations for it to be correct. See the calculation for the unlevered P/B in the chapter.

Exercises

E.14.1 Simple Forecasting and Valuation

(a) Residual operating income (ReOI) is

91.4 = (12% - required return) × 4,572

So required return = 10%

(b) Value of equity = CSE + $\frac{ReOI_{2004}}{0.10}$

$$= 3{,}329 + \frac{91.4}{0.10}$$

$$= \$4{,}243 \text{ million}$$

Also,

$$\text{Value of equity} = \frac{OI_{2004}}{0.10} - \text{NFO}$$

$$= \frac{548.64}{0.10} - 1{,}243$$

$$= \$4{,}243 \text{ million}$$

(c) To get the residual earnings forecast, we need the required return for equity. Using the value of the equity calculated in part (b), and the value of the net debt on the balance sheet, we can calculate the required return using the "market leverage," as in the formula 13.8 in Chapter 13.

$$\text{Required return for equity} = 10.0\% + \left[\frac{1{,}243}{4{,}243} \times (10.0\% - 6.0\%)\right]$$

$$= 11.17\%$$

So the comprehensive earnings forecast for 2004 is

Operating income	548.6	(4,572 × 12%)
Net financial expense	74.6	(1,243 × 6%)
Comprehensive	474.0	

The residual earnings forecast is

RE = 474.0 - (0.1117 × 3,329) = 102.2

E14.2 SF2 and SF3 Valuation: Ben & Jerry's

(a) Refer to reformulated statements for Ben & Jerry's in the solution to Exercise 11.8 in Chapter 11.

The ReOI for 1996 can be calculated from the operating income (4.1) and NOA at the beginning of the year (74.8):

$$\text{ReOI}_{1986} = 4.1 - (0.10 \times 74.8)$$

$$= 3.38$$

SF2 valuation:

The value of the equity is

$$\text{Value of equity} = \text{CSE} + \frac{\text{ReOI}_{1996}}{0.10}$$

$$= 82.8 - \frac{3.38}{0.10}$$

= $49 million or 6.81 per share

An SF3 valuation won't work: growth can't be applied to negative ReOI.

More information needed:

Generally we want information on future RNOA and growth in NOA: will increase in advertising affect PM, ATO and NOA?

Strategy? Expansion plans? New products? Possible takeover target?

(b) One reason might be market inefficiency: The stock is overpriced. Ben & Jerry's is priced high for a low profitability firm.

Taking $18\frac{1}{8}$ as an efficient price, then the market sees much higher RNOA and/or growth in NOA than currently. The $18\frac{1}{8}$ price is a premium of 6.62 per share over book value (11.51 per share). This implies a permanent level of ReOI of 4.76:

$$V_O^E = 82.8 + \frac{4.76}{0.10} = 130.4 \text{ or } 18\frac{1}{8} \text{ per share.}$$

Can one forecast future RNOA and growth in NOA that will justify this level of residual operating profitability? If not, the stock is overpriced.

Too excited about ice cream? Cool it!

E14.3 Simple Forecasting and Sensitivity Analysis: Reebok International

(a) Unlevered P/B

$$= \frac{\text{Price of Equity} + \text{Net Debt} + \text{Value of Minority Interest}}{\text{NOA}}$$

$$= \frac{2{,}401 + 720 + 210}{1{,}135}$$

$$= 2.93$$

(b) Market price of operations = \$1,135 million × 2.93 = \$ 3,331 million.

Value of operations = 1,135 + $\frac{(0.146 - 0.101) \times 1{,}135}{1.101 - 9}$

For a market price of \$3,331 million for the operations,

g = 1.078, or a 7.8% annual growth rate in net operating assets

If asset turnovers were also constant, thus growth rate would translate into a sales growth rate.

(c) RNOA would fall to 3.5% × 2.95 = 10.33%.

So, value of operations with this RNOA would be:

Value of operations $= 1{,}135 + \frac{(0.1033 - 0.101) \times 1{,}135}{1.101 - 1.078}$

$= \$1{,}248.5$ million

Unlevered P/B $= \frac{\$1{,}248.5}{1{,}135.0}$

$= 1.1$

(d) Sales growth would contribute nothing to the valuation with a 3.42% profit margin, RNOA would be 3.42% × 2.95 = 10.1%, equal to the required return on operations. Reebok would be worth book value.

E14.4 Idle Capacity and Value

(a)

$$\text{ATO} = \frac{32}{10} = 2.0$$

$$\text{Accounts receivable turnover} = \frac{32}{1.0} = 32.0$$

$$\text{Inventory turnover} = \frac{32}{4.3} = 7.4$$

$$\text{Plant turnover} = \frac{32}{10.7} = 3.0$$

$$\text{RNOA} = \text{PM} \times \text{ATO}$$

$$= 5.6\% \times 2.0$$

$$= 11.2\%$$

(b)

$$\text{Value of operations} = 16.0 + \frac{(0.112 - 0.10) \times 16.0}{0.10}$$

$$= \$17.92 \text{ million (an SF2 valuation)}$$

(c)

The net operating asset section of the balance sheet will change to reflect the increased investment in accounts receivable and inventory (in millions of dollars):

Accounts receivable	2.0 (turnover unchanged)
Inventory	8.6 (turnover unchanged)
Plant	<u>10.7</u> (turnover increases to 6.0)
NOA	<u>21.3</u>

Total ATO $= \dfrac{64}{21.3}$

$= 3.0$

RNOA $= 5.6\% \times 3.0$

$= 16.8\%$

Value of operations $= 21.3 + \dfrac{(0.168 - 0.10) \times 21.3}{0.10}$

$=$ \$35.78 million

The value has come by using the idle components (with no additional investment in plant) with just a little additional investment in accounts receivable and inventory. The driver that picks this up is the Plant Turnover: This increases from 3.0 to 6.0. And other drivers, except sales growth, remain the same.

E14.5 Value and Growth in Sales: Wal-Mart Stores

(a)

With constant margins and turnovers, growth will be determined by growth in sales.

RNOA = PM × ATO = 3.65% × 4.66 = 17.0%

Forecast of ReOI for 2000 = (0.17 - 0.11) × 29.9 = 1.794

Forecasted growth in ReOI = 8% per year

$$V_{1999}^{NOA} = 29.9 + \frac{1.794}{1.11-1.08}$$

$$= \$89.7 \text{ billion}$$

$$V_{1999}^{E} = V_{1999}^{NOA} - \text{NFO} = 89.7 - 8.0 = \$81.7 \text{ billion}$$

(b)

Calculate the implied growth rate using reverse engineering. As margins and turnovers are constant, the implied growth in ReOI is the implied growth in sales.

$$P_{1999}^{NOA} = 200 + 8 = \$208 \text{ billion}$$

$$208 = 29.9 + \frac{1.794}{1.11-g}$$

$$g = 1.099 \text{ (9.9\% growth rate)}$$

[Again, sales growth rate is ReOI growth rate in this case]

Sales_{2000} = ATO × NOA

$= 4.66 \times \$29.9$ billion

$= 139.334$ billion

Expected $\text{Sales}_{2004} = 139.334 \times 1.099^4 =$ $203.258 billion

E14.6 Preparing a Valuation Grid: Coca-Cola

(a)

To prepare the valuation grid, apply alternative scenarios to the following valuation formula, and then divide by the 2,271 million shares outstanding:

$$\text{Value of equity} = 7{,}311 + \frac{\text{RNOA} - 0.10) \times 11{,}186}{1.10 - g}$$

Where g is growth in NOA or, with a constant asset turnover, growth in sales.

So, for example, if the RNOA in 1996 was indicative of the future RNOA (rather than the 1997 RNOA), the value of the equity would, with a sales growth rate of 7.5%, be

$$\text{Value of equity} = 7{,}311 + \frac{(0.367 - 0.10) \times 11{,}186}{1.10 - 1.075}$$

= $126,777 million (or $51.31 per share)

The $51.31 per share contrasts with the $56.20 per share calculated in the text with 1997 RNOA.

Here is a valuation grid that gives some range of RNOA and growth in Sales.

Values one per share.

Growth in Sales \ RNOA	30%	33%	36%	39%	42%
5%	21.07	23.78	26.50	29.21	31.93
6%	25.59	28.99	32.38	35.78	39.17
7%	33.14	37.67	42.19	46.72	51.25
8%	48.23	55.02	61.81	69.00	75.39
9%	93.50	107.08	120.66	134.24	147.82

Growth in sales is used rather than growth in NOA for the case of constant ATO. The grid can be expanded for changing ATO and, indeed, changing forecasts of profit margins.

Cotie's per-share price at the end of 1997 was $70. This corresponds (in the grid) to an expected RNOA of 39% with growth in sales of 8% per year.

(b)

This question requires a matched pairs analyses. For a given RNOA, the required growth rate in NOA (plus one) is given by

$$g = \frac{(\text{Premium x } 1.10) - [(\text{RNOA} - 0.10) \times 11{,}186]}{\text{Premium}}$$

The market value of the firm is 70 x 2,471 million = $172,970 million.

So the premium is $172,970 - 7,311 = $165,659 million

So,

$$g = \frac{(165{,}659 \times 1.10) - [(RNOA - 0.10) \times 11{,}186]}{165{,}659}$$

Thus, for an RNOA of 39%, g = 1.0804 or 8.04%.

The matched pairs for the RNOA in the valuation grid are:

Matched Pairs
Price = $70

RNOA	Growth in NOA
30%	8.65%
33%	8.45%
36%	8.24%
39%	8.04%
42%	7.84%

Coke needs considerable growth to justify a $70 price, even at an expected RNOA of 42%.

E14.7. A Simple Valuation Based on Abnormal Operating Income Growth: Coca Cola

Box 14.3 applies an SF3 valuation to Coke using the residual operating income method. With constant RNOA and constant ATO, residual operating income is forecasted to grow at the sales growth rate of 7.5%. As the growth rate in residual operating income is always to the abnormal operating income growth rate, we can apply the SF3 AOIG valuation with this growth rate. The formula is in equation 14.4 of the chapter:

$$V_0^{NOA} = OI_1 \times \frac{1}{\rho_F - 1}\left[1 + \frac{AOIG_2 / OI_1}{\rho_F - g}\right]$$

The inputs: Year 0 is 1997; Year 1 is 1998; Year 2 in 1999

$OI_1 = NOA_0 \times RNOA_1$ (RNOA is expected to stay at the same level as in 1997)

$= 11{,}186 \times 0.394$

$= 4{,}407$

$AOIG_2 = OI_2 + (FCF_1 \times 0.10) – (1.10 \times 4{,}407$

$NOA_1 = NOA_0 \times 1.075 = 12{,}025$ (NOA growing at the sales growth rate)

$OI_2 = 12{,}025 \times 0.394 = 4{,}738$

$FCF_1 = OI_1 - \Delta NOA_1 = 4{,}407 – 839 = 3{,}568$

$AOIG_2 = 4{,}738 + (3{,}568 \times 0.10) – (1.10 \times 4{,}407)$

$= 247.1$

$$\text{Value of operations} = \$\,4{,}407 \times \frac{1}{0.10}\left[1 + \frac{247.1 / 4{,}407}{1.10 - 1.075}\right]$$

$= \$4{,}407 \times 32.43$

= $142,910 million

This is close to the valuation of operations in Box 14.3, allowing for rounding error.

Note: a simpler way to get $AOIG_2$

$AOIG_2 = ReOI_1 \times 1.075$

$= 3{,}288.7 \times 0.075$

$= 247.0$

This works because AOIG is always just the growth in residual operating income.

The exercise can also be worked using growth rates and model 14.4a:

$$V_0^{NOA} = OI_1 \times \frac{1}{\rho_F - 1}\left[1 + \frac{G_2 - \rho_F}{\rho_F - g}\right]$$

As G_2 (cum-FCF OI growth rate in Year 2) = 15.61, then

$$V_0^{NOA} = 4{,}407 \times \frac{1}{0.10}\left[1 + \frac{1.1561 - 1.10}{1.10 - 1.075}\right]$$

= 142,910 million

E14.8. A simple Valuation with Short-term and Long-term Growth Rates: Cisco Systems

Pro forma Cisco as follows:

	2003	2004
Eps	0.54	0.61
Dps	0.00	
Reinvested dividends		0.00
Cum-dividend earnings		0.61
Cum-div growth rate (G_2)		12.96%
Long-term growth (G_{long})		4.0%

Applying the two-stage growth formula:

$$V_{2002}^{NOA} = OI_1 \times \frac{1}{\rho_F - 1}\left[\frac{G_2 - G_{long}}{\rho_F - G_{long}}\right]$$

$$= 0.54 \times \frac{1}{0.09}\left[\frac{1.1296 - 1.04}{1.09 - 1.04}\right]$$

$$= 0.54 \times 19.9$$

= $10.75 per share

(The forward P/E is 19.9). This valuation is less than the market price of $15. The market is pricing Cisco at a forward P/E of 15/0.54 = 27.8. So the market implicitly is seeing long-term growth in excess of 4% (if the required return is 9%) if one takes analysts forecasts for 2003 and 2004 as sound estimates.

E14.9. Using Short-term and Long-term Growth Rates to Value Reebok

Pro forma Reebok as follows:

	1996	1997	1998

Operating income ($million)		187	200
Net operating assets (NOA) (growing at 7%)	1,135	1,214	1,299
Free cash flow (OI - ΔNOA)		108	115
Reinvested free cash flow (at 10.1%)			10.9
Cum-FCF operating income			210.9
Cum-FCF OI growth rate (G_2) 210.9/187			12.78%

The formula for a two-stage growth valuation is:

$$V_{1996}^{NOA} = OI_1 \times \frac{1}{\rho_F - 1}\left[\frac{G_2 - G_{long}}{\rho_F - G_{long}}\right]$$

A valuation grid is prepared by setting G_2 = 1.1278 and calculating V^{NOA} for different long-term growth rates, G_{long}. The forward enterprise P/E (which multiplies OI_1 of $187 million in the formula) is included below. Per-share value is based on the 55.84 million shares outstanding (Box 13.5 in Chapter 13).

G_{long}	Forward P/E	V^{NOA}	NFO	V^E	Value per share
1%	12.82	$2,397	720	1,677	30.03
2%	13.18	2,464	720	1,744	31.23
3%	13.64	2,550	720	1,830	32.77
4%	14.25	2,665	720	1,918	34.36
6%	16.37	3,061	720	2,342	41.94
8%	22.64	4,214	720	3,494	62.58

Reebok was trading at about $42 at the time. So, Given analysts' forecasts for 1997 and 1998, the market was implicitly forecasting ling-run growth at 6% and so gave Reebok a forward enterprise P/E of 16.4. This is a bit high for a perpetual growth rate.

Minicases

M14.1 Simple Forecasting, Valuation, and Sensitivity Analysis: Home Depot

Introduction

This case applies simple forecasting to the valuation of Home Depot, Inc. at the end of 1999. At the time this firm traded at very high multiples that conjecture overvaluation. Simple valuation methods give us perspective on this conjecture.

They allow the analyst to test forecasting scenarios --through sensitivity analysis-- and to examine the implied forecasts in the market price.

Students will see simple forecasting in action in this case. And they will see the limitations of simple forecasting-- and the need to search for further information to develop the full-information forecasting of the next chapter.

Simple forecasting and valuation is based on the information in the current and past financial statements. So, before forecasting, summarize the statements in a form that elicits the information in the statements that will help with forecasting:

- Reformulate financial statements to separate the operating activities from the financial activities.
- Identify core (sustainable) income in the reformulated income statements
- Examine the regularity of the profitability by preparing comparative common size income statements over the years. Common size statements yield an analysis of profit margins.
- Analyze asset turnovers to complement the analysis of margins.
- Prepare a trend analysis to observe any trends that might be extrapolated to the future

The Set-up for Forecasting: Reformulated Financial Statements

Reformulated Income Statements

	1999	1998	1997	1996
Sales	30,219	24,156	19,535	15,470
Cost of Merchandise	21,614	17,375	14,101	11,184
Gross Profit	8,605	6,781	5,434	4,286
Core operating expenses	5,429	4,368	3,584	2,836

General and administrative		515		413		324		270
Core operating income from sales		2,661		2,000		1,526		1,180
Tax reported	1,040		738		597		464	
Tax on financing	3		(1)		(4)		(6)	
Tax on unusual items	---	1,043	41	778	---	593	---	458
Core operating income from sales (after tax)		1,618		1,222		933		722
Non- recurring charge		---		(104)		---		
Currency translations		(33)		(30)		8		5
Tax for non-recurring charge		---		41		---		
Operating income after tax		1,585		1,129		941		727
Interest expense	(37)		(42)		(16)		(4)	
Interest Income	30		44		25		20	
	(7)		2		9		16	
Tax (39%)	3	(4)	(1)	1	(4)	5	6	10
COMPREHENSIVE INCOME		1,581		1,130		946		737

(The 1996 income statement was not given in the case. This has been added for further comparisons.)

Reformulated Balance Sheets

	1999	1998	1997	1996
Operating assets	13,384	11,037	8,762	7,199
Operating liabilities	(3,136)	(2,704)	(2,040)	(1,567)
NOA	10,248	8,333	6,722	5,632
Financial assets	(81)	(192)	(580)	(155)
Financial liabilities	1,580	1,311	1,249	722
NFO	1,499	1,119	669	567
Minority interest	9	116	98	77
CSE	8,740	7,098	5,955	4,988
Average NOA	9,291	7,528	6,177	4,951
Average NFO	1,309	894	618	530
Average equity before minority interest	7,982	6,634	5,559	4,421

As a balance sheet is not available for 1995, average amounts are approximated.

Financial assets are the sum of cash and cash equivalents, short-term investments, long-term investments (debt) and long-term notes receivable, minus part of cash for operating cash.

The Set-up: Analyzing the Reformulated Financial Statements

Common Size Income Statements
(Operating Profit Margin Analysis)

	1999	1998	1997	1996
Sales	$30,219	$24,156	$19,535	$15,470
Gross profit	28.5%	28.1%	27.8%	27.7%
Selling and operating expenses	18.0	18.1	18.3	18.3
General and administrative	1.7	1.7	1.7	1.7
Core operating income from sales	8.8	8.3	7.8	7.6
Taxes on core operating income	3.5	3.2	3.0	3.0
Core operating income after tax	5.4	5.1	4.8	4.6
Operating income after unusual items	5.2	4.7	4.8	4.7
Comprehensive income	5.2	4.7	4.8	4.8

These percentages gave expense ratios (for expense items) and profit margins (for income items).

Commentary:

Gross margins, core operating profit margins from sales, and expense ratios are fairly constant, and look like a good basis for forecasting.

A note on Price-to-Sales ratios:

The case refers to HD's price-to-sales (P/S) ratio. In recent years analysts have given considerable attention to P/S ratio (particularly in cases of negative earnings). Home Depot had a P/S ratio of 3.3 in 1999. This is considerably above the historical median for all firms (about 1.0) and above that for retailers (0.8). How should an analyst interpret a P/S ratio? Just as the P/E ratio is interpreted as an indication of earnings growth, so the P/S ratio is often interpreted as an indication of sales growth. So, a P/S ratio of 3.3 builds in an expectation of considerable sales growth. But we have to be careful. Sales are important to valuation and growth in sales adds value, all else constant. But there is also the question of the profitability of sales, the expected profit margins from sales. So, as

$$P/S = P/E \times E/S$$

$$= P/E \times PM$$

one should modify the P/S ratio for the PM. But then, of course, one is really looking at the P/E ratio: the ability to grow earnings through growth in sales and increasing profit margins.

Note, also that P/S ratios should be unlevered because sales come from assets, not equity. See chapter 2.

Turnover Analysis

Major Balance Sheet Items
As a Percentage of Sales

	1999	1998	1997	1996
Receivables	1.7%	2.0%	1.8%	1.9%
Inventories	13.1	13.1	12.5	12.7
Property, plant and equipment	24.3	24.7	25.3	24.9
Operating assets	40.4	41.0	40.9	41.0
Operating liabilities	9.7	9.8	9.2	9.1
Total asset turnover $\left(\text{inverse: } \frac{1}{\text{ATO}}\right)$	30.7	31.1	31.6	32.0

(Calculations are based on average balance sheet amounts)

Leverage Ratios

Financial Leverage (FLEV)	0.164	0.165	0.111	0.115
Operating liability leverage (OLLEV)	0.314	0.307	0.292	0.294

(Leverage ratios are calculated from average balance sheet amounts.)

Commentary:

Turnovers are also reasonably constant. Typically Home Depot requires investment of 31 cents of net operating assets to generate a dollar of sales and maintains an operating liability level of about 0.3.

Trend Analysis

Income statement:	1999	1998	1997
Sales growth rate	25.1%	23.7%	26.3%
Cost of sales growth rate	24.3	23.2	26.1
Gross profit growth rate	26.1	24.8	26.8
Operating expense growth	24.3	21.9	26.4
General and administrative Growth	24.7	27.5	20.0
Tax expense growth	34.1	31.2	29.5
Core operating income growth	32.4	31.0	29.2
Comprehensive income growth	39.9	19.5	28.4

Commentary:

Growth rates in most items are fairly constant and consistent with the growth in sales. But these growth rates are high! Will they persist?

Balance Sheet:

	1999	1998	1997
Operating asset growth	21.3%	26.0%	21.7%
Operating liability growth	16.0%	32.5%	30.2%
NOA growth	23.0%	24.0%	19.4%
CSE growth	23.1%	19.2%	19.4%

Commentary:

Again, HD has regular growth, corresponding to the growth in sales. With constant ATO, the NOA growth rate must equal the sales growth rate; the two rates are similar.

Free Cash Flow Analysis

	1999	1998	1997
Operating income (OI)	1,585	1,129	941
Change in NOA (ΔNOA)	1,915	1,611	1,090
Free cash flow (OI - ΔNOA)	(330)	(482)	(149)

HD is generating negative free cash flow.

Analysis of Residual Operating Income and its Drivers

	1999	1998	1997	1996
RNOA	17.06%	15.0%	15.2%	14.8%
Core RNOA	17.4%	16.2%	15.1%	14.6%
Core profit margin	5.4%	5.1%	4.8%	4.6%
Asset turnover	3.26	3.22	3.16	3.13
Growth in NOA	23.0%	24.0%	19.4%	--
ReOI(10%) (millions)	$656	$376	$323	$232
Core ReOI (millions)	$689	$469	$315	$227
Growth in core ReOI	46.9%	48.9%	38.8%	---
ReOI is based on average NOA				
Price per share, 1999	$83			
Shares outstanding	1,475million			
Market value of equity	$122,200 million			
Levered P/B ratio	14.0	(based on January, 1999 book values)		
Unlevered P/B ratio	12.1	(based on January, 1999 book values)		

Question A: Simple Forecasts

We are restricting ourselves to information in the financial statements. So work with SF1, SF2, and SF3 forecasts. An SF1 forecast won't work; with a P/B ratio of 14.0 (and an unlevered P/B of 12.1), the balance sheet is certainly imperfect. So move on to SF2 and SF3 forecasts.

The **SF2** forecast of operating income:

OI_{2000} = Core OI_{1999} + (0.10 x ΔNOA_{1999})
= 1,618 + (0.10 x 957)
= $1,714 million

[The Δ in NOA is the ending NOA in 1999 over the average NOA. Core OI is used as a base for forecasting, rather than full OI, as unusual items (in full OI) do not forecast the future]

The **SF3** forecast of operating income:

OI_{2000} = Core $RNOA_{1999}$ × NOA (beginning of 2000)

= 0.174 × 10,248

= $1,783 million

The **SF2** eps forecast:

OI_{2000}	=	1,714
NFE_{2000}	=	45
$Earnings_{2000}$	=	1,669

EPS $1.13 (on 1,475 million shares)

Note: Net financial expenses are forecasted as follows

NFF_{2000} = NFO1999 × After-tax Borrowing Cost

= 1,499 × 3.0%

= 45

The after-tax borrowing cost is estimated from past reformulated statements. Some of the interest expense is capitalized in construction of stores, and analysts are (probably) anticipating this.

The **SF3** eps forecast

OI_{2000}	=	1,783
NFE_{2000}	=	45
		1,738
EPS		$1.18

These forecasts are under analysts' consensus forecast of $1.38 per share in October 1999. By October, analysts were using more information than that in the 1999 financial statements. Note, however, that analysts were forecasting 1.24 per share in March 1999, just after the 1999 financial statements were published. So at that time they did not see much a lot than was indicated in the statements. Revisions (afterwards) came later as they obtained more information.

Question B: Simple Valuations

SF2 Valuation:

$$V^{E}_{1999} = CSE_{1999} + \frac{\mathrm{Re}\,OI_{2000}}{0.10}$$

$$= 8{,}740 + \frac{689}{0.10}$$

$$= 15{,}630 \text{ (or \$10.60 per share)}$$

[Forecasted $ReOI_{2000}$ is 1,714 – (0.10 x 10,248) = 689]

SF3 Valuation:

$$V^E_{1999} = CSE_{1999} + \frac{\overline{ReOI}_{2000}}{1.10 - g}$$

$$= 8{,}740 + \frac{758}{1.10 - g}$$

[Forecasted $ReOI_{2000}$ is 1,783 - (0.10 × 10,248) = 758]

Then we have a problem: what should the growth rate, g, be?

- Use the past growth in NOA?: 23%
- Use past sales growth rate and assume a constant ATO?: 25%

These rates are too high to be maintained perpetually.

Question C

Clearly, the main focus for the analysis must be on the growth rate. Growth rates in the order of 23% must come down, but to what level?

Home Depot has fairly consistent margins, profitability and growth. These are features that make a firm suitable for simple valuation. But growth is not on its long-run path. The analyst needs information as to the long run growth prospects. In addition, he needs to be concerned about how the profitability is likely to fade in the future.

Question D

The implicit growth forecast from the market is obtained by solving for g in the SF3 valuation. For a market valuation of $122,200 million ($83 per share),

$$122{,}200 = 8{,}740 + \frac{758}{1.10 - g}$$

So, g = 1.093 (a growth rate of 9.3% per year)

[One could test sensitivity of this calculation to different estimates of the required return]

Is this growth rate justified? The key is forecasting the sales growth rate because ATO is reasonably constant. To forecast retail sales growth, analysts distinguish

(1) growth in same-store sales

(2) growth from store openings

HD was achieving 10% increase in same-store sales during 1999.

Question E

The valuation grid gives the value per share that different forecasts of RNOA and growth in NOA imply.

RNOA / Growth in Sales	15%	16%	17%	18%	19%	20%	21%
2%	10.27	11.14	12.00	12.87	13.74	14.61	15.48
4%	11.72	12.87	14.03	15.19	16.35	17.51	18.67
6%	14.61	16.35	18.08	19.82	21.56	23.29	25.03
8%	23.29	26.77	30.24	33.72	37.19	40.66	44.13
9%	40.66	47.61	54.56	61.51	68.5	75.40	82.35

$$\text{Value} = 8{,}740 + \frac{(\text{RNOA} - 0.10) \times 10{,}248}{1.10 - (1 + \text{growth rate})}$$

$$\text{Value per share} = \frac{\text{Value}}{1{,}475}$$

This grid gives a sense of what is required to justify the market price of $83. If Home Depot increases its RNOA to 21%, it would still have to generate a growth in NOA (driven by sales growth) of 9% a year. Lower profitability or growth yields a lower value than the current $83 price. This valuation grid can be supplemented with a matched forecast pairs analysis (see text).

HD is currently generating very high growth. The question is, for how long can it keep such growth up. Forecasting declining growth rates follows in the next chapter.

Short-term and Long-term Growth Rates

One can also get a sense of the appropriate valuation – and develop a valuation grid – using the two-stage growth model in the chapter. This forecasts operating income for two years, based on current operating income with a growth rate, and then adds a long-term growth rate:

$$V_{2002}^{NOA} = OI_1 \times \frac{1}{\rho_F - 1}\left[\frac{G_2 - G_{long}}{\rho_F - G_{long}}\right]$$

The following pro forma uses the SF3 forecast for OI_1 and then forecasts cum-FCF operating income for year 2 by maintaining the SF3 forecast of growth in NOA of 23% with RNOA at the same level as currently:

	1999	**2000**	**2002**	
Net operating assets (NOA)	10,248	12,605		
Operating income		1,783	2,193	(12,605 × 0.174)
Free cash flow (OI – ΔNOA)		(574)		
Reinvested FCF (at 10%)			(57)	
Cum-FCF OI			2,136	

Cum-FCF growth rate (G_2) 2,136/1,783 19.8%

With this two-year ahead growth rate, G_2, one can now develop a valuation grid for different long-term growth rates, G_{long}, using the formula. For example, if the long-term growth rate is 5%, then V^{NOA} = $52,776.8 million. If the long-term growth rate is 8.3%, V^{NOA} is approximately equal to the current market price of the operations. So, given that the forecast for 2000 and 2001 are reasonable, the market is expecting very large long-term growth to be sustained.

Near-term and Long-term Growth Rates

(The following was supplied by Professor Kenton Yee)

Home Depot has been delivering growth in residual operating income of over 40% in the years up to 1999. One can imagine their keeping up this growth rate for some years, but the growth rate tapering off in the long term. A model forecasts different growth rates for the near term and long term follows:

$$P_{1999} = CSE_{1999} + \left\{ \frac{1 - \left(\frac{g_{near}}{\rho}\right)^5}{\rho - g_{near}} + \frac{\left(\frac{g_{far}}{\rho}\right)^5 \left(\frac{g_{near}}{g_{far}}\right)^4}{\rho - g_{far}} \right\} \times \overline{core\,\mathrm{Re}\,OI}_{2000}$$

where

g_{near} is annual RE growth during next 5 years;

g_{far} is annual RE perpetuity growth after 5 years;

``g'' always refers to 1 PLUS the growth rate; and

<u>mean reversion</u> suggests $g_{far} << g_{near}$ if the latter is large.

A valuation grid can be developed using this model:

rho=	1.1					
cse=	8740					
REcoreOI(99)=	689		REcoreOI(00)=g_near*REcoreOI(99)			
shares=	1475					
g_near \ g_far	1	1.02	1.04	1.06	1.07	1.08
1.35	$23.43	$27.01	$32.97	$44.89	$56.81	**$80.66**
1.4	$26.62	$30.91	$38.06	$52.36	**$66.66**	**$95.26**
1.45	$30.28	$35.40	$43.92	$60.96	**$78.00**	$112.08
1.5	$34.46	$40.52	$50.61	**$70.80**	**$90.99**	$131.37

This valuation grid indicates that the current (1999) price of $83 per share makes sense if one can forecast short-term growth of 45 - 50% and long-term growth of about 6 – 7 %.

The bottom line on this case

Home Depot can't be valued using simple valuations. But the analysis with simple forecasts and simple valuations gives us considerable understanding of the critical valuation issues. HD has regular profitability--margins and turnovers-- and this helps us in forecasting. The simple analysis instructs the analyst to focus on sales growth. How will this be different in the future? Given that profitability is fairly regular, this is where the analyst should focus her efforts. Of course, she must also be sensitive to declining margins that may ensue from pursuit of sales growth. But, if the sensitivity analysis in the valuation grid indicates that the combination of growth in sales and RNOA implied by a price of $83 is very unlikely, the analyst may reach the conclusion that the stock is overpriced, and issue a SELL, without going into further forecasting analysis.