CHAPTER TWELVE

The Analysis of Growth and Sustainable Earnings

Concept Questions

C12.1 A growth firm is one that is expected to grow residual earnings. As changes in residual earnings are equal to abnormal earnings growth, a growth firm can also be defined as one that can generate abnormal earnings growth, that is, earnings growth (cum-dividend) at a rate greater than the required rate. As residual earnings is driven by return on common equity (ROCE) and growth in equity, a growth firm is one that can increase ROCE and/or grow investment that is expected to earn at an ROCE that is greater than the equity cost of capital.

C12.2 Abnormal earnings growth is the same as growth in residual earnings, so it doesn't matter. Abnormal growth in earnings – growth above the required rate of growth – is a simpler concept, but residual earnings growth helps to lead the analyst into the drivers of growth – investment and the profitability of investment.

C12.3 A no-growth firm has zero or negative residual earnings growth or, equivalently, has growth in cum-dividend earnings at a rate equal or less than the required return.

C12.4 A growth company would have the following features:

- An ROCE greater than the cost of capital

- Increasing residual earnings (that amounts to abnormal earnings growth) due to
    - Sales growth (with positive profit margins)
    - Increasing profit margins
    - Increasing asset turnover
    - Growing net investment (earning a ROCE greater than the cost of capital)

A growth company is one that is expected to have these attributes in the future. It is possible that a firm may have had these attributes in the past but is not expected to have them in the future. And it is possible that a firm may not have these features currently (a start-up, for example), but is expected to have them in the future.

C12.5 The analyst is interested in the future because value is based on future earnings (or strictly, on future residual earnings). So she analyzes current earnings for indications of what future earnings might be. To the extent that current earnings is not sustainable (that is, will not be a part of future earnings), the analyst wants to identify those earnings.

C12.6 Transitory earnings are aspects of current earnings that have no bearing on future earnings. Examples are earnings from a one-time contract, a write-off on unusually large bad debt, a write-down of obsolescent inventory, a one-time uninsured loss of property, a restructuring charge, and profit from an asset sale or a discontinued line of business.

Note that write-offs and restructurings do have an effect on future income in a technical, accounting sense because, if the charge is not taken now, it will have to be taken in the future. But, provided the charge is a "fair" one that does not over or underestimate the restructuring cost, its effect on earnings will be completed in the current period.

C12.7 In one sense, these gains and losses are persistent because they occur every period. But a gain or loss in the current period gives no indication of whether there will be a gain or loss in the future. That is, the expected future gain or loss is zero, irrespective of the current gain or loss. So these gains and losses are treated as transitory.

C12.8 Operating leverage is the proportion of fixed and variable costs in a firm's cost structure; it is an income statement concept.

Operating liability leverage is the proportion of operating liabilities in net operating assets; it is a balance sheet concept.

Both create leverage. Operating leverage levers the operating income from sales. Operating liability leverage levers operating income from net operating assets (RNOA).

C12.9 This is correct. A higher contribution margin means lower variable costs. So more of each dollar of sales "goes to the bottom line."

C12.10 Profit margins in retailing tend to be low because the business is very competitive. See Table 11.3 in Chapter 11 where the median profit margin for

food stores is 1.7%. If a firm were reporting a 6.0% profit margin, we'd guess that it is temporary: Competition will probably erode this margin.

C12.11 Common equity grows through earnings and new share issues, and declines through stock repurchases and dividends. But more fundamental factors underlie this growth. Equity grows because of increases in sales (revenues) that require more net operating assets (to service the sales). The amount of net operating assets to service additional sales depends on $\frac{1}{\text{ATO}}$, that is, on the NOA required for each dollar of sales. The amount of equity growth to finance the NOA growth depends on the extent of net debt financing used. If firms issue debt to finance the growth or liquidate financial assets, no growth in equity occurs.

C12.12 Almost none of the drop in common shareholders' equity was due to operations. Three factors drive changes in equity:

1. Changes in sales
2. Changes in asset turnover
3. Changes in net debt

Reebok's sales remained "flat" from 1995 to 1996 and the asset runover (ATO) changed little. So almost all of the change in equity was due to the change in financial leverage as a result of the stock repurchase that was financed by new debt.

C12.13 Yes, this is correct. A trailing P/E can be high because current earnings are temporarily low, even though expected future growth would indicate that the P/E should otherwise be low.

C12.14 This is correct. A normal P/E implies that residual earnings are expected to continue at the current level (and, equivalently, earnings are expected to grow, cum-dividend, at the required rate of return). See the Whirlpool example on the chapter.

C12.15 Yes. See the cell analysis of the chapter. A firm with a high P/E and a low P/B is

one where residual earnings are expected to increase from their current level but are expected to be lower than zero (a cell C firm).

C12.16 Yes, correct. Temporarily high earnings are expected to decline, so should have a low P/E ratio.

Exercises

E12.1 Calculating Core Profit Margin

The reformulated statement that distinguishes core and unusual items is as follows (in millions of dollars):

Sales			667.3
Core operating expenses			580.1
Core operating income before tax	(73.4 +13.8)		87.2
Tax as reported		18.3	
Tax benefit of net debt	(0.39 × 20.5)	8.0	
Tax on operations		26.3	
Tax allocated to unusual items:		5.4	31.7
Core operatimg inome after tax			55.5
Unusual items			
Start-up costs		(4.3)	
Merger charge		(13.4)	
Gain on asset disposals		3.9	
		(13.8)	
Tax effect (0.39)		5.4	
		(8.4)	
Translation gain		8.9	0.5
Comprehensive operating income			56.0

Note:

1. The currency translation gain is transitory; it does not affect core income.
2. Translation gains, like all items reported in other comprehensive income are after-tax.
3. The gain on disposal of plant may attract a higher tax rate than 39% due to depreciation recapture.

Core operating income (after tax) = 55.5

$$\text{Core profit margin} = \frac{\text{Core operating income (after tax)}}{\text{Sales}}$$

$$= \frac{55.5}{667.3}$$

$$= 8.32\%$$

E12.2 Explaining a Change in Profitability

Reformulate balance sheets and income statements

Balance Sheets

	1998		1999		2000	
	NOA	NFO	NOA	NFO	NOA	NFO
Cash	100		100		120	
A/R	900		1,000		1,250	
Inventory	2,000		1,900		1,850	
PPE	8,200		9,000		10,500	
Accr. Liab.	(600)		(500)		(550)	
A/P	(900)		(1,000)		(1,100)	
Def. Taxes	(490)		(500)		(600)	
S/T investments		(300)		(300)		(330)
Bank loan						3,210
Bonds payable		4,300		4,300		1,000
Preferred stock		1,000		1,000		1,000
	9,210	5,000	10,000	5,000	11,470	4,880
CSE		4,210		5,000		6,590
		9,210		10,000		11,470
Leverage (NFO/CSE)		1.188		1.000		.741
Average leverage				1.086		.853

Income Statements

	1999		2000	
Sales		22,000		24,000
CGS	13,000		13,100	
S&A	8,000	21,000	8,250	21,350
Core OI b/4 tax		1,000		2,650
Tax on OI		337		812
Core OI after tax		663		1,838
Restructuring charge	190			
Tax Benefit	65	(125)		
Operating income		538		
Net Financial expenses				
Net interest expenses	406		405	
Tax Benefit	(138)		(137)	
	268		268	
Gain on retirement (after tax)	0		100	
	268		168	
Preferred divs.	80	(348)	80	(248)
NI available for common		190		1,590

Tax on Core OI (1999) = 134 + 138 + 65 = 337
Tax on Core OI (2000) = 675 + 137 = 812

Net borrowing cost (NBC): Net fin. exp/average NFO

1999: 348/5,000 = 6.96%
2000: 248/4,940 = 5.02%

Return on net operating assets (RNOA): OI/average NOA

1999: 538/9,605 = 5.60%
2000: 1,838/10,735 = 17.12%

Core profit margin (PM): Core OI/Sales

1999: 663/22,000 = 3.01%
2000: 1,838/24,000 = 7.66%

Asset turnover (ATO): Sales/average NOA

1999: 22,000/9,605 = 2.290

2,000: 24,000/10,735 = 2.236

Unusual items to net operating assets: UI/average NOA

1999: -125/9,605 = -1.30%
2000 = 0

Spread: RNOA - NBC

1999: -1.36%
2000: 12.10%

Explaining ΔROCE:

ROCE (1999) = NI avail for common/average CSE = 190/4,605 = 4.13%
ROCE (2000) = 1,590/5,795 = 27.44%
Δ ROCE (2000) = 23.31%

Δ ROCE = Δ RNOA + [ΔSpread × FLEV (1999)] + [Δ FLEV × Spread (2000)]
= 0.1152 + (0.1346 × 1.086) + (-0.233 × 0.1210)
= 0.2331

Explaining the Δ RONA component:

Δ RNOA = [Δ core profit margin × turnover (1999)] + [Δ turnover × core profit margin (2000)] + Δ unusual items/NOA
= [0.0465 × 2.290] + [-0.054 × 0.0766] + 0.0130
= 0.1152

In words, the Δ ROCE is explained by an increase in profit margin (despite a small reduction in sales turnover) that was levered up by an increase in the spread (the effect of which was reduced by a decrease in leverage). In addition there were no unusual changes in 2000 that reduced operating profitability.

E12.3 Explaining a Change in operating Profitability: Quantum Corporation

Refer to the solution to exercise E10.9 in Chapter 10 for calculations of RNOA, profit margins, turnovers and related measures used below.

The change in RNOA is explained by the change in its components:

	1994	1995	1996
RNOA	0.0244	0.1872	-0.0836
ΔRNOA		0.1628	-0.2708
Core PM	0.0112	0.0432	0.0181
ΔCore PM		0.0320	-0.0251
ATO (based on ave. NOA)	6.967	6.784	5.260
ΔATO		-0.1830	-1.5240
UI/Average NOA	-0.0536	-0.1058	-0.1791
Δ [UI/average NOA]		-0.0522	-0.0733

$\Delta RNOA_{1995}$ = [ΔCore PM_{1995} x ATO_{1994}] + [ΔATO_{1995} x Core PM_{1995}]+ Δ [UI/NOA]

= 0.223 - 0.008 - 0.052

= 0.163

Quantum increased RNOA in 1995 by 16.28%. This was due to an increase in core profit margins of 3.2%. Indeed, turnover decreased slightly to reduce RNOA, and an increase in unusual charges also decreased the operating profitability.

A similar calculation can be done for 1996:

$\Delta RNOA_{1996}$ = -0.170 – 0.028 – 0.073

= -0.271

RNOA in 1996 was damaged by a decrease in profit margins, a deterioration of turnovers and an increase in unusual charges. Students can dig further by finding the components of the profit margins and turnovers that produced these changes.

E12.4 Raising Questions Regarding a Change in Income: Boeing

Questions are prompted (and partially answered) by comparative reformulated statements. First reformulate. Then analyze as far as you can go, then list unanswered questions for investigation.

Reformulated income statements

	1998	1997	1996
Operating income, as reported	1,567	(256)	2,485
Unusual items (special charges)	0	1,400	0
Core operating income before tax	1,567	1,144	2,485
Tax, as reported	277	(163)	662
Tax on net interest (38%)	65	32	3
Tax on operating income	342	(131)	665
Tax on unusual items (38%)	0	532	0
Tax on core operating income	342	401	665
Core operating income after tax	1,225	743	1,820
Unusual charges	0	1,400	0
Tax on unusual items		532	
Unusual charges after tax	0	868	0
Net interest expense	170	85	5
Tax on net interest	65	32	2
Net interest after tax	105	53	3
Net income	**1,120**	**(178)**	**1,818**

Analysis

	1998	1997	1996
Sales growth	22.60%	29.20%	
Core operating income growth (after tax)	64.90%	-59.20%	
Operating cost ratio	90.00%	88.70%	82.90%
General and administrative expenditures	3.50%	4.80%	5.10%
R & D expense ratio	3.40%	4.20%	4.60%
Core income profit margin	2.20%	1.60%	5.10%

Questions Raised

1. Will sales growth continue to decline?
2. Why did core operating income grow at 64.9% in 1998 while sales grew at only 22.6%.

a) Was the growth in core operating income in 1998 due to unusually low income (before special change) in 1997? Why was 1997 lower than 1996?

b) Why did the general administrative expense ratio decline in 1998? Is this temporary or does it indicate permanent cost (efficiencies?).

c) Why did the R&D expense ratio decline in 1998? Is the firm cutting back on R&D in detriment to future sales?

3. The operating cost ratio is increasing. Will this continue (and damage profitability?)

Questions Answered

The increase in core operating profit margins in 1998 over 1997 was due to reduction in general and administrative expenses and R&D costs as a percentage of sales. With the growth in sales, core operating income increased by 64.9%. The reduction in core operating margins in 1998 over 1996 was due to a large increase in

the operating cost ratio. Even with much higher sales in 1998, operating costs yielded a lower core operating income.

Clearly we need more detail to get at the reasons for the changes in expenses. With the limited information in the statement, significant questions arise about future profitability.

Critical Questions

- Can Boeing get its operating costs down?
- Can Boeing maintain the lower 1998 ratios for other costs?
- What is Boeing's R&D strategy?
- What is the sales outlook?

E12.5 Explaining Changes in Income: US Airways

First prepare the reformulated income statements to distinguish core operating income from sales, other core income, unusual items and net financial expenses:

		1998		1997
Core operating revenues		8,688		8,514
Core operating expenses				
Personnel costs		3,101		3,179
Aviation fuel		623		805
Commissions		519		595
Aircraft rent		440		475
Other rent and landing fees		417		420
Aircraft maintenance		448		451
Other selling expenses		342		346
Depreciation and amortization		318		401
Other		1,466		1,258
Total operating expenses		7,674		7,930
Core operating income before tax		1,014		584
Tax as reported	364		(353)	
Tax benefit of debt (38%)[1]	43		56	
Tax on unusual items	1	408	(73)	(370)
Core operating income from sales		606		954
Other core income: equity income in affiliates		1		30
Core operating income		607		984
Unusual items				
Other income	(4)		13	
Gain on sale of interests in affiliates	0		180	
	(4)		193	
Less tax (38%)[2]	1	(3)	(73)	120
Operating income		604		1,104
Net financial expenses				
Net interest	112		148	
Tax effect (38%)[1]	43		56	
	69		92	
Preferred dividends	6	75	64	156
Net income, adjusted[3]		529		948

Notes: 1. Marginal tax rate is assumed to be 38%.
2. Gains on sale of securities may be taxed at a lower capital gains tax rate.
3. Net income and net interest are before capitalized interest. ($3million in 1998 and $13 million in 1997).

(a) Explaining increase in before-tax operating income from $584 million to $1,014 million; standardizing for the increase in sales:

As a percentage of sales:	1998	1997
Personnel costs	35.7	37.3
Fuel	7.2	9.5
Commissions	6.0	7.0
Aircraft rent	5.1	5.6
Other rent and landing fees	4.8	4.9
Aircraft maintenance	5.2	5.3
Other selling expenses	3.9	4.1
Depreciation and amortization	3.7	4.7
Other expenses	16.9	14.8
Total core operating expenses	88.5	93.2
Core PM before tax	11.7	6.9
	100.2	100.1

Operating expenses as a percentage of sales declined in 1998; the largest declines were in personnel costs, commissions and depreciation and amortization. But "other expenses" (for which there is limited information) increased. Note that operating income, as reported, does not include all components of operating income. Gains on sale of shares in operating affiliates are also operating income. But reported operating income does identify core income (before tax).

While core operating income increased before tax, it decreased after tax. The after-tax decrease was due to negative taxes in 1997 (see below). One could classify the negative taxes in 1997 as an unusual item.

(b) The decline in net income (on an increase in before-tax operating income) can be explained as follows:

1. Transitory effect of negative taxes in 1997

2. Transitory gain on sale of shares of affiliates in 1997

3. Change in interest capitalization
4. Decrease in "other income"
5. Change in net financial expenses: a decrease in both after-tax net interest and preferred dividends.

(c) The negative taxes with positive income seems strange. This could be due to either:

1. Tax credits in 1997 from features of operations that are given credits; this is unlikely for an airline.
2. Changes in deferred taxes.

   The second reason was indeed the case. US Airways had accumulated tax benefits from operating losses in the year prior to 1997. In 1997 it determined that it was "more likely than not" that it would be able to utilize these tax benefits in the future. So it reduced its previous valuation allowance on deferred tax assets substantially.

The calculation of 1997 tax expense, relative to 1996, was as follows (in thousands):

	1997	1996
Current provision:		
Federal	$ 100,879	$ 6,423
State	7,680	3,000
Total current provision	108,559	9,423
Deferred provision:		
Federal	(406,571)	-
State	(54,651)	2,686
Total deferred provision	(461,222)	2,686
Provision (credit) for income taxes	$(352,663)	$12,109

You see that taxes were assessed but the change in the deferred tax provision yielded negative taxes.

The accounting for the deferred tax asset in the exercise shows the change in the valuation allowance. The change of $642 million should be treated as a transitory item. Accordingly, the tax on core operating income would be calculated as follows:

Tax on core operating income before unusual component	(370)
Change in valuation allowance	642
Core tax on operating income	272

(d) 1998 income is more indicative of future income:

1. It is the more recent income year.
2. It has fewer transitory items.

E12.6 Analysis of Pension Expense: Boeing Co.

Focus on the components of net periodic benefit cost (pension expense). The service cost is the implicit wage expense for pensions benefits for workers during 1998. The amortization of the transition asset of $86 million (from when pension accounting was first adopted) is transitory: the amortization will be complete by 2000. The amortization of prior service cost at $101 million can be accepted as a permanent feature. The actuarial loss of $5 million is transitory--it's due to changes in actuarial assumptions. Interest of $1,793 million on the pension liability is a recurring item.

The expected return on plan assets is the suspect element. These are expected returns, not actual returns, so do not directly reflect the gains on plan assets. But, if the value of the plan assets has increased (due to appreciation of stocks in the plan's portfolio) the expected dollar return on the assets has also increased. These returns (that reflect the success of the pension fund) are clearly affecting pension expense -- enough, in this case, to yield a negative expense, that is, income. This does not reflect the cost of employing people in operations: If the fund had been less successful--or the stock market drops in the future--this expense would be (considerably) higher.

Here's a thought: What-if Boeing's pension fund had invested only in Boeing's shares? Then the income statement which the analyst is using to value Boeing's shares (to see if Boeing's shares are reasonably priced), would reflect the price of Boeing's shares.

There is another consideration lurking here. If actual gains of a fund exceed a certain level, the firm is required to bring actual gains into the pension expense (as well as expected returns), and that would affect pension expense further.

There are some other firms where the gains on pension fund assets have had a significant effect on income: USX-US Steel, Lucent Technologies, Northroop Grumman, General Electric, and Westvaco.

E12.7 Transitory Taxes: Kimberly-Clark Corporation

(a) The tax expense is greater than before-tax income largely because the restructuring charges included in income do not receive a tax benefit at the statutory rate of 37.2% (see below). (There are some operating losses that reduced the effective tax rate below the statutory rate of 37.2% also.) From the tax footnote, the tax benefit of the restructuring charge is $360 million, so the tax rate for the benefit of the $1,440 million charges is 360/1,440 = 25%. In dollar terms, that is a $176 million difference from receiving a tax deduction at a 35% rate.

The firm may not receive the full benefit of the restructuring change at the statutory rate, for one or more of the following reasons.

1. Some restructuring costs may not be deductible.
2. Restructuring may occur in countries where the tax rate is lower than in the U.S. or where the tax rules for loss carry forwards affect the deferred tax valuation allowance (the likelihood that there will not be a benefit from the loss carry forward).
3. The firm may have recapture taxes for depreciation overcharged on the restructured operations and may have capital gains taxes.

(b) The reformulated statement:

Net sales		$13,788.6
Cost of products sold		8,828.1
Gross profit		4,960.5
Advertising, promotion and selling expenses		2,496.5
Research expense		207.2
General expense		603.8
Sustainables operating income from sales before tax		1,653.0
Tax as reported	153.5	
Tas benefits of debt (37.2%)[1]	91.3	
Tax benefit of restructuring[2]	360.0	604.8
Sustainable operating income after tax		1,048.2

Notes: 1. The tax rate is calculated as follows:

U.S. statutory rate		35.0%
State rate (from footnote)	34.2/1,554.4	2.2
		37.2%

2. From tax footnote

(c) Effective tax rate on core operating income $= \frac{604.8}{1653.0}$

$= 36.6\%$

(d) There are two frustrations here:

1. There is a large "other income" of $136.9 million. Is this recurring or a one-time item? What is it?
2. Equity income of $113.3 can't be analyzed without the accounts of the subsidiary firms.

E12.8 Analysis of Effects of Operating Leverage: US Airways

(a) The fixed and variable operating cost breakdown is:

Variable cost (VC)	$3,636 million
Fixed cost (FC)	4,038
	$7,674 million

One measure of operating leverage is

$$\frac{FC}{VC} = 1.11$$

Another measure is

$$OLEV = \frac{\text{Contribution Margin}}{\text{Operating Income}} = \frac{\text{Sales - Variable Cost}}{\text{Operating Income}} = \frac{8{,}688 - 3{,}636}{1{,}014} = 4.98$$

(b) % change in core operating income = OLEV × (% change in sales)
= 4.98 × 1%
= 4.98%

That is, operating income will increase 4.98% for an increase in sales by 1%. This can be proofed:

1% increase in sales	$86.88 million
Variable cost (at 41.9%)	36.40
Contribution Margin	50.48

Additional contribution as a % of operating income = $\frac{50.48}{1{,}014} = 4.98\%$

(c) Breakeven occurs at the point where sales = fixed costs + variable costs, or where contribution margin equals fixed costs. As fixed costs are $4,038 million, that point is

Breakeven = 4,038/0.581 = $6,950 million of sales

where 0.581 is the contribution margin ratio (contribution margin/sales).

E12.9 Analysis of Growth in Common Equity for a Firm with Constant Asset Turnover

The ingredients:

	2,000	1,999
Average CSE	4,560	4,259
Growth in average CSE	301	
Growth in average NFO	0	
Growth in sales	902	
Asset turnover (Sales/Average NOA)	3	3

As asset turnover is constant and average net financial obligations did not change from 1999 to 2000, the growth in CSE is explained solely by the growth in sales:

$$\text{Growth in CSE} = \text{Growth in sales} \times \frac{1}{\text{ATO}}$$

$$= \frac{902}{3}$$

$$= 301$$

E12.10 Analysis of Growth in Residual Earnings: Kmart Corporation

First calculate the growth in residual earnings to be analyzed.

Residual earnings (RE) = Comprehensive Income - (0.10 + Ave. CSE)

RE_{1991} = 751 - (0.10 × 5,178)

= 233.2

RE_{1990} = 291 - (0.10 × 4,972)

= - 206.2

Change in RE_{1991} = 439.4

Residual earnings is driven by return on common equity (ROCE) and change in equity (assuming cost of capital remains unchanged). So analyze the change in ROCE and the change in common equity.

A. Analyze change in ROCE

1. Calculate ROCE for each year:

	1991	1990
ROCE (comprehensive income/average CSE)	14.50%	5.83%
2. Calculate financial leverage (ave. NFO/ave. CSE)	0.733	0.725

3. Calculate RNOA and its components

RNOA (OI/ave NOA)	11.21%	6.05%
Core RNOA	11.21%	10.83%
Unusual OI/NOA	0%	-4.78%
PM (OI/Sales)	3.10%	1.74%
Core PM (core OI/Sales)	3.10%	3.11%
Asset turnover (ATO)	3.62	3.49

4. Explain change in RNOA of 5.16%.

$\Delta RNOA_{1991}$ = $[\Delta CorePM_{1991} x ATO_{1990}] + [\Delta ATO_{1991} \times Core\ PM_{1991}]$ + Δ[UI/NOA]

5.16% = [-0.01 × 3.49] + [0.13 × 3.10] + 4.78
(allow for rounding error)

The increase of 5.16% in the RNOA for 1996 was largely due to the absence of unusual charges, but an increase in the asset turnover also added 0.4% to RNOA. Core operating profit margins had little effect on the RNOA.

Further detail in the balance sheet and income statement would explain how components in the core PM and ATO changed.

5. Calculate net borrowing cost and SPREAD

	1991	**1990**
Net borrowing cost (NBC=NFE/av.NFO)	6.72%	6.32%
SPREAD (RNOA - NBC)	4.49%	-0.27%

6. Explain change in ROCE

ROCE = RNOA + [FLEV × SPREAD]

ROCE, 1991 = 11.21% + [0.733 × 4.49%]
= 11.21% + 3.29%
= 14.50%

ROCE, 1990 = 6.05% + [0.725 × (-0.27%)]
= 5.85%

$\Delta ROCE_{1991}$ = $\Delta RNOA_{1991}$ + [$\Delta SPREAD_{1991}$ × $FLEV_{1990}$] + [$\Delta FLEV_{1991}$ × $SPREAD_{1991}$]
= 5.16 + [4.76% × 0.725] + [0.008 × 4.49%]
= 8.65%

As financial leverage (FLEV) did not change much, the change in ROCE can be explained approximately by

$\Delta ROCE_{1991}$ = $\Delta RNOA_{1991}$ × [1+ Average $FLEV_{1991}$]

ΔROCE1991 = 5.16% × [1+0.733]
= 8.94%

B. Analyze change in Equity

Change in average common equity (CSE) is $206 million

$$\Delta CSE = \Delta\left[\text{Sales} \times \frac{1}{\text{ATO}}\right] - \Delta NFO$$

$$= \frac{32,452}{3.62} - \frac{29,898}{3.49} - 188$$

$$= 210 \text{ (allow for rounding error)}$$

$$\text{OR, } \Delta CSE_{1991} = \left[\Delta \text{Sales}_{1991} \times \frac{1}{\text{ATO}_{1990}}\right] + \left[\Delta \frac{1}{\text{ATO}_{1991}} \times \text{Sales}_{1991}\right] - \Delta NFO$$

$$= \frac{2,254}{3.49} - [0.0103 \times 32,452] - 188$$

$$= 210$$

Sales increased by $2,554 million requiring additional investment, in net operating assets of $394 million, allowing for a change in the asset turnover from 3.49 to 3.62. But $188 million in NOA was financed by debt, leaving $206 million to be financed with growth in common equity.

C. Bringing change in ROCE and change in CSE together to explain the change in residual earnings

$$\Delta RE_{1991} = [(\Delta ROCE - 0.10) \times CSE_{1990}] + \{\Delta CSE_{1991} \times (ROCE_{1991} - 0.10)]$$

$$= (8.67\% \times 4,972) \times (209 \times 4.50\%)$$

$$= 440$$

E12.11. P/E, P/B, and Return on Common Equity: Hilton Hotels

(a) If ROCE is abnormally high, the P/E will be low. P/E is based on forecasts of future residual earnings (that are driven by future ROCE) relative to current residual earnings (that are driven by current ROCE). A decline in residual earnings is expected (and a low P/E results) if ROCE is temporarily higher than expected in the future.

(b) For the same reason, if an ROCE of 4.8% for 1996 is considered low, P/E will be high. At a P/B ratio of 2.1, the market expects ROCE above the cost of capital in the future. For any reasonable guess at the cost of capital, 4.8% is below it, and the market sees ROCE increasing.

(c) 1994: cell A

1995: cell A

1996: cell A

In all three years the market sees positive residual earnings in the future (ROCE above the cost of capital) and residual earnings increasing.

(d) Over the three years, 1994-96, Hilton was earning an average ROCE of under 10%. The market was pricing the equity at over two times book value. So the market was (implicitly) expecting higher ROCE in the future. If the higher ROCE was not realized, the price should fall. An ROCE of 10% indicates that the firm should sell at about book

Minicases

M12.1 A Study in Value Creation: Dell Computer Corporation

Preliminaries

Share price, March 25, 1999	38.00
Dividends	0.00
Change in per-share value, 1993-1999 (6 years)	693.70%
Eps, February 1, 1999 fiscal year	0.58
Bps (on 2,543 million shares)	0.91
P/E (trailing)	65.50
P/B	41.80
P/E for computer stocks	43.00
P/E for S&P 500	30.20
Beta	1.70
CAPM cost of capital (with equity risk premium of 6%)	15.60%

Price chart: www.bigcharts.com

These numbers indicate very high price appreciation to P/E and P/B levels that are also considered very high. The case seeks to understand, from the financial statements, the fundamentals that drove the value appreciation. How does value created show up in financial statements? The solution here benchmarks Dell against numbers for Compaq, Gateway 2000 and Hewlett Packard.

Working the Case

The case solution is under the following headings:

I. Reformulation of the Financial Statements
II. Analysis of the Reformulated Statement of Shareholders' Equity
III. Analysis of the Reformulated Balance Sheet
IV. Analysis of Profit Margins
V. Analysis of Turnovers
VI. Cash Flow Analysis
VII. Summary of the Value Creation

I. To set up for analysis, reformulate the financial statements

Reformulated Statements of Common Stockholders' Equity

	Common Stock	Comprehensive Income	Total
(1) **Balance, 1992**	166	108	274
Net transactions with owners	12		
Net income		102	
Currency translation loss		(19)	83
Balance, 1993	178	191	369
(2) Net transactions with owners	22		
Net income		(36)	
Currency translation loss		(5)	
Unrealized gain on financial items		3	
Preferred dividends		(2)	(40)
Balance, 1994	200	151	351
(3) Net transactions with owners	38		
Net income		149	
Currency translation gain		9	
Unrealized loss on financial items		(6)	
Preferred dividends		(9)	143
Balance, 1995	238	294	532
(4) Net transactions with owners	173		
Net income		272	
Unrealized gain on financial items		3	
Preferred dividends		(13)	262
Balance, 1996	411	556	967
(5) Net transactions with owners	(696)		
Net income		518	
(6) Other income		17	535
Balance, 1997	(285)	1,091	806
Net transactions with owners	(443)		
Net income		944	
(6) Other income		(14)	930
Balance, 1998	(728)	2,021	1,293
(3) Net transactions with owners	(431)		
Net income		1,460	
Other income		(1)	1,459
Balance, 1999	(1,159)	3,480	2,321

This reformulation is before identification of hidden dirty surplus items: see later

Notes:

1. Preferred stock is excluded from the statement and treated as a financial obligation in the reformulated balance sheet.

2. Many of the stock issuances from fiscal 1994 onwards are to employees under employee compensation plans. The accounting does not recognize the implied compensation expense for stock option plans but does recognize the tax benefit (in common stock in excess of par). The tax benefits, like the implied compensation expense, is part of comprehensive income. See the discussion later for estimates.

3. The charge in the "other" column against share issues in the published statements is deferred compensation from issuing shares at less than market value under an employee stock purchase plan. It is really a deferred charge (part of NOA) but, as it is small, it is netted against common stock, along with subsequent amortizations in the "other" column.

4. A loss (equal to the difference between the market price and conversion price) in the preferred stock conversions to common in 1996 and 1997 should be recognized as a financing expense in comprehensive income. The market price of the common at the date of conversion is needed for this calculation. See discussion later.

5. Put option transactions are treated as equity transactions. See discussions later on the analysis of the statement of shareholders' equity.

6. Other income is not identified in 1997-99. It is probably foreign currency translation gains and losses and unrealized gains on financial assets. All marketable securities are financial items.

Reformulated Balance Sheets

	1999	1998	1997	1996	1995	1994	1993
(1) Cash	20	20	15	15	10	3	10
Accounts receivable (gross)	2,124	1,514	934	755	564	437	
Allowance for bad debts	(30)	(28)	(31)	(29)	(26)	(26)	
Accounts receivable (net)	2,094	1,486	903	726	538	411	374
Inventories (FIFO)	273	233	251	429	293	220	303
Deferred tax assets	137	106	133	67	78	64	62
Property, plant and equipment (gross)	775	509	374	292	208	152	
Accumulated depreciation	(252)	(167)	(139)	(113)	(91)	(65)	
PPE, net	523	342	235	179	117	87	70
Other assets	669	257	119	101	41	21	22
Operating Assets	3,716	2,444	1.656	1,517	1,077	806	841
Accounts payable	2,397	1,643	1,040	466	403	283	295
Accrued and other liabilities	1,298	1,054	618	473	349	255	199
Deferred warranty revenue	237	225	219	116	68		
Other liabilities	112	36	13	7	9	31	16
Operating liabilities	4,044	2,958	1,890	1,062	829	569	510
Net Operating Assets	(328)	(514)	(234)	455	248	237	331
Cash equivalents	500	300	100	40	33	0	5
(2) Marketable securities	2,661	1,524	1,237	591	484	334	81
Debt	(512)	(17)	(18)	(113)	(113)	(100)	(48)
Put options			(279)				
Preferred stock				(6)	(120)	(120)	
Net Financial Assets	2,649	1,807	1,040	512	284	114	38
Common Shareholders' Equity	$2,321	1,293	806	967	532	351	369

Notes:

(1) Cash is allocated between operating and financing assets.
(2) Marketable securities are all debt (footnotes)

Reformulated Income Statements

	1999	1998	1997	1996	1995	1994	1993
Net revenue	$18,243	$12,327	$7,759	$5,296	$3,475	$2,873	$2,014
Cost of revenue	14,137	9,605	6,093	4,229	2,737	2,440	1,565
Gross margin	4,106	2,722	1,666	1,067	738	433	449
Core operating expenses:							
General and administrative	1,589	1,065	739	512	361	346	208
(1) Advertising	199	137	87	83	63	77	60
Research, development and engineering	272	204	126	95	65	49	42
Total core operating expenses	2,060	1,406	952	690	489	472	310
Core operating income before tax	2,046	1,316	714	377	249	(39)	139
Tax as reported	624	424	216	111	64	(3)	41
Tax on financial income	13	18	12	2	(13)	0	1
Tax on operating income	611	406	204	109	77	(3)	40
Core operating income after tax	1,435	910	510	268	172	(36)	99
(2) Unusual items	(1)	(14)	4		9	(5)	(19)
Operating income	1,434	896	514	268	181	(41)	80
(3) Net interest income	38	52	33	6	(36)	0	4
(4) Tax on interest income (.35)	(13)	(18)	(12)	(2)	13	0	1
	25	34	21	4	(23)	0	3
Preferred dividends				(13)	(9)	(2)	
Core net financial income	25	34	21	(9)	(32)	(2)	3
(5) Unrealized financial gains				3	(6)	3	0
Net financial income	25	34	21	(6)	(38)	1	3
Comprehensive income	1,459	930	535	262	143	(40)	83

Notes:

(1) Given in Note 1 to 10-K

(2) Unusual items are foreign currency translation gains and losses plus an extraordinary charge of $13 million in 1997. All are reported after tax. Dirty-surplus income from 1997 to 1999 is assumed to be translation losses (but could also be unrealized losses on securities)

(3) Other income is included here and assumed to be financial income

(4) Dells marginal tax rate is 35%.

(5) Not identified for 1997-99.

II. Analysis of Reformulated Statements of Stockholders' Equity

The reformulated statement gives an improved picture of the evolution of shareholders' equity. The cumulative net cash paid in by shareholders is negative by the end of fiscal 1999 (and the effective cash dividend relative to cash contributed is large). The reformulated statement also shows clearly the equity increase from business activities through comprehensive income.

Balance, 1992	274
Value added in comprehensive income, 1992 - 99	3,372
	3,646
Net dividend (in net share repurchases)	(1,325)
Balance, 1999	2,321

The reformulated statement also reveals the ROCE for each year (equal to comprehensive income dividend by average common equity):

	1993	1994	1995	1996	1997	1998	1999
ROCE	25.8%	–11.1%	32.4%	34.9%	60.3%	88.6%	80.8%

From 1997 to 1999 these ROCE might be sensitive to the timing of the (large) stock repurchases during the year. The 10-K indicates that the repurchases are part of an on-going stock repurchase program.

These ROCE are before any hidden dirty-surplus items. For Dell there are four areas of concern.

1. Preferred stock conversions to common shares in 1996 and 1997. The amount in 1997 is small, so is ignored. In 1996, 1.19 million preferred shares were converted into 10 million common shares plus a cash premium of $10 million dollars. The cash premium was treated as a preferred dividend so is accounted for in net income available to

common (1996 10-K, Note 7). The loss on conversion, not recognized, is estimated as follows:

Estimated market price of 10 million of common shares on conversion	$240 million
Carrying value of preferred converted	114 million
Loss on conversion	126 million

(The estimated market price is based on the average price of common shares over the conversion period). The loss reduces 1996 comprehensive income (an implicit financing expense).

2. Granting in-the-money stock or stock options to employees requires a recognition of deferred compensation: the difference between grant price and market price is deemed to be compensation that is amortized over a service period. The amount to be amortized -- deferred compensation -- and the amortizations go through the equity statement. The appropriate treatment, in a reformulation, is to treat the deferred compensation (in the "other" column in Dell's equity statement) as an operating asset (like other deferred charges) and amortize it from there. Dell's amounts are small, so both the deferred amounts and the amortizations have been netted against common stock. (The amortizations will still appear in the income statement as expenses).

3. Put options to sell stocks to the firm at a pre-set price were sold in 1996. The appropriate clean-surplus accounting is to treat these as liabilities (to buy stock back at less than market price), as with the reclassification to liabilities in the balance sheet for 1997. Lapse of the option is a gain to current shareholders (financing income) and exercise is a loss. The $279 million in put option liability at the end of 1997 was reclassified as additional paid-in-capital in 1998 when the option lapsed. This amount is really a gain (to be included in comprehensive income) rather than an increase in equity from share transactions. However, restatement to comprehensive income does not affect operating activities, so the restatement is not made in the reformulated statements here.

4. Stock compensation. The amount of stock issued to employees below market price is wages expense. But, if the shares are issued on exercise of options, GAAP does not recognize the expense. The implicit wages expense for 1996-99 is calculated approximately (from the 10-K stock compensation footnote) as follows (in millions).

	1996	1997	1998	1999
Shares issued on exercise of options	80	67	79	110
Estimated average market value of shares at exercise	$78	$112	$537	2,193
Weighted average exercise value	21	26	60	142
Compensation expense	57	86	477	2,051
Estimated tax effect (at 35%)	20	30	167	718
After-tax compensation expense	$ 37	$ 56	$310	$1,333

The weighted-average exercise price is given in the 10-K footnote on benefit plans. It was $1.29 per-share in 1999, $0.76 per-share in 1998. The market value of shares at exercise is based in the per-share weighted exercise price for option grants during the year. This was $19.94 for 1999 and $ 6.80 for 1998. As options are granted at the money, this is an indication of average prices over the year. But options might well have been exercised at different prices over the range of $11 to $38 for the year.

After fiscal 1996, Dell reported the value of options at grant date in its footnotes as required by FASB Statement No. 123. The effect on pro forma earnings was as follows (in millions):

	1996	1997	1998	1999
Shares under grant	128	171	86	60
Effect on pro forma earnings after tax	$6	$16	$ 69	$136

These amounts are considerably less than the expenses calculated (above) at exercise rather than grant date.

The implicit stock compensation expense affects comprehensive income as follows:

	1996	1997	1998	1999
Stock compensation expense (after tax)	37	56	315	1,333
Percentage of reported comprehensive income	14.1%	10.5%	33.9%	91.4%
Revised comprehensive income	225	479	615	126

The calculation of wages expense on exercise follows exercise-date accounting. The FASB method is grant-date accounting. A full liability accrual accounting would recognize option value for all options in the form of a contingent liability, with settlement at exercise date. A corresponding deferred charge would be recognized and amortized to wages expense over a service period (so to match to revenues).

Tax benefits from stock compensation are included in capital in excess of par. So, if one were to formally modify the statement of shareholders' equity for stock compensation expense, the after-tax compensation would be subtracted from comprehensive income, but also the paid-in capital would be reduced by the amount of the tax benefit.

Besides the stock option plan, Dell has an employee stock purchase plan under which employees may purchase shares at 85% of market value. This discount off market value is also a compensation expense which, under GAAP, is recognized as deferred compensation in the equity statement (and subsequently amortized to the income statement). See point 2 above.

The cash tax benefit from employee stock plans is given (for the first time) in the 1999 cash flow statement.[1] The amount of $ 444 million is less than the $718 million calculated above which might suggest that the assumed market value on exercise above is too high There is a question, however, as to what plans are tax deductible.

[1] Some firms report this benefit as cash from operations, and some report it as cash from financing activities.

III. Analysis of the Balance Sheet

	1999	1998	1997	1996	1995	1994
Average CSE	1,807	1,050	887	750	442	360
Average NOA	(421)	(374)	111	352	243	284
Average NFA	2,228	1,424	776	398	199	76
Average OA	3,080	2,050	1,587	1,297	942	824
Average OL	3,501	2,424	1,476	945	699	540
Financial Leverage $\left(\text{FLEV} = \frac{\text{NFO}}{\text{CSE}}\right)$	–1.141	–1.398	–1.290	–.529	–.534	–.325
Operating Liability Leverage $\left(\text{OLLEV} = \frac{\text{OL}}{\text{NOA}}\right)$	Large	Large	13.30	2.68	2.88	1.90

Some Comparisons, 1998-99:			
Financial Leverage	– Compaq	–0.26	–0.29
	– Gateway 2000	-.84	–0.63
	– Hewlett Packard	–0.34	–0.25
Operating Liability Leverage	– Compaq	1.07	1.61
	– Gateway 2000	7.36	3.01
	– Hewlett Packard	1.13	0.94

Note:

Compaq's 1999 results reflect merger with Digital Equipment; Hewlett Packard's business is ⅘ computers and printers. The results for the comparison firms are for their fiscal year nearest to Dell's. Compaq and Gateway have a December 31 year, Hewlett Packard has an October 31 year.

Discussion:

All four firms have negative financial leverage, but Dell is extreme. Its large holding of financial assets, even after using a considerable amount in stock purchases, is a result of its cash generating utility.

The significant feature of Dell is, however, its negative net operating assets. By stretching its payables and other accrued liabilities, and by keeping inventories and receivables down, Dell has been able to finance the business with the credit of trade creditors. This has meant that shareholders have not had to have their funds tied up in the business, creating value for them. Indeed, shareholders are taking cash out while operating assets grow, with no need for debt financing. Value creation indeed!

These features are a result of management practices for keeping inventory low and putting the burden on suppliers to carry inventory and provide credit.

Note that operating liability leverage can't be calculated for Dell (as NOA is negative) But it is high! The comparison firms also have high OLLEV (the typical number is more like 0.4). Gateway has imitated Dell's practices but still has positive NOA.

IV. **Analysis of Profit Margins**

		1999	1998	1997	1996	1995	1994	1993
Gross margin ratio		22.5%	22.1%	21.5%	20.1%	21.2%	15.1%	22.3%
Selling and admin. expense ratio		8.8	8.6	9.5	9.7	10.4	12.0	10.3
Advertising expense ratio		1.0	1.1	1.1	1.6	1.8	2.7	3.0
R&D ratio		1.5	1.7	1.6	1.8	1.9	1.7	2.1
Taxes/Sales		3.3	3.3	2.6	2.1	2.2	(0.1)	2.0
Taxes/OI before tax		29.9	30.9	28.6	28.9	30.9	–	28.8
Core profit margin before tax		11.2	10.7	9.2	7.1	7.2	(1.4)	6.9
Core profit margin after tax		7.9	7.4	6.6	5.0	4.9	(1.3)	4.9
Profit margin		7.9	7.3	6.6	5.1	5.2	(1.4)	4.0
Sales growth rate		48.0	58.9	46.5	52.4	21.0	42.7	
Core OI growth rate		57.7	78.4	90.3	55.8		–36.4	
Some comparisons:								
Sales	– Compaq	31,169	24,584	20,009	16,675			
	– Gateway 2000	7,468	6,294	5,035	3,676			
	– Hewlett Packard	47,061	42,895	38,420	31,519			
Sales growth rates	– Compaq	26.8%	22.9%	20.0%				
	– Gateway 2000	18.7	25.0%	37.0%				
	– Hewlett Packard	9.7%	11.6%	21.9%	26.1%			
Gross margin ratio	– Compaq	23.1%	27.5%	25.8%	26.3%			
	– Gateway 2000	20.7%	17.1%	18.6%	16.5%			
	– Hewlett Packard	31.8%	34.0%	33.6%	36.5%			

		1999	1998	1997	1996	1995	1994	1993
S&G expense ratio	– Compaq	14.9%	11.1%	11.7%	11.8%			
	– Gateway 2000	14.5%	12.5%	11.5%	9.7%			
	– Hewlett Packard	14.0%	14.1%	14.3%	15.2%			
Advertising expense ratio	– Compaq	1.1%	0.9%	0.9%	1.3%			
	– Gateway 2000	–	–	–	–			
	– Hewlett Packard	2.6%	2.6%	2.6%	2.6%			
R&D ratio	– Compaq	4.3%	3.3%	3.5%	3.3%			
	– Gateway 2000		–	–	–			
	– Hewlett Packard	7.1%	7.2%	7.1%	7.3%			
Core PM after tax	– Compaq	1.9%	7.8%	6.6%	6.3%			
	– Gateway 2000	4.6%	3.3%	4.6%	4.5%			
	– Hewlett Packard	4.7%	7.1%	6.9%	7.4%			

Discussion:

Dell's growth in operating income is driven by sales growth at rates considerably above the other firms (and they have high growth rates).

Dell's gross margin rate is not as high as Compaq and HP, but this is more than made up for by sales growth. In addition Dell maintains lower SG&A expenses per dollar of sales and manages sales growth with relatively low advertising and R&D expenditures. Accordingly core profit margins are higher than the comparable firms.

V: Analysis of Turnovers

		1999	1998	1997	1996	1995	1994
Asset turnover (ATO)		Large	Large	69.9	15.1	14.3	10.1
Accounts receivable turnover		10.2	10.2	9.5	8.4	7.3	7.3
Inventory turnover		72.1	50.6	22.8	14.7	13.5	11.0
PPE turnover		42.1	42.3	37.5	35.8	34.1	36.4
Operating asset turnover		5.9	6.0	4.9	4.1	3.7	3.5
Operating liability turnover		5.2	5.1	5.3	5.6	5.0	5.3
Some comparisons:							
ATO	– Compaq	4.1	9.2	6.0	4.3		
	– Gateway 2000	21.4	19.7	13.1			
	– Hewlett Packard	4.5	3.8				
A/R turnover	– Compaq	17.5	7.4	6.3	6.1		
	– Gateway 2000	12.9	13.1	11.8			
	– Hewlett Packard	7.6	5.6				
Inventory turnover	– Compaq	28.4	17.3	12.1	8.0		
	– Gateway 2000	32.9	23.9	19.6			
	– Hewlett Packard		6.5				
PPE turnover	– Compaq	12.8	13.2	20.9	18.4		
	– Gateway 2000	92.9	21.8	24.3			
	– Hewlett Packard	7.4	7.2				
Operating asset turnover	– Compaq	2.0	3.1	2.9	2.6		
	– Gateway 2000	4.8	4.9	4.8			
	– Hewlett Packard	2.1	2.0				
Operating liability turnover	– Compaq	3.8	4.9	5.7	6.5		
	– Gateway 2000	5.6	6.5	7.3			
	– Hewlett Packard	3.8	4.1				

Discussion:

ATO can't be calculated for Dell because it is employing negative net operating assets. But individual turnovers are revealing. Compare those for inventory and PPE with the other firms. And note the operating liability turnover. Dell keeps inventories low and creditors long.

Again, Gateway's imitation of Dell shows up in its ratios. Compaq was proceeding at the time to become more like Dell in its computer operations, although it was digesting its merger with Digital equipment to become somewhat of a different company.

Note that a considerable portion of Dell's value is being surrendered to employees in the exercise of stock options, particularly in 1999.

VI. Cash Flow Analysis

	1999	1998	1997	1996	1995	1994
Operating income	1,434	896	514	268	181	(41)
Δ Net operating assets	186	(280)	(689)	207	11	(94)
Free cash flow	1,248	1,176	1,203	61	170	53
(1) Receipts from net financial income	25	34	21	(9)	(32)	(2)
(after tax)	1,273	1,210	1,224	52	138	51
(2) Net cash to shareholders	1,306	898	438	(48)	(35)	(22)
Investment in net financial assets	(33)	312	786	100	173	73

Notes:

(1) Accrual number from income statement (cash number not available)

(2) From cash flow statement. The numbers do not agree with the net transactions with shareholders in the statement of shareholders' equity because of (presumed) receivables and payables with shareholders and points 2, 3 and 5 in the notes to the reformulated statement of shareholders' equity.

This format follows the treasurer's rule: C – I + net cash interest received – net dividend = cash invested in financial assets.

Working with the Statement of Cash Flows, free cash flow is calculated as follows:

	1999	1998	1997	1996	1995	1994
Reported cash from operations	2, 436	1,592	1,362	175	243	113
Net interest after tax	25	34	21	4	(23)	0
	2,411	1,558	1,341	171	266	113
Capital expenditures	296	187	114	101	64	48
Free cash flow	2,115	1,371	1,227	70	202	65

These numbers are a little higher than those calculated above, more so in 1998 and 1999. In 1999 the GAAP Statement includes $444 million in tax benefits of employee share plans. These were not included in operating income in the reformulated income statement. Also there are the questions about the reporting of interest income raised earlier. There may also be receivables for share issues. The disclosure is frustrating. See the solutions to Minicase M.1 in Chapter 9.

In any case, the picture is clear. Dell has generated considerable free cash flow from operations through its high profitability and low investment in net operating assets. This has been used to repurchase shares with the remainder invested in financial assets. Dell has a "cash problem" in the sense that it generates more cash than it can use in operations.

But note that a considerable part of the value generated is going to employees. If the implied compensation expense for 1999 had been treated as an as-if cash transaction (cash wages) the free cash flow would have been substantially different.

VII. Summary of the Value Creation

Value creation is evidenced by growth in residual earnings:

	1999	1998	1997	1996	1995	1994
Comprehensive income	1,459	930	535	242	143	(40)
Average common equity	1,807	1,050	887	750	442	360
RE (0.156)	1,178	766	397	145	74	(96)
Growth in RE	54%	93%	174%	96%	–	–

The growth in RE has been generated by the drivers identified in the analysis above. In Part III of the book you will see that value generation is best analyzed by focusing on operations (and residual operating income).

Analysis for 2001 and 2002

Dell's history can be continued with an analysis of the 2001 and 2002 statements, most of which are available in Exhibit 2.1 in Chapter 2. Here are the reformulated statements for those years. Cash flow computations are in the solution to case M10.1 in Chapter 10.

Reformulated Statement of Stockholders' Equity
(in millions of dollars)

Balance, February 2, 2001		$5,622
Transactions with shareholders:		
Share issues	$ 853	
Share repurchases	3,003	(2,150)
Comprehensive income:		
Net income	$1,246	
Unrealized loss on investments	(65)	
Translation gain	2	
Unrealized gain on derivatives	39	1,222
Balance, February 1,2002		4,694

Reformulated Balance Sheets

(in millions of dollars)

		2002		2001
Cash		20		20
Accounts receivable		2,269		2,424
Inventories		278		400
Other current assets		1,416		1,467
PPE		826		996
Other		459		530
Operating assets		5,268		5,837
Accounts payable	5,075		4,286	
Accrued and other	2,444		2,492	
Other long-term	802	8,321	761	7,539
Net operating assets (NOA)		**(3,053)**		**(1,702)**
Net financial assets (NFA)		**7,747**		**7,324**
Common shareholders' equity (CSE)		**4,694**		**5,622**

Reformulated Income Statement, 2002

		2002		2001
Net revenue		31,168		31,888
Cost of revenue		25,661		25,445
Gross margin		5,507		6,443
Core operating expenses:				
General and administrative		2,784		3,193
Research, development and engineering		452		482
Total core operating expenses		3,236		3,675
Core operating income before tax		2,271		2,768
Tax as reported		485		958
Tax on unual items		169		37
Tax on financial income		20		(186)
Tax on operating income		674		809
Core operating income after tax		1,597		1,959
Unusual items				
Special charge	(482)		(105)	
Tax benefit of special charge	169		37	
	(313)		(68)	
Effect of change in accounting			(59)	
Translation gain	2		4	
Gain on derivative investments	39	(272)	--	(123)
Operating income		1,325		1,836
Net investment income		(58)		531
Tax on interest income (35%)		20		(186)
Core net financial income		(38)		345
Unrealized losses on debt investments		(65)		(475)
Net financial expense		(103)		(130)
Comprehensive income		1,222		1,706

M12.2. Analysis of Growth in Core Operating Income During the 1990s: International Business Machines

This case completes the analysis of IBM's operating income begun in the Chapter. Students will be surprised to see how different the growth picture looks once the unsustainable elements are stripped out. It appears that each year IBM found another way to give the appearance of growth and so perpetuate its reputation as a growth firm. Up to 1990, IBM was known for its non-aggressive accounting. During the 1990s, the firm developed a different reputation and became an (otherwise solid) firm whose accounting quality was called into question as the bubble burst in the early 2000s.

As there is considerable material on IBM in Chapter 12, the instructor may wish to teach this chapter with this case as a centerpiece.

The case solution comes in two parts. The first gives the complete answer to the case question. The second extends the discussion to other quality of earnings issues that present themselves in the case material.

The Restated Income Statements

Here are the restated income statements that the case question asked for. Focus on the core operating income and compare it to the operating income reported by IBM.

INTERNATIONAL BUSINESS MACHINES CORPORATION

Identification of Core Income Before Tax

	2000	1999	1998	1997	1996
Revenue	88,396	87,548	81,667	78,508	75,947
Cost of revenue	55,972	55,619	50,795	47,899	45,408
Gross profit	32,424	31,929	30,872	30,609	30,539
Advertising	1,746	1,758	1,681	1,708	1,569
Pension service expense	891	915	838	590	600
Interest on pension liability	3,787	3,686	3,474	3,397	3,427
General and administrative expense	15,951	18,561	16,147	15,921	17,229
Research and development	5,151	5,273	5,046	4,877	5,089
Core operating expenses	27,526	30,193	27,186	26,493	27,914
Core operating income	4,898	1,736	3,686	4,116	2,625
Non-core items:					
Pension gains	5,944	5,400	4,862	4,364	4,180
Gains on asset sales	792	4,791	261	273	300
Bleed back of restructuring charge	--	--	355	345	1,491
	6,736	10,191	5,478	4,982	5,971
Operating income before tax	11,634	11,927	9,164	9,098	8,596
Percentage of revenue:					
Reported operating income	13.2%	13.6%	11.2%	11.6%	11.3%
Reformulated core operating income	5.5%	2.0%	4.5%	5.2%	3.5%
Advertising	1.98%	2.01%	2.06%	2.18%	2.07%
R&D	5.83%	6.02%	6.18%	6.21%	6.70%
General and Administrative	18.0%	21.2%	19.8%	20.3%	22.7%
Pension expense (incl. interest)	5.3%	5.3%	5.3%	5.1%	5.3%
Growth in reported operating income (before tax)	-2.5%	30.2%	0.7%	5.8%	--
Growth in core operating income before tax	182.1%	-52.9%	-10.4%	56.8%	--

The following adjustment have been made to develop this reformulated statement:

1. *Added information*. Advertising expense has been retrieved from the footnotes, given in the case for 1997-1999 and extracted from the 10-K for other years. These are worth investigating because firms can reduce advertising expenses to

increase income temporarily, with detrimental effects to future income. IBM's advertising, as a percentage of sales, is fairly constant, however.

2. *Treatment of net pension expense*. Net pension expense goes into the income statement, but includes expected returns on running the pension fund (that are not income from core business). These must be stripped out. (See Box 12.5 in the chapter.) Information in the pension footnote W is broken out as follows:

    a. Pension service cost is a core operating expense, the equivalent of wages expense

    b. Amortizations for past service costs, etc., given in footnote W are netted into pension service cost. There is an argument to classify them – particularly the actuarial gains component (unidentified) due to changes in estimates -- as unusual income. However, the income and expenses are smoothed over many periods, making them repetitive and predictable. The net effect of the amortizations is positive, contributing between 93 million and 196 million to income each period.

    c. Interest expense on the pension liability looks as if it should be a financing expense; however, it is the interest on an operating liability that must be paid to employees at retirement over and above service cost, to compensate them for the delay in payment. In this way, pension expense is like any other operating liability: the supplier charges more (in implicit interest) if payment is delayed.

d. The gains on running the pension fund (expected returns on plan assets) are identified outside of core income. These gains are from running the pension fund, not the core business.

3. Gains on assets sales are retrieved from the cash flow statement. See Box 12.7 on IBM'S asset sales.
4. Effects of restructuring charges are retrieved from the cash flow statement. See Box 12.6 on IBM's restructuring charges.
5. The net amount of these adjustments has been added to SG&A expense. Some of the pension costs may be in cost of revenue and R&D, as may some of the effects of restructuring charges, but there is no information for the breakout of the numbers.
6. The R&D line is as reported. R&D expense needs to be investigated because firms can reduce R&D to increase reported income (and damage future income). IBM's R&D as a percentage of sales is reasonably constant, though one might question the lower R&D in 2000; with a drop of 0.2 % of sales, this amounts to an added $177 million to income.

Some observations:

- Core operating income as a percentage of sales is considerably lower than reported operating income to sales.
- We have an example of smoothing here. The reported income gives a picture of relatively smooth growth. Not so the core numbers. In 1999, the large gain on assets sale of $4.791 billion (that was credited to SG&A expenses) covered up a large drop in core operating income.

Note: The reformulation above does not include the cost of employee stock options.

Extending the Quality of Earnings Analysis

The presentation of the case can be completed at this point. However, there are additional earnings quality concerns that arise from inspection of the statements and the footnotes. These issues can be covered here or when looking at the quality of earnings material in Chapter 17.

The following lays out a step-by-step approach to analyzing the quality of the reported earnings numbers. The analysis raises red flags for which explanations must be found. The reformulated statements above will supply some but not all of the explanations. For many flags, there are often legitimate explanations.

Start with the income statement to see if there are any quality flags there that suggest that further investigation is required. Then analyze the accruals in the cash flow statement. Finally, dig into the footnotes for further detail (and some answers). The analysis below refers mainly to 1999 statements (and comparative 1998) statements for which there are footnotes, but can be extended to the other years.

Income Statement Analysis

(i) Compare growth in operating income (before tax) with growth in sales

	1999	1998
Growth in sales	7.2%	4.0%
Growth in OI before tax	30.2%	0.7%

Flag: There is a large growth in operating income in 1999 on only a 7.2% growth in sales. Compare with 1998. Is there something unusual in 1999 expenses? The reformulated statements above supply an answer (with the asset gains credited to SG&A a big item).

(ii) Track margins and expense ratios

	1999	1998	1997
Gross Margin Ratio	36.5%	37.8%	39.0%
SG&A/sales	16.8%	20.4%	21.2%
R&D/sales	6.0%	6.2%	6.2%
Operating PM before tax	13.6%	11.2%	11.6%

Flag: There is a higher profit margin in 1999 on a lower gross margin. SG&A is considerably lower as a percentage of sales. Why? Answer above.

(iii) Look at effective tax rates

	1999	1998	1997
Tax reported	4,045	2,712	2,934
Tax on net interest expense (37%)	63	46	26
	4,108	2,758	2,960
Effective tax rate on OI	*34.4%*	*30.1%*	*32.5%*

Flag: Effective tax rates are low relative to statutory rate (35% for federal taxes plus State taxes), especially in 1998 and 1997. Why? Will these rates revert towards the statutory rate (as they appear to be doing in 1999)?

Cash Flow Statement Analysis

(i) Compare cash flow from operations with net income. In all years, cash flow from operations is higher than net income, so there is not, on the face of it, a great concern. But, when one considers that depreciation is considerable, a considerable amount of income is coming from accruals other than depreciation.

(ii) Inspect accruals that explain the difference between net income and cash from operations:

Flag: Why has amortization of software costs declined (by over 50%) over the years while investment in software (in the investment section of the statement) increased?

Flag: Operating income for 1996 to 1998 was boosted by reversals of earlier restructuring changes (by $355 million in 1998, $445 million in 1997, and $1,491 million in 1996). This is "bleeding back" of previous over-reserving. The restructurings were as far back as 1991 (see Footnote M) and the credits to income here have nothing to do with current operations. The core income statement separates out these effects.

Flag: Why is depreciation higher (as a percentage of sales) in 1999? Unlike 1998 and 1997, depreciation is higher than capital expenditures (in the cash investment section of the statement). Why is depreciation lower in 2000?

Flag: Income increased by $713 million in 1999 and $606 million in 1998 from changes in deferred taxes. Why?

Flag: Income includes gains on asset sales (within a particularly large one of $4.8 billion in 1999). These did not appear separately on the income statement so must be aggregated there with other operating items. Operating income is thus not a good measure of income from current operations, as we have seen.

Flag: There is a lower increase in net receivables in 1999 despite higher sales growth than in 1998. There is also a higher increase in other liabilities. Both reduce income.

Flag: What is the large increase in other assets in 1997?

Flag: Why the big increase in receivables (non-cash sales) in 2000. The increase is bigger than the increase in sales over 1997. Are receivables (and sales) of lower quality? The increase in receivables in 1997 is also bigger than the growth in sales for that year.

The coincidence, in 1999, of higher depreciation, lower changes in receivables and higher growth in other liabilities (all of which reduce income) with higher profits from gains on disposition of assets raises the question as to whether the firm was decreasing income against the benefit of the gain in order to bleed it back in the future.

Footnote Analysis

Footnote D

The disposal gain in 1999 comes largely from the sale of IBM's Global Network to AT&T. Although not indicated in the annual report, this gain was credited to SG&A expenses (as indicated in a 10-Q report). That's partly why profit margins improved in 1999.

Footnote M

The post-retirement liability estimates should be investigated for changes in actuarial and discount rate assumptions. These liabilities are reserves that can be increased or liquidated by use of estimates.

The restructuring reserve is in other liabilities. Note that the "bleed back" to income appears on the cash flow statement for 1997 and 1998, but the change in the estimate is included, less transparently, in the change in other liabilities in 1999.

Footnote P

Bad debt (and other) reserves increased in 1998 but declined in 1999 producing changes to deferred tax assets in a pattern that is not consistent with the steady growth in revenues. Is the firm estimating reserves in such a way as to shift income between periods? The effects of restructuring changes (and their reversals) show up in an effect on deferred taxes.

There is a large reduction in the deferred tax valuation allowance -- an estimate -- in 1998. Is the $1.7 billion reduction justified by the explanation given? In any case this amount goes to after-tax income, so a significant portion of 1998 income is due to this change of estimate, not to current operations.

Estimates of residual values on sales-type leases are always suspect. Note that the deferred tax effect is not trivial and a question arises whether these estimated residual values will ultimately be realized. This is of particular concern in an industry with rapidly changing technology (and likely obsolescence).

The deferral of software costs is also a concern when technology is rapidly changing.

Footnote Q and S

There don't seem to be any concerns about marketing and R&D Costs. These are as a fairly consistent percentage of sales. But the practice of charging off acquired in-process R&D immediately (which might otherwise be unamortized goodwill) is a concern. If possible, this component of R&D should be separated out so to give a clearer picture of in-house R&D expenditures.

Footnote W

Go to Box 12.5 for an analysis of IBM's pension footnote. A considerable component of income comes from pension fund gains rather than core business.

Note that IBM was using an expected rate of return on pension plan assets of 10% in 2000, up from earlier (and up considerably from the rates used in the 1980s). Applied to the growing pension asset prices (bubble prices at the time?) this boosts the pension gain component of income. IBM subsequently lowered the rate, resulting in considerably lower earnings in the early 2000s.

Note also that IBM modified its discount rate for the pension liability calculation to 7.75% in 1999 from 6.5% in 1998, affecting the estimate and the pension expense.

The effect of this change in estimate is large (probably about $1 billion increase in income), but the effect is amortized into income over a long period.

A reminder: quality flags raise suspicions but don't necessarily mean that there is a problem. These flags call for more investigation.