CHAPTER 23
RESIDUAL INCOME VALUATION

1. (B) A loss of $31.8 million.

Explanation

Net income = 200,000,000 – 83,000,000 – 46,800,000 = $70,200,000.
The equity capital charge is 850,000,000 x 0.12 = $102,000,000.
Thus, residual income = 70,200,000 – 102,000,000 = – $31,800,000.
(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

2. (B) loss of $7.8 million.

Explanation

Net income = 200,000,000 – 83,000,000 – 46,800,000 = $70,200,000. The equity capital charge is 650,000,000 x 0.12 = $78,000,000. Thus, residual income = 70,200,000 –78,000,000 = – $7,800,000.
(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

3. (B) a charge for total capital.

Explanation

EVA = NOPAT – (C% x TC), where NOPAT is a firm's net operating profit after taxes, C% is the cost of capital, and TC is total capital.
(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

4. (A) the models focus on economic rather than just on accounting profitability.

Explanation

The models focus on economic rather than just on accounting profitability. Both remaining responses are arguments against using the RI approach.
(Module 23.5, LOS 23.i)

Related Material

SchweserNotes - Book 3

5. (B) higher.

Explanation

In general, firms making aggressive (conservative) accounting decisions will report higher (lower) book values and lower (higher) future earnings.

(Module 23.5, LOS 23.k)

Related Material

SchweserNotes - Book 3

6. (B) Intrinsic value calculated by both should be the same if assumptions are the same.

Explanation

Theoretically the intrinsic value calculated by both should be the same, but since they use different approaches the values are often different in practice. Residual income relies on book value and discounts income, not cash flow.

(Module 23.5, LOS 23.i)

Related Material

SchweserNotes - Book 3

Pedro Fernandez, CFA, is part of a team of analysts working for DAB Inc. He is currently analyzing the equity value of Silo Inc., which he believes is under threat of takeover by its main rival Cart Inc. Fernandez decides to use a residual income model to value the company using the following information:

Silo Inc. is expecting a return on equity (ROE) of 14% over each of the next four years. Its current book value is $8.00 per share. Its dividend payout ratio is 40%. The required return on equity is 11%. Forecasted earnings in years 1 through 4 are equal to ROE times the beginning book value.

Fernandez is concerned over what persistence factor to use for the residual income valuation and so consults his colleague Oliver Chippy who makes the following comments:

Comment 1: The persistence factor needs to be between −1 and +1.

Comment 2: The persistence factor will be higher if there is a high dividend payout ratio and historically high residual income persistence in the industry.

As part of the valuation exercise Fernandez consults DAB's valuation handbook, which outlines when it is appropriate to use the residual income method and some of the necessary adjustments:

Statement 1: Due to the clean surplus violation, it is important to adjust net income for items that are charged directly to shareholders' equity. Such items include foreign currency translation gains and losses under the all- current method. If this cumulative translation adjustment (CTA) does not reverse over time then ROE can be forecasted without taking in to account the CTA.

Statement 2: The residual income model is appropriate when the terminal value forecast is highly uncertain and the expected free cash flows are negative for the foreseeable future.

7. (A) $8.9.

Explanation

Year	E_t	Div 40%	Ending Book Value B_{t-1}	Equity charge $r \times B_{t-1}$	Residual Income $E - (r \times B_{t-1})$
0			$8.00		
1	$ 1.12	0.448	8.67	$0.88	$0.24
2	1.21	0.484	9.40	0.95	0.26
3	1.32	0.528	10.19	1.03	0.29
4	1.43	0.572	11.05	1.12	0.31

Residual income begins to decline after Year 4, so the terminal value in Year 3 includes the present value of Year 4 residual income.

PV of terminal value at $T_3 = \frac{0.31}{1 + 0.11 - 0.30} = 0.38$

The intrinsic value today is the book value plus the present value of years 1 through 3 residual income plus the present value of the terminal value in year 3.

$$V_0 = \$8.00 + \left[\frac{0.24}{1.11} + \frac{0.26}{1.11^2} + \frac{0.29 + 0.38}{1.11^3}\right] = \$8.92$$

(Module 23.4, LOS 23.h)

Related Material

SchweserNotes - Book 3

8. (C) $10.7.

Explanation

PV of terminal value at $T_3 = \frac{0.31}{0.11} = 2.82$

$$V_0 = \$8.00 + \left[\frac{0.24}{1.11} + \frac{0.26}{1.11^2} + \frac{0.29 + 2.82}{1.11^3}\right] = \$10.70$$

(Module 23.4, LOS 23.h)

Related Material

SchweserNotes - Book 3

9.	(B)	Incorrect	Incorrect

Explanation

The projected rate at which residual income is expected to fade over the life cycle of the firm is captured by the persistence factor, which is between zero and one.

Higher persistence factors will be associated with low dividend payouts (high reinvestment) and historically high residual income persistence in the industry.

(Module 23.4, LOS 23.h)

Related Material

SchweserNotes - Book 3

10.	(C)	Incorrect	Correct

Explanation

If the CTA tends to reverse over time and is not consistently positive or negative, the ROE can be forecasted without taking in to account the CTA.

(Module 23.5, LOS 23.k)

Related Material

SchweserNotes - Book 3

11. (C) $21.00.

Explanation

g = retention ratio x ROE = (1 – 0.30) x 0.20 = 0.14 or 14%

$$V_0 = \$10.50 + \left(\frac{0.20 - 0.17}{0.117 - 0.14} \times \$10.50\right) = \$21.00$$

(Module 23.3, LOS 23.f)

Related Material

SchweserNotes - Book 3

12. (A) market value of the company minus total capital.

Explanation

Market value added is the market value of the company minus total capital. It is used to measure the effect on value of management's decisions since the firm's inception.

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

13. (B) £91.67.

Explanation

The stock's terminal value as of year 5 is:

TV = 11.00 / 0.12 = 91.67

(Module 23.4, LOS 23.h)

Related Material

SchweserNotes - Book 3

14. (A) providing a check of consistency between competing approaches like free cash flow of equity (FCFE) and dividend discount model (DDM).

Explanation

A RI model can be used along with other models to assess the consistency of results. FCFE and DDM models forecast future cash flows while RI models start with a balance sheet measure of equity and add the present value of expected future RI.

(Module 23.5, LOS 23.i)

Related Material

SchweserNotes - Book 3

15. (C) 10.57%.

Explanation

The P/B ratio of 8.00 and the current book value per share of $12.00 imply a current market price of $96.00. This implies a growth rate of:

$g = r - [B_0(ROE - r)] / (V_0 - B_0) = 0.11 - [12.00(0.14 - 0.11)] / (96.00 - 12.00) = 0.1057 = 10.57\%$.

(Note: the curriculum does not provide this expression directly.)

(Module 23.3, LOS 23.g)

Related Material

SchweserNotes - Book 3

16.

(C)	Yes	No

Explanation

Residual income models work for companies with no dividends and volatile or negative cash flows. They do not work, however, when the clean surplus relation does not hold, as is the case when companies take charges against equity.

(Module 23.5, LOS 23.j)

Related Material

SchweserNotes - Book 3

17. (C) expected free cash flows are negative for the foreseeable future.

Explanation

The residual income approach is appropriate when expected free cash flows are negative for the foreseeable future. It is not appropriate when the clean surplus accounting relation is violated significantly. A firm that pays high dividends that are quite stable is also a poor candidate for the approach.

(Module 23.5, LOS 23.j)

Related Material

SchweserNotes - Book 3

18. (C) decrease.

Explanation

A decrease (increase) in initial book value decreases (increases) value. This is revealed by the RI valuation expression:

$V_0 = B_0 + [(ROE - r) / (r - g)]B_0$

(Module 23.2, LOS 23.e)

Related Material

SchweserNotes - Book 3

19. (A) capitalize and amortize research and development expenses.

Explanation

It is common to capitalize and amortize research and development (R&D) expenses and add R&D expenses back to earnings. Deferred taxes are eliminated to pick up only cash taxes. Operating leases are treated as capital leases.

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

20. (A) Operating leverage.

Explanation

Operating leverage is not measured directly by residual income models, although operating leverage may have an effect on the residual income measured. Residual income models are intended as a measure of economic income, and are often used to measure goodwill impairment.

(Module 23.1, LOS 23.b)

Related Material

SchweserNotes - Book 3

21. (B) FCFE models use historical cash flows.

Explanation

In theory, the same value or total present value should be derived using expected dividends, expected FCFE, or book value plus expected residual income if the underlying assumptions are the same. However, the recognition of value is different because FCFE and DDM models forecast future cash flows, while residual income models start with a balance sheet measure of equity and add the present value of expected future residual income. A residual income model can be used along with other models to assess the consistency of results.

(Module 23.5, LOS 23.i)

Related Material

SchweserNotes - Book 3

22. (A) 10.60%.

Explanation

The P/B ratio of 6.00 and the current book value per share of $13.00 imply a current market price of $78.00. This implies a growth rate of:

$g = r - [\{B_0(ROE - r)\} / \{V_0 - B_0\}] = 0.11 - [\{13.00(0.13 - 0.11)\} / \{78.00 - 13.00\}] = 0.1060 = 10.60\%$.

Note that the reading in the curriculum does not provide this expression directly.

(Module 23.3, LOS 23.g)

Related Material

SchweserNotes - Book 3

23. (C) Statement 1.

Explanation

In a competitive market, ROE has been found to decline over time – not to zero but to the cost of equity. Thus, residual income approaches often model ROE fading toward the cost of equity. As ROE approaches the cost of equity, residual income approaches zero. The other two statements are accurate.

(Module 23.2, LOS 23.d)

Related Material

SchweserNotes - Book 3

24. (A) lower.

Explanation

In general, firms making aggressive (conservative) accounting decisions will report higher (lower) book values and lower (higher) future earnings.

Firms may adopt aggressive accounting practices that overstate the value of earnings by, for example, accelerating revenues to the current period or deferring expenses to a later period.

Current earnings will be higher, but future earnings will be lower.

(Module 23.5, LOS 23.k)

Related Material

SchweserNotes - Book 3

25. (B) book value plus the present value of the firm's expected economic profits.

Explanation

The single-stage residual income model values a company at book value plus the present value of the firm's economic profits, or the additional value generated by the firm's ability to produce returns higher than the cost of equity.

(Module 23.2, LOS 23.d)

Related Material

SchweserNotes - Book 3

26. (A) Book-value estimates are not reliable.

Explanation

Residual income models can handle negative free cash flows and poor forecasts for terminal value. However, poor book-value estimates render the statistic less useful.

(Module 23.5, LOS 23.j)

Related Material

SchweserNotes - Book 3

27. (A) – $128,420,000.

Explanation

The dollar-based equity charge is:

equity charge = equity capital x cost of equity = $2.0 billion × 0.1246 = $249,200,000.

RI is calculated as:

Net Income	$120,780,000
(Less) Equity charge	.(249,200,000).
RI	–$128,420,000

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

28. (C) 9.33%.

Explanation

The P/B ratio of 4.00 and the current book value per share of $12.00 imply a current market price of $48.00. This implies a growth rate of:

$g = r - [\{B_0(ROE - r)\} / \{V_0 - B_0\}] = 0.10 - [\{12.00(0.12 - 0.10)\} / \{48.00 - 12.00\}] = 0.0933 = 9.33\%$.

Note that the reading in the curriculum does not provide this expression directly.

(Module 23.3, LOS 23.g)

Related Material

SchweserNotes - Book 3

Sue Clifton, CFA, is a senior portfolio manager at Lewiston Investments, a small research firm. Clifton has been assigned to help new hire Ralph Rawls get acclimated to his new job as a stock analyst. She discovers early on that Rawls is not too familiar with residual income valuation, a tool for determining economic profitability.

Clifton explains the basics of the residual-income model and the clean surplus relationship that underpins the system.

Clifton explains to Rawls that analysts use assumptions to make the residual-income models easier to interpret. She goes on to identify four commonly used assumptions: Residual income can be expected to:

- disappear immediately
- decline gradually as return on equity (ROE) declines
- decline to the market average

After her initial review of residual income, Clifton gives Rawls a test. The information about CR Industries in Year X (in $ millions):

Invested capital	$225
Market capitalization	$231
Debt	$130
Sales	$90
Cost of goods sold (COGS)	$26
Selling, general & administrative (SG&A) expense	$10
Depreciation and amortization expense	$25
Interest expense	$6.5
Dividend expense	$6
Tax rate	40.0%
Pretax cost of equity	11.4$
Pretax cost of equity	5.00%

29. (C) **book value.**

Explanation

When ROE is equal to the required return on equity, the justified market value of a share of stock is equal to its book value. In this case, there is no residual income. (Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

30. (B) decline to the market average.

Explanation

A common assumption involves residual income declining to an average level consistent with a mature industry. This assumption makes sense, considering that we generally calculate residual income for an individual company, and the company's industry average is quite possibly the best benchmark for its future income-generation potential. The market average is not generally used as a proxy. Both remaining assumptions are commonly used.

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

31. (C) The market value of securities available for sale changes.

Explanation

The clean surplus relationship holds that ending book value equals the beginning book value plus earnings minus dividends, excluding ownership transactions. The relationship is violated when charges skip the income statement and go directly to equity. Changes in the market value of debt and equity classified as available for sale can affect equity without affecting earnings. Unusual charges should not be included in residual-value calculations because they are not expected to recur. Charges that do not affect equity will not violate the relationship. Cessation of dividends also does not violate the relationship.

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

32. (C) $2.67 million.

Explanation

EVA = NOPAT – (WACC x invested capital).

NOPAT = (sales – COGS – SG&A expense - depreciation and amortization expense) x (1 - tax rate) = $17.40 million.

To calculate the weighted average cost of capital (WACC), start by determining the percentage of equity and debt. $130 million in debt represented 57.78% of total capital. The remaining 42.22% is the equity portion. Don't forget to adjust the cost of debt for taxes.

WACC = 57.78% x (5% x [1 – 40%]) + (42.22% x 11.4%) = 6.55%.

EVA = $17.40 million – ($225 million x 6.55%) = $2.67 million.

Note that in this problem residual income and EVA are the same. This is true in a "perfect world" but you should not assume this will always be true on exam problems.

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

33. (C) the clean surplus accounting relation is violated significantly.

Explanation

The residual income approach is not appropriate when the clean surplus accounting relation is violated significantly. Both remaining responses describe circumstances in which the approach is appropriate.

(Module 23.5, LOS 23.j)

Related Material

SchweserNotes - Book 3

Jon Binkster, CFA, has decided to determine the value of the equity in Busicomb Inc. using the residual income method. Binkster has obtained financial statements for the year ended December 20x5. These financial statements are included in Exhibits 1-3 below.

Exhibit 1

Busicomb Inc. Annual Income Statement For the Year Ended December 31, 20x5 (in $ millions)	
Sales	721.9
Operating expenses	(417.0)
Operating profit	304.9
Gain on sale of fixed assets	9.6
Depreciation	(170.8)
Earnings before interest and tax	143.7
Interest expense	(40.3)
Pre-tax income	103.4
Income taxes	(31.0)
Net income	72.4

Exhibit 2

Busicomb Inc. Balance Sheet AS of December 31 ($ millions)		
	20X5	20X4
Current Asset		
Cash and equivalents	31.2	14.0
Accounts receivable	72.0	64.8
Inventories	501.7	453.7
Total current assets	604.9	532.5

Non-Current Assets		
Property, plant, and equipment	1138.7	982.7
Less: Accumulated depreciation	(370.0)	(216.0)
Net property, plant, and equipment	768.7	766.7
Total assets	1373.6	1299.2
Current Liabilities		
Accounts payable	60.1	62.5
Notes payable	30.0	20.0
Total current liabilities	90.1	82.5
Non-Current Liabilities		
Long term debt	576.0	588.0
Total liabilities	666.1	670.5
Shareholders' Equity		
Common equity	384.0	360.0
Retained earnings	323.5	268.7
Total equity	**707.5**	**628.7**
Total liabilities and equity	1373.6	1299.2

Exhibit 3

Busicomb Inc. Cash Flow Statement For the Year ended December 31, 20x5 (in $millions)		
Cash Flow from Operating Activities		
Net income		72.4
Depreciation		170.8
Gain on sale of fixed assets		(9.6)
Change in Working Capital		
(Increase) Decrease in accounts receivable	(7.2)	
(Increase) Decrease in inventories	(48.0)	
Increase (Decrease) in accounts payable	(2.4)	
Net change in working capital		(57.6)
Net cash from operating activities		176.0
Cash Flow from Investing Activities		
Purchase of property, plant, and equipment	(183.2)	
Proceeds on disposal of plant and equipment	20.0	
Net cash from investing activities		(163.2)
		12.8

Cash Flow from Financing Activities		
Change in debt outstanding	(2.0)	
Change in common stock	24.01	
Payment of cash dividend	(17.6)	
Net cash from financing activities		4.4
Net change in cash and cash equivalents		17.2
Cash at beginning of period		14.0
Cash at end of period		31.2

You can assume for the following question that the ROE of Busicomb Inc. is 12% and the cost of equity is 13% and the long-term sustainable rate of growth is 7.5%.

Binkster is concerned about the rate of growth he has assumed for the model and is aware that the residual income model can be used to calculate the implied rate of growth. He has compiled the following data for Entrebus Inc., a competitor, and wants to use this to calculate the implied rate of growth for Entrebus Inc.:

The price to book ratio	2.50
ROE	13%
Current book value per share	$8.00
Cost of equity	11%

Despite the issues encountered with post levered residual income Binkster is convinced that value based management approaches will prove beneficial in the analysis of Busicomb. His attention alights on another method referred to as Economic Value Added (EVA). Binkster makes the following estimates for Busicomb Inc. for 20x6:

EBIT $150m
Tax rate 30%
Cost of equity 12%
Cost of debt 7%

The target debt to equity ratio for next year will be 1.

The invested capital is to be calculated as long-term debt plus stockholders' equity (using the information from the Exhibits 1-3).

Jon Binkster and a colleague, Bob Slacker, were discussing the merits of the residual income approach. Bob commented that the unrealized gains or losses relating to available for sale securities are reported in comprehensive income and not the income statement and that this results in earnings being an inaccurate measure of returns to investors. Bob states that the book value of equity is not affected.

Binkster commented that including the gains or losses from one-off asset sales in income would distort the estimation of future residual earnings and therefore these gains and losses should be excluded. However, there is no need to adjust the book value of equity.

34. (B) $579m.

Explanation

Equity value using the residual income model:

$$MV_0 = B_0 + \left[B_0 \times \frac{ROE - r}{r - g} \right]$$

$$MV_0 = 707.5 + \left[707.5 \times \frac{0.12 - 0.13}{0.13 - 0.075} \right]$$

$MV_0 = 578.86m$

Note that residual income is negative due to the negative ROE – r spread. This therefore gives us a value lower than current book value of equity. It is important to note that residual income models were developed to appraise management and not to specifically value equity. In this case, we can see that the management of Busicomb are not earning returns sufficient to satisfy the equity investors required returns. This would lead us to question the current business strategy and the effectiveness of management.

It should also be noted that asset based valuation (i.e., the value of net assets adjusted to fair market value) will often act as a minimum valuation on the company. The fair value of net assets could be realized by liquidating the company.

(Module 23.3, LOS 23.f)

Related Material

SchweserNotes - Book 3

35. (B) The intrinsic value is not dominated by the terminal value.

Explanation

The fact that the terminal value does not dominate the intrinsic value is a major advantage of the RI model.

(Module 23.5, LOS 23.j)

Related Material

SchweserNotes - Book 3

36. (C) 9.67%.

Explanation

Growth rate using the RI model would be:

$$g = r - \frac{ROE - r}{\frac{MV_0 - BV_0}{BV_0}}$$

$$g = 0.11 - \frac{0.13 - 0.11}{\frac{20 - 8}{8}} = 0.096667$$

g = 9.67%

Rather than learning yet another formula, simply substitute known values (g) from the question into the equation in question above and solve for MV_0.

(Module 23.3, LOS 23.g)

Related Material

SchweserNotes - Book 3

37. (B) –$3.46m.

Explanation

EVA = NOPAT – (invested capital x WACC)

NOPAT = EBIT(1 – T)

$$WACC = \left(12\% \times \frac{100}{200}\right) + \left(7\%(1 - 0.3) \times \frac{100}{200}\right) = 8.45\%$$

EVA = 150 x (1 – 0.3) – [(707.5 + 576) x 0.0845] = –3.46

Note that EVA (Economic Value Added) is a pre-levered version of residual income. A negative result means that returns are not sufficient to meet the requirements of the providers of finance. Negative residual income means that the model will not yield meaningful results from a valuation perspective. This does not prevent the model being a useful tool for managerial appraisal.

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

38. (A) correct.

Explanation

The unrealized gains or losses relating to fair value through other comprehensive income securities (FVOCI) are reported in comprehensive income and not the income statement. The book value of equity (Net Assets) does include the FVOCI securities. The problem is therefore that our measure of investor return (if net income is used) will not be matched with our balance sheet measure of equity. We

are missing these returns in our computation of ROE. Items, which bypass the income statement, being taken directly to comprehensive income (within stockholders equity), are referred to as dirty surplus items. In the presence of dirty surplus items (unlikely to reverse in the near future) the forecast of ROE should be amended, replacing earnings with comprehensive income. Comprehensive income = net income + OCI.

(Module 23.5, LOS 23.k)

Related Material

SchweserNotes - Book 3

39. (A) correct.

Explanation

Binkster comment relates to the treatment of non-recurring items. Future residual income should be based on recurring items and therefore Binkster comment is correct. As the gains or losses from one-off asset sales are non-recurring, these gains and losses should be excluded when estimating residual income. However, there is no need to adjust the book value of equity.

(Module 23.5, LOS 23.k)

Related Material

SchweserNotes - Book 3

40. (B) Free cash flow to equity will be positive.

Explanation

In a single-stage residual income model with ROE greater than the required rate of return, justified P/B will be greater than one and market value will be greater than book. There is no clear relationship with free cash flow to equity.

(Module 23.2, LOS 23.e)

Related Material

SchweserNotes - Book 3

41. (A) fall to zero immediately.

Explanation

A persistence factor of zero is used when residual income is expected to drop immediately to zero. A persistence factor of one is used when residual income is expected to persist at the current level forever. A persistence factor between zero and one is used when residual income is expected to decline over time.

(Module 23.4, LOS 23.h)

Related Material

SchweserNotes - Book 3

42. (A) $18.45.

Explanation

Applying the multistage residual income model:

$V_0 = B_0$ + PV of interim high-growth RI + PV of continuing RI

$= 11.00 + 2.90 + [(7.00) / (1.09)^5] = \$18.45$

(Module 23.2, LOS 23.c)

Related Material

SchweserNotes - Book 3

43. (B) increase if ROE is greater than the required rate of return.

Explanation

An increase (decrease) in ROE increases (decreases) value if the ROE exceeds the required rate of return. This is revealed by the RI valuation expression:

$V_0 = B_0 + [(ROE - r) / (r - g)]B_0$

(Module 23.2, LOS 23.d)

Related Material

SchweserNotes - Book 3

44. (C) $7.56.

Explanation

Retention ratio = (0.68 – 0.17) / 0.68 = 0.75 or 75%

ROE = $0.68 / $4.00 = 0.17 or 17%

g = retention ratio x ROE = (0.75) x 0.17 = 0.1275 or 12.75%

$$V_0 = \$4.00 + \left(\frac{0.17 - 0.15}{0.15 - 0.1275} \times \$4.00\right) = \$7.56$$

(Module 23.3, LOS 23.f)

Related Material

SchweserNotes - Book 3

45. (C) $0.32 per share.

Explanation

To answer this question, we need to establish the residual values using the following equations:

Earnings = prior year book value x ROE

Equity charge = prior year book value x required ROE

Residual income = earnings – equity charge

Here is a table containing the relevant values.

Year	Earnings (ROE = 13.60%)	Book Value	Equity Charge (Required ROE = 8.70%)	Residual Income	PV of Residual Income
0		$12.40			
1	$1.69	$14.09	$1.08	$0.61	$0.56
2	$1.92	$16.00	$1.23	$0.69	$0.58
3	$2.18	$18.18	$1.39	$0.78	$0.61
4	$2.47	$20.65	$1.58	$0.89	$0.64
5	$2.81	$23.46	$1.80	$1.01	$0.67

Company value = $12.40 + the sum of the residual incomes

Assuming residual value drops to zero after year five, the company is valued at $15.46 per share.

Now, we modify the model to reflect the persistence factor of 35%. The only value that persistence factor effects is the terminal value. Instead of discounting the Year 5 residual income by 1 + required ROE, we discount it by 1 + required ROE - persistence factor. The new values are as follows:

	Book Value	Year 1	Year 2	Year 3	Year 4
Value	$12.40	$0.56	$0.58	$0.61	$1.62

Year 4 CF = Residual income in year 4 + PV Continuing residual income = 0.89 + 1.37 = 2.26

PV of continuing residual income (T=4) = RI(year 5)/1+r-w = 1.01/(1+0.087-0.35) = 1.37

PV(T=0) of 2.26(T=4)=1.62

For a total value of $15.78 per share, or $0.32 higher than the original value.

(Module 23.2, LOS 23.c)

Related Material

SchweserNotes - Book 3

46. (C) -$4 million.

Explanation

Economic value added (EVA) measures the value added for shareholders by management during a given year. A company must produce EVA in order to increase its market value. EVA is calculated as:

EBIT(1 - t) - $WACC

10(1 – 0.30) – 0.11(55 + 45)

7 – 11

– 4

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

47. (A) $18.81.

Explanation

Applying the multistage residual income model:

$V_0 = B_0$ + PV of interim high-growth RI + PV of continuing RI

$= 9.50 + 3.10 + [(10.00) / (1.10)^5] = \$18.81$

(Module 23.2, LOS 23.c)

Related Material

SchweserNotes - Book 3

48. (A) standards allow charges directly to stockholders' equity while bypassing the income statements.

Explanation

Bias is likely when standards allow charges directly to stockholders' equity while bypassing the income statement. Both remaining responses are consistent with the use of data that will not introduce a bias.

(Module 23.5, LOS 23.k)

Related Material

SchweserNotes - Book 3

You are the chairperson of the board of Retty Inc. You are reviewing the statistics on management performance over the past three years.

The accounts of the firm are summarized below:

Exhibit 1: Income Statement

	20x4 $m	20x5 $m	20x6 $m
Sales	40.2	42.	43.9
Cost of goods sold (11.6) (12.3) (12.8)	.(11.6).	(12.3).	.(12.8).
Gross profit	28.6	30.0	31.1
Administrative expenses	.(10.0)	.(10.)0	.(3.0).
Earnings before interest and tax	18.6	20.0	28.1
Interest	.(6.3).	.(6.3).	.(4.2).
Earnings before tax	12.3	13.7	23.9
Tax	.(5.1).	.(5.6).	.(11.4).
Net income	7.2	8.1	12.5
Dividends	.(3.0).	.(3.1).	.(3.2).
Retained income	4.2	5.0	9.3

Exhibit 2: Balance Sheet at 31 December

	20x3 $m	20x4 $m	20x5 $m	20x6 $m
Total assets	100.0	104.2	109.2	110.5
Liabilities	24.0	24.0	24.0	16.0
Common stock	20.0	20.0	20.0	20.0
Additional paid up capital	10.0	10.0	10.0	10.0
Retained income	46.0	50.2	55.2	64.5
	100.0	104.2	106.2	110.5
Market value equity (31 December)	167	203	199	145

- Beta of firm = 1
- Debt holders' required rate of return: 5%
- Equity holders' required rate of return: 15%
- After tax WACC: 12.5%
- Tax rate: 45%

Notes:

1. Administrative expenses include goodwill write downs of $7m in 20x4 and 20x5-goodwill is fully written off by the end of 20x5
2. $8m of debt was redeemed at the start of 20x6
3. Other than the debt redeemed in 20x6, the liabilities consist mostly of long-term debt valued approximately at book value
4. Replacement value of assets is roughly equal to book value minus 4%

49. (C) 14.7%.

Explanation

Return on starting equity = 12.5 / 85.2 = 14.7%

Note we are using the start of year equity.

(Module 23.2, LOS 23.c)

Related Material

SchweserNotes - Book 3

50. (C) $1.6 million positive.

Explanation

EVA = NOPAT – $WACC

NOPAT = EBIT x (1 – t) = 28.1 x (1 – 0.45) = 15.455

$WACC = WACC x invested capital = 12.5% x 110.5 = $13.81m

EVA = 15.455 – 13.81 = $1.64m

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

51. (A) **–$1.7 million.**

Explanation

Residual income = accounting profit (after tax and interest) minus a charge for equity capital employed.

Net income for 2x06	12.5
Stockholders' equity	94.5
Charge at cost of equity, 15%	(14.2)
Hence residual income	(1.7)

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

52. (C) **$50.5 million.**

Explanation

Market value added = market value of (total) capital – book value of capital

= (145 + 16) – (94.5 + 16)

= $50.5m

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

53. (C) **The market expectation is that Retty's future Economic Value Added (EVA®) is lower than the previous expectation.**

Explanation

MVA can be described as the present value of future expected EVA®. Hence, actual performance in 2x06 (answer B) is not a valid Explanation. Answer A is also wrong, as relative performance is not relevant. If Retty's WACC decreases, then, all else being equal, the MVA will increase.

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

54. (A) **$144.5 million.**

Explanation

Value of equity = book value of equity + NPV of residual income

Value as at 31 December 2x06:

= 94.5 + [5 / (0.15 – 0.05)]

= $144.5m

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

55. (A) $11.18.

Explanation

Applying the residual income valuation model:

$V_0 = B_0$ + sum of discounted RIs + discounted premium

$50 + 1.10 + [(0.30)(13.83)/(1.10)^5] = \$11.18$

(Module 23.2, LOS 23.c)

Related Material

SchweserNotes - Book 3

56. (B) £130.77.

Explanation

The stock's terminal value as of year 5 is:

TV = 17.00 / 0.13 = 130.77

(Module 23.4, LOS 23.h)

Related Material

SchweserNotes - Book 3

57. (C) declines to zero as return on equity (ROE) drops to the cost of equity over time.

Explanation

It is common to assume that RI declines to zero as ROE drops to the cost of equity over time. Other assumptions analysts may make include RI continues indefinitely at a positive level or RI reflects a decline in ROE to a long-run average level.

(Module 23.4, LOS 23.h)

Related Material

SchweserNotes - Book 3

58. (B) The different models should result in different intrinsic values because of the theoretical differences in the models.

Explanation

The three models should all produce the same intrinsic value as long as the underlying assumptions are the same. The differences in intrinsic values arise from difficulty in estimating the inputs, not from theoretical differences in the models. Since they should produce the same results, they can be used to assess consistency. Residual income differs from DDM and FCFE in the use of accounting assumptions, including book value and discounting income.

(Module 23.5, LOS 23.i)

Related Material

SchweserNotes - Book 3

59. (A) reduces the problem of terminal value dominating total value.

Explanation

Terminal value does not dominate total present value as is the case in dividend and free cash flow valuation models. Both remaining responses are arguments against using the RI approach.

(Module 23.5, LOS 23.i)

Related Material

SchweserNotes - Book 3

60. (A) a firm does not pay dividends or the payments are too volatile to be sufficiently predictable.

Explanation

The residual income approach is appropriate when a firm does not pay dividends or the payments are too volatile to be sufficiently predictable. It is not appropriate when the clean surplus accounting relation is violated significantly. A firm that pays high dividends that are quite stable is also a poor candidate for the approach.

(Module 23.1, LOS 23.b)

Related Material

SchweserNotes - Book 3

61. (A) residual income that is expected beyond the initial forecast time horizon.

Explanation

Continuing residual income is defined as the residual income that is expected beyond the initial forecast time horizon. It comes into play when RI is forecast for a defined time horizon and a terminal value based on continuing RI is estimated at the end of that time frame.

(Module 23.4, LOS 23.h)

Related Material

SchweserNotes - Book 3

62. (B) the models rely on accounting data that can be manipulated by management.

Explanation

An argument against using the RI approach is that the models rely on accounting data that can be manipulated by management. Both remaining responses are arguments in favor of the approach.

(Module 23.5, LOS 23.j)

Related Material

SchweserNotes - Book 3

63. (B) Price to book value (P/B).

Explanation

The residual income model is most closely linked to P/B because justified P/B is directly linked to expected residual future income.

(Module 23.2, LOS 23.e)

Related Material

SchweserNotes - Book 3

Ilias Chair has read a recent article on the internet which championed the benefits of using a residual income model to calculate company valuations. He is having trouble understanding the model, and has presented you with the following assumptions for a hypothetical company that the article used, and would like to know the valuation it results in.

RI Inc.

Return on equity	4.6%
Retention rate	0.6
Current book value per share	$8.50
Required rate of return for equity holders	4%

Chair currently uses dividend valuation methodology to compute intrinsic value. He is interested to know if residual income models could be adapted and used instead of the dividend discount model (DDM). Chair has two main concerns about using it instead of the DDM:

Concern 1: The residual income model seems to be to some extent dependent on book value per share, which may be calculated differently according to the accounting policy choices a firm makes.

Concern 2: It's a shame that all residual income models assume constant growth in economic profit. It seems unreasonable to assume that economic profits can be sustained let alone grow at a constant rate. The models don't seem to factor in the impact of competition on future residual income.

Ilias is also trying to assess a fundamental value of yet another company in the sector, Topper Inc., using the residual income model. He believes that the current value of Topper is primarily based on the current book value plus the present value of residual income for the next three years.

Ilias estimates the required return to equity holders to be 4% pa. The current book value per share is $8.50.

He has estimated the EPS forecasts for the next three years to be $1.50, $1.40, and $1.35 respectively. Her estimates for the dividend per share for the next three years are $0.70, $0.75, and $0.80 respectively.

Chair does have concerns about the use of a residual income model for Topper.

Ilias has extracted the following from the Accounting Policies Note in Topper's most recent annual report:

Foreign Subsidiaries:

Topper Inc. has two foreign subsidiaries which are both based in Europe and for the purposes of the group accounts, Topper has assumed that the Euro is the functional currency for both, and hence, used the current rate method for translation into the group reporting currency (U.S. dollars).

Financial Instruments:

Topper Inc. owns $3 million of par value bonds issued by Pastini Inc., which are due to mature in 2x18. The group intends to hold the bonds until 2x18 and hence they have been classed as amortized cost on the Group Balance Sheet.

64. (A) $12.61.

Explanation

V_0 = Bo + [(ROE – r) x B_0 / (r – g)]

g = rr x roe = 0.6 x 0.046 = 0.0276

V_0 = $8.50 + [(0.046 – 0.04) x $8.50 / (0.04 – 0.0276)]

V_0 = $12.61

(Module 23.3, LOS 23.f)

Related Material

SchweserNotes - Book 3

65. (B) Correct in Statement 1 only.

Explanation

Residual income is dependent on book value, which is an accounting based figure. The residual income constant growth formula can, however, be used to calculate implied growth given a market to book value ratio.

(Module 23.3, LOS 23.g)

Related Material

SchweserNotes - Book 3

66. (C) $11.41.

Explanation

	Year 1	Year 2	Year 3
BV_{t-1}	$8.50	$9.30	$9.95
EPS	$1.50	$1.40	$1.35
DPS	$0.70	$0.75	$0.80
r x BV_{t-1}	$0.34	$0.37	$0.40
RI forecast	$1.16	$1.03	$0.95

Value = $8.50 + $1.16 / 1.04 + $1.03 / 1.042 + $0.95 / 1.043

Value = $11.41

(Module 23.2, LOS 23.c)

Related Material

SchweserNotes - Book 3

67. (A) Foreign Subsidiaries note.

Explanation

Foreign exchange gains and losses calculated under the current rate method are taken directly to shareholders' equity (CTA). This violates the clean surplus relationship and should be adjusted for unless they are expected to reverse in the near future.

Only assets held as "fair value through other comprehensive income (FVOCI)" would cause an issue in the financial instruments note.

(Module 23.5, LOS 23.k)

Related Material

SchweserNotes - Book 3

68. (C) net income less a charge that measures stockholders' opportunity cost in generating that income.

Explanation

Residual income is defined as net income less a charge that measures stockholders' opportunity cost in generating that income.

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

69. (C) £125.00.

Explanation

The stock's terminal value as of year 5 is:

TV = 15.00/0.12 = 125.00

(Module 23.4, LOS 23.h)

Related Material

SchweserNotes - Book 3

70. (B) 11.43%.

Explanation

The P/B ratio of 4.50 and the current BVPS of Sf22.50 imply a market price of Sf101.25(4.5 x 22.5). This implies a growth rate of:

$$g = r - \frac{B_0 \times (ROE - r)}{V_0 - B_0} = 0.12 - \frac{SF22.50 \times (0.14 - 0.12)}{Sf\ 101.25 - Sf22.50} = 0.1143 = 11.43\%$$

(Module 23.3, LOS 23.g)

Related Material

SchweserNotes - Book 3

71. (B) $11.28.

Explanation

After tax earnings = Pretax earnings x (1 – T) = 8.6 million x (1 – 0.35) = $5.59 million

EPS = After tax earnings/shares outstanding = $5.59 million / 8 million = $0.70

Retention ratio = (0.70 – 0.35) / 0.70 = 0.50 or 50%

Beginning Equity = Assets - liabilities = $53.2 million - $27.8 million = $25.4 million

Book value per share° = Total equity/shares outstanding = $25.4 million / 8 million = $3.18

ROE = $0.70 / $3.18 = 0.22 or 22%

g = retention ratio x ROE = (0.50) x 0.22 = 0.11 or 11.00%

Expected return = 0.045 + [0.125 – 0.045]1.2 = 0.1410 or 14.10%

$$V_0 = \$3.18 + \left(\frac{0.22 - 0.141}{0.141 - 0.11} \times \$3.18\right) = \$11.28$$

(Module 23.3, LOS 23.f)

Related Material

SchweserNotes - Book 3

72. (A) Residual income.

Explanation

Residual income is commonly used to measure managerial effectiveness, goodwill impairment and equity value. The Gordon Growth Model (GGM) would not be appropriate in instances where the underlying assumptions (such as stable growth in perpetuity) do not apply. Free cash flow to the firm and price to sales would often not be appropriate tools to measure goodwill impairment.

(Module 23.1, LOS 23.b)

Related Material

SchweserNotes - Book 3

Geremiah Analytics provides litigation consulting services to the intellectual property industry. They specialize in patent infringement liability and software valuation. Mariah Hofstedt, CFO of Geremiah, projects that the firm will earn $3 million pre-tax income this year. Additional selected financial data on Geremiah are presented below.

Table 1: Selected Financial Data for Geremiah Analytics

Total assets	$40 million
Debt/assets	60%
Average coupon on debt	8%
Cost of equity	12%
Tax rate	40%

Hofstedt has not been happy with the firm's financial performance. She would like to increase return on equity (ROE) and improve revenue growth, and is considering various ways to deploy Geremiah's cash flow in order to meet these two goals. One possibility is using some of Geremiah's cash flow to make a strategic acquisition.

Hofstedt has been looking at a smaller boutique firm, Logiciels LaMarre, which provides consulting services to the software industry. Hofstedt and a Geremiah Analytics valuation team have performed a preliminary valuation on Logiciels LaMarre using a free cash flow to equity (FCFE) model. However, Theodore LaMarre, CEO of Logiciels LaMarre, is not pleased with the resultant valuation that Geremiah has placed on his firm.

Rather than argue about the inputs of the free cash flow (FCF) model, LaMarre takes the position that FCFE is an inappropriate model for valuing Logiciels LaMarre. He cites the firm's rapid growth and resultant need for capital investment as reasons that valuing the firm on projections of FCFE is not reliable.

LaMarre wants Geremiah to value Logiciels LaMarre using the residual income approach.

LaMarre asserts, "The fact that our terminal value can be calculated with a high degree of certainty makes the use of a residual value model more appropriate than use of a FCFE model." Hofstedt counters that the residual income approach is not in LaMarre's interest. She points out, "Value tends to be recognized later in a residual income approach than in a FCFE approach."

There is, however, one point on which LaMarre and Hofstedt agree. They both recognize that competitive forces in the industry will drive the current high ROE of Logiciels LaMarre down to the cost of equity capital over time. Hofstedt concludes, "Given the assumption of a decline in ROE, we should use a persistence factor between zero and one." LaMarre disagrees, saying, "The assumption about ROE means that the present value of the continuing residual income at Logiciels LaMarre is the current residual income divided by the cost of equity capital.

73. (A) Incorrect Incorrect

Explanation

LaMarre is incorrect that residual income models are less subject to forecast error in terminal value estimates than FCFE models because a large portion of intrinsic value in a residual income model is current book value. Hofstedt is incorrect because residual income models tend to recognize value earlier, not later, than other present value based approaches.

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

74. (A) Terminal value represents a higher proportion of intrinsic value in a residual income model than in a dividend discount model (DDM).

Explanation

Terminal value represents a lower, not higher, proportion of intrinsic value in a residual income model than in other present value based approaches. A residual income model is applicable to a firm that does not have FCF and relies on accounting data that is generally easily found. However, the accounting data used in a residual income model are more easily manipulated by management than cash flow data.

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

75. (A) –$120,000.

Explanation

Geremiah's after-tax income is ($3 x (1 – 0.40)) = $1.8 million. They have ($40 x 0.60) = $24 million in debt and ($40 x (1 – 0.60)) = $16 million in equity. Their equity charge is ($16 x 0.12) = $1.92 million. Their residual income is ($1.8 – $1.92) = -$0.12 million, or -$120,000.

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3

76. (B) Incorrect Correct

Explanation

LaMarre is incorrect because the present value of the continuing residual income for a firm is equal to the current value divided by the return on equity when residual income continues indefinitely, which is not the case if ROE declines to the return on equity capital. Hofstedt is correct that ROE declining to the cost of equity capital implies a decline in residual income and thus a persistence factor between zero and one.

(Module 23.1, LOS 23.a)

Related Material

SchweserNotes - Book 3