21. FCFF.

22. FCFE.

The following information relates to questions 23-28

Ryan Leigh is preparing a presentation that analyzes the valuation of the common stock of two companies under consideration as additions to his firm's recommended list, Emerald Corporation and Holt Corporation. Leigh has prepared preliminary valuations of both companies using an FCFE model and is also preparing a value estimate for Emerald using a dividend discount model. Holt's 2019 and 2020 financial statements, contained in Exhibits 1 and 2, are prepared in accordance with US GAAP.

Exhibit 1: Holt Corporation Consolidated Balance Sheets (US$ Millions)

		As of 31 December		
		2020		2019
Assets				
Current assets				
Cash and cash equivalents		$ 372		$ 315
Accounts receivable		770		711
Inventories		846		780
Total current assets		1,988		1,806
Gross fixed assets	4,275		3,752	
Less: Accumulated depreciation	1,176	3,099	906	2,846
Total assets		$5,087		$4,652
Liabilities and shareholders' equity				
Current liabilities				
Accounts payable		$ 476		$ 443
Accrued taxes and expenses		149		114
Notes payable		465		450
Total current liabilities		1,090		1,007
Long-term debt		1,575		1,515
Common stock		525		525
Retained earnings		1,897		1,605
Total liabilities and shareholders' equity		$5,087		$4,652

Exhibit 2: Holt Corporation Consolidated Income Statement for the Year Ended 31 December 2020 (US$ Millions)

Total revenues	$3,323
Cost of goods sold	1,287
Selling, general, and administrative expenses	858

Earnings before interest, taxes, depreciation, and amortization (EBITDA)	1,178
Depreciation expense	270
Operating income	908
Interest expense	195
Pretax income	713
Income tax (at 32%)	228
Net income	$ 485

Leigh presents his valuations of the common stock of Emerald and Holt to his supervisor, Alice Smith. Smith has the following questions and comments:

1. "I estimate that Emerald's long-term expected dividend payout rate is 20% and its return on equity is 10% over the long term."
2. "Why did you use an FCFE model to value Holt's common stock? Can you use a DDM instead?"
3. "How did Holt's FCFE for 2008 compare with its FCFF for the same year? I recommend you use an FCFF model to value Holt's common stock instead of using an FCFE model because Holt has had a history of leverage changes in the past."
4. "In the last three years, about 5% of Holt's growth in FCFE has come from decreases in inventory."

Leigh responds to each of Smith's points as follows:

1. "I will use your estimates and calculate Emerald's long-term, sustainable dividend growth rate."
2. "There are two reasons why I used the FCFE model to value Holt's common stock instead of using a DDM. The first reason is that Holt's dividends have differed significantly from its capacity to pay dividends. The second reason is that Holt is a takeover target and once the company is taken over, the new owners will have discretion over the uses of free cash flow."
3. "I will calculate Holt's FCFF for 2020 and estimate the value of Holt's common stock using an FCFF model."
4. "Holt is a growing company. In forecasting either Holt's FCFE or FCFF growth rates, I will not consider decreases in inventory to be a long-term source of growth."

23. Which of the following long-term FCFE growth rates is *most* consistent with the facts and stated policies of Emerald?

A. 5% or lower

B. 2% or higher

C. 8% or higher

24. Do the reasons provided by Leigh support his use of the FCFE model to value Holt's common stock instead of using a DDM?

A. Yes

B. No, because Holt's dividend situation argues in favor of using the DDM

C. No, because FCFE is not appropriate for investors taking a control perspective

25. Holt's FCFF (in millions) for 2020 is *closest* to:

A. $308.

B. $370.

C. $422.

26. Holt's FCFE (in millions) for 2020 is *closest* to:

A. $175.

B. $250.

C. $364.

27. Leigh's comment about not considering decreases in inventory to be a source of long-term growth in free cash flow for Holt is:

A. inconsistent with a forecasting perspective.

B. mistaken because decreases in inventory are a use rather than a source of cash.

C. consistent with a forecasting perspective because inventory reduction has a limit, particularly for a growing firm.

28. Smith's recommendation to use an FCFF model to value Holt is:

A. logical, given the prospect of Holt changing capital structure.

B. not logical because an FCFF model is used only to value the total firm.

C. not logical because FCFE represents a more direct approach to free cash flow valuation.

29. Indicate the effect on this period's FCFF and FCFE of a change in each of the items listed here. Assume a $100 increase in each case and a 40% tax rate.

A. Net income.

B. Cash operating expenses.

C. Depreciation.

D. Interest expense.

E. EBIT.

F. Accounts receivable.

G. Accounts payable.

H. Property, plant, and equipment.

I. Notes payable.

J. Cash dividends paid.

The following information relates to questions 6-7

May Stewart, CFA, a retail analyst, is performing a P/E-based comparison of two hypothetical jewelry stores as of early 2020. She has the following data for Hallwhite Stores (HS) and Ruffany (RUF).

- HS is priced at $44. RUF is priced at $22.50.
- HS has a simple capital structure, earned $2.00 per share (basic and diluted) in 2019, and is expected to earn $2.20 (basic and diluted) in 2020.
- RUF has a complex capital structure as a result of its outstanding stock options. Moreover, it had several unusual items that reduced its basic EPS in 2019 to $0.50 (versus the $0.75 that it earned in 2018).
- For 2020, Stewart expects RUF to achieve net income of $30 million. RUF has 30 million shares outstanding and options outstanding for an additional 33,333,333 shares.

6. Which P/E (trailing or forward) should Stewart use to compare the two companies' valuation?

7. Which of the two stocks is relatively more attractive when valued on the basis of P/Es (assuming that all other factors are approximately the same for both stocks)?

The following information relates to questions 8-9

You are researching the valuation of the stock of a company in the food-processing industry. Suppose you intend to use the mean value of the forward P/Es for the food-processing industry stocks as the benchmark value of the multiple. This mean P/E is 18.0. The forward or expected EPS for the next year for the stock you are studying is $2.00. You calculate 18.0 × $2.00 = $36, which you take to be the intrinsic value of the stock based only on the information given here. Comparing $36 with the stock's current market price of $30, you conclude the stock is undervalued.

8. Give two reasons why your conclusion that the stock is undervalued may be in error.

9. What additional information about the stock and the peer group would support your original conclusion?

The following information relates to questions 10-16

Mark Cannan is updating research reports on two well-established consumer companies before first quarter 2021 earnings reports are released. His supervisor, Sharolyn Ritter, has asked Cannan to use market-based valuations when updating the reports.

Delite Beverage is a manufacturer and distributor of soft drinks and recently

acquired a major water bottling company in order to offer a broader product line. The acquisition will have a significant impact on Delite's future results.

You Fix It is a US retail distributor of products for home improvement, primarily for those consumers who choose to do the work themselves. The home improvement industry is cyclical; the industry was adversely affected by the recent downturn in the economy, the level of foreclosures, and slow home sales. Although sales and earnings at You Fix It weakened, same store sales are beginning to improve as consumers undertake more home improvement projects. Poor performing stores were closed, resulting in significant restructuring charges in 2020.

Before approving Cannan's work, Ritter wants to discuss the calculations and choices of ratios used in the valuation of Delite and You Fix It. The data used by Cannan in his analysis are summarized in Exhibit 1.

Exhibit 1: Select Financial Data for Delite Beverage and You Fix It

	Delite Beverage	You Fix It
2020 earnings per share (EPS)	$3.44	$1.77
2021 estimated EPS	$3.50	$1.99
Book value per share end of year	$62.05	$11.64
Current share price	$65.50	$37.23
Sales (billions)	$32.13	$67.44
Free cash flow per share	$2.68	$0.21
Shares outstanding end of year	2,322,034,000	1,638,821,000

Cannan advises Ritter that he is considering three different approaches to value the shares of You Fix It:

Approach 1	Price-to-book ratio (P/B)
Approach 2	Price-to-earnings ratio (P/E) using trailing earnings
Approach 3	Price-to-earnings ratio using normalized earnings

Cannan tells Ritter that he calculated the price-to-sales ratio (P/S) for You Fix It but chose not to use it in the valuation of the shares. Cannan states to Ritter that it is more appropriate to use the P/E than the P/S because

Reason 1	Earnings are more stable than sales.
Reason 2	Earnings are less easily manipulated than sales.
Reason 3	The P/E reflects financial leverage, whereas the P/S does not.

Cannan also informs Ritter that he did not use a price-to-cash-flow multiple in valuing the shares of Delite or You Fix It. The reason is that he could not identify a cash flow measure that would both account for working capital and noncash revenues and be after interest expense and thus not be mismatched with share price. Ritter advises Cannan that such a cash flow measure does exist.

Ritter provides Cannan with financial data on three close competitors as well as the overall beverage sector, which includes other competitors, in Exhibit 2. She asks Cannan to determine, based on the P/E-to-growth (PEG) ratio, whether Delite shares are overvalued, fairly valued, or undervalued.

Exhibit 2: Beverage Sector Data

	Forward P/E	Earnings Growth
Delite	—	12.41%
Fresh Iced Tea Company	16.59	9.52%
Nonutter Soda	15.64	11.94%
Tasty Root Beer	44.10	20%
Beverage sector average	16.40	10.80%

After providing Ritter his answer, Cannan is concerned about the inclusion of Tasty Root Beer in the comparables analysis. Specifically, Cannan says to Ritter: "I feel we should mitigate the effect of large outliers but not the impact of small outliers (i.e., those close to zero) when calculating the beverage sector P/E. What measure of central tendency would you suggest we use to address this concern?" Ritter requests that Cannan incorporate their discussion points before submitting the reports for final approval.

10. Based on the information in Exhibit 1, the *mostappropriate* price-to-earnings ratio to use in the valuation of Delite is *closest* to:

A. 18.71.

B. 19.04.

C. 24.44.

11. Based on the information in Exhibit 1, the price-to-sales ratio for You Fix It is *closest* to:

A. 0.28.

B. 0.55.

C. 0.90.

12. Which valuation approach would be *most* appropriate in valuing shares of You Fix It?

A. Approach 1

B. Approach 2

C. Approach 3

13. Cannan's preference to use the P/E over the P/S is *best* supported by:

A. Reason 1.

B. Reason 2.

C. Reason 3.

14. The cash flow measure that Ritter would *most likely* recommend to address Cannan's concern is:

A. free cash flow to equity.

B. earnings plus noncash charges.

C. earnings before interest, tax, depreciation, and amortization.

15. Based on the information in Exhibits 1 and 2, Cannan would most likely conclude that Delite's shares are:

A. overvalued.

B. undervalued.

C. fairly valued.

16. The measure of central tendency that Ritter will *most likely* recommend is the:

A. median.

B. harmonic mean.

C. arithmetic mean.

The following information relates to questions 17-22

Andrea Risso is a junior analyst with AquistareFianco, an independent equity research firm. Risso's supervisor asks her to update, as of 1 January 2020, a quarterly research report for Centralino S.p.A., a telecommunications company headquartered in Italy. On that date, Centralino's common share price is €50 and its preferred shares trade for €5.25 per share.

Risso gathers information on Centralino. Exhibit 1 presents earnings and dividend data, and Exhibit 2 presents balance sheet data. Net sales were €3.182 billion in 2019. Risso estimates a required return of 15% for Centralino and forecasts growth in dividends of 6% into perpetuity.

Exhibit 1: Earnings and Dividends for Centralino, 2016–2020

	2016	2017	2018	2019	2020(E)
Earnings per share (EPS, €)	4.93	5.25	4.46	5.64	6.00
Dividends per share (DPS, €)	2.45	2.60	2.60	2.75	2.91
Return on equity (ROE)	13.01%	13.71%	11.58%	14.21%	14.96%

Note: The data for 2016–2019 are actual and for 2020 are estimated.

Exhibit 2: Summary Balance Sheet for Centralino, Year Ended 31 December 2019

Assets (€ millions)		Liabilities and Shareholders' Equity (€ millions)	
Cash and cash equivalents	102	Current liabilities	259
Accounts receivable	305	Long-term debt	367
Inventory	333	**Total liabilities**	626
Total current assets	740	Preferred shares	80

sponse to Nkomo's Question 3, would be:

A. an upward adjustment to book value.

B. an upward adjustment to the cost of equity.

C. to exclude it from the estimate of net income.

15. Under Scenario 1, the intrinsic value per share of the equity of Amersheen is *closest* to:

A. R13.29.

B. R15.57.

C. R16.31.

16. Under Scenario 2, the intrinsic value per share of the equity of Amersheen is *closest* to:

A. R13.29.

B. R15.57.

C. R16.31.

The following information relates to questions 17-26

Elena Castovan is a junior analyst with Contralith Capital, a long-only equity investment manager. She has been asked to value three stocks on Contralith's watch list: Portous, Inc. (PTU), SSX Financial (SSX), and Tantechi Ltd. (TTCI).

During their weekly meeting, Castovan and her supervisor, Ariana Beckworth, discuss characteristics of residual income models. Castovan tells Beckworth the following.

Statement 1	The present value of the terminal value in RI models is often a larger portion of the total intrinsic value than it is in other DCF valuation models.
Statement 2	The RI model's use of accounting income assumes that the cost of debt capital is appropriately reflected by interest expense.
Statement 3	RI models cannot be readily applied to companies that do not have positive expected near-term free cash flows.

Beckworth asks Castovan why an RI model may be more appropriate for valuing PTU than the dividend discount model or a free cash flow model. Castovan tells Beckworth that, over her five-year forecast horizon, she expects PTU to perform the following actions.

Reason 1	Pay dividends that are unpredictable
Reason 2	Generatepositiveand fairly predictable free cash flows
Reason 3	Report significant amounts of other comprehensive income

At the conclusion of their meeting, Beckworth asks Castovan to value SSX using RI models. Selected financial information on SSX is presented in Exhibit 1.

Exhibit 1: SSX Financial (SSX) Selected Financial Data

Total assets (millions)	€4,000.00
Capital structure	60% debt/40% equity
EBIT (millions)	€700.00
Tax rate	35.00%
Return on equity (ROE)	23.37%
Pretax cost of debt[a]	5.20%
Cost of equity	15.00%
Market price per share	€48.80
Price-to-book ratio	2.10

[a] *Interest expense is tax-deductible.*

Castovan's final assignment is to determine the intrinsic value of TTCI using both a single-stage and a multistage RI model. Selected data and assumptions for TTCI are presented in Exhibit 2.

Exhibit 2: Tantechi Ltd. (TTCI) Selected Financial Data and Assumptions

Book value per share	€45.25
Market price per share	€126.05
Constant long-term ROE	12.00%
Constant long-term earnings growth rate	4.50%
Cost of equity	8.70%

For the multistage model, Castovan forecasts TTCI's ROE to be higher than its long-term ROE for the first three years. Forecasted earnings per share and dividends per share for TTCI are presented in Exhibit 3. Starting in Year 4, Castovan forecasts TTCI's ROE to revert to the constant long-term ROE of 12% annually. The terminal value is based on an assumption that residual income per share will be constant from Year 3 into perpetuity.

Exhibit 3: Tantechi Ltd. (TTCI) Forecasts of Earnings and Dividends

	Year 1	Year 2	Year 3
Earnings per share (€)	7.82	8.17	8.54
Dividends per share (€)	1.46	1.53	1.59

Beckworth questions Castovan's assumption regarding the implied persistence factor used in the multistage RI valuation. She tells Castovan that she believes that a persistence factor of 0.10 is appropriate for TTCI.

17. Which of Castovan's statements regarding residual income models is correct?

A. Statement 1

B. Statement 2

C. Statement 3

18. Which of Castovan's reasons *best* justifies the use of a residual income model to value PTU?

A. Reason 1

B. Reason 2

C. Reason 3

19. The forecasted item described in Reason 3 will *most likely* affect:

A. earnings per share.

B. dividends per share.

C. book value per share.

20. Based on Exhibit 1, residual income for SSX is *closest* to:

A. €40.9 million.

B. €90.2 million.

C. €133.9 million.

21. Based on Exhibit 1 and the single-stage residual income model, the implied growth rate of earnings for SSX is *closest* to:

A. 5.8%.

B. 7.4%.

C. 11.0%.

22. Based on the single-stage RI model and Exhibit 2, Castovan should conclude that TTCI is:

A. undervalued.

B. fairly valued.

C. overvalued.

23. Based on Exhibit 2, the justified price-to-book ratio for TTCI is *closest* to:

A. 1.79.

B. 2.27.

C. 2.79.

24. Based on Exhibits 2 and 3 and the multistage RI model, Castovan should estimate

the intrinsic value of TTCI to be *closest* to:

A. €54.88.

B. €83.01.

C. €85.71.

25. The persistence factor suggested by Beckworth will lead to a multistage value estimate of TTCI's shares that is:

A. less than Castovan's multistage value estimate.

B. equal to Castovan's multistage value estimate.

C. greater than Castovan's multistage value estimate.

26. The *best* justification for Castovan to use Beckworth's suggested persistence factor is that TTCI has:

A. a low dividend payout.

B. extreme accounting rates of return.

C. a strong market leadership position.

27. Use the following information to estimate the intrinsic value of VIM's common stock using the residual income model:

- VIM had total assets of $3,000,000, financed with twice as much debt capital as equity capital.
- VIM's pretax cost of debt is 6% and cost of equity capital is 10%.
- VIM had EBIT of $300,000 and was taxed at a rate of 40%. EBIT is expected to continue at $300,000 indefinitely.
- VIM's book value per share is $20.
- VIM has 50,000 shares of common stock outstanding.

28. Palmetto Steel, Inc. (PSI) maintains a dividend payout ratio of 80% because of its limited opportunities for expansion. Its return on equity is 15%. The required rate of return on PSI equity is 12%, and its long-term growth rate is 3%. Compute the justified P/B based on forecasted fundamentals, consistent with the residual income model and a constant growth rate assumption.

The following information relates to questions 29-30

Protected Steel Corporation (PSC) has a book value of $6 per share. PSC is expected to earn $0.60 per share forever and pays out all of its earnings as dividends. The required rate of return on PSC's equity is 12%. Calculate the value of the stock using the following:

PRACTICE PROBLEMS

The following information relates to questions 1-5

Alan Chin, CEO of Thunder Corporation, has asked his chief financial officer, Constance Ebinosa, to prepare a valuation of Thunder for the purpose of selling the company to a private investment partnership. Thunder is a profitable US-domiciled manufacturer of generic household products with $200 million in annual sales. Customers consist of several grocery store chains in the United States. Competitors include large companies such as Procter & Gamble, The Clorox Company, and Unilever. Thunder has been in business for 15 years and is privately owned by the original shareholders, none of whom are employed by the company. Thunder's senior management has been in charge of the company's operations for most of the past 15 years and expects to remain in that capacity after any sale.

The partnership has expectations about Thunder similar to the current shareholders and management of Thunder. These investors expect to hold Thunder for an intermediate period and then bring the company public when market conditions are more favorable than currently.

Chin is concerned about what definition of value to use in analyzing Thunder. He notes that the stock market has been very volatile recently. He also wonders whether fair market value can be realistically estimated when the most similar recent private market transactions may not have been at arm's length.

Chin asks Ebinosa whether there will be differences in the process of valuing a private company like Thunder compared with a public company. Ebinosa replies that differences do exist and mentions several factors an analyst must consider.

Ebinosa also explains that several approaches are available for valuing private companies. She mentions that one possibility is to use an asset-based approach because Thunder has a relatively large and efficient factory and warehouse for its products. A real estate appraiser can readily determine the value of these facilities. A second method would be the market approach and using an average of the price-to-earnings multiples for Procter & Gamble and Clorox. A third possibility is a discounted free cash flow approach. The latter would focus on a continuation of Thunder's trend of slow profitable growth during the past 10 years.

The private investment partnership has mentioned that it is likely to use an income approach as one of its valuation methods. Ebinosa decides to validate the estimates they make. She assumes that for the next 12 months, Thunder's revenues will increase by the long-term annual growth rate of 3%. She also makes the following assumptions to calculate the free cash flow to the firm for the next 12 months:

- Gross profit margin is 45%.
- Depreciation is 2% of revenues.
- Selling, general, and administrative expenses are 24% of revenues.
- Capital expenditures equal 125% of depreciation to support the current level of revenues.
- Additional capital expenditures of 15% of incremental revenues are needed to fund future growth.
- Working capital investment equals 8% of incremental revenues.

- Marginal tax rate on EBIT is 35%.

Chin knows that if an income approach is used, the choice of discount rate may have a large influence on the estimated value. He makes two statements regarding discount rate estimates:

1. If the CAPM method is used to estimate the discount rate with a beta estimate based on public companies with operations and revenues similar to Thunder, then a small stock premium should be added to the estimate.
2. The weighted average cost of capital of the private investment partnership should be used to value Thunder.

Ebinosa decides to calculate a value of Thunder's equity using the capitalized cash flow method and decides to use the build-up method to estimate Thunder's required return on equity. She makes the following assumptions:

- Growth of FCFE is at a constant annual rate of 3%.
- Free cash flow to equity for the year ahead is $2.5 million.
- Risk-free rate is 4.5%.
- Equity risk premium is 5.0%.
- Size premium is 2.0%.

1. The *least likely* factor that would be a source of differences in valuing Thunder compared with valuing a publicly traded company is:

   A. access to public debt markets.

   B. agency problems.

   C. the size of the company.

2. Ebinosa can *best* value Thunder using the:

   A. excess earnings approach.

   B. asset-based approach.

   C. discounted free cash flow approach.

3. The free cash flow to the firm is *closest* to:

   A. $23,031,000.

   B. $25,441,000.

   C. $36,091,000.

4. Regarding the two statements about discount rate estimates, Chin is:

   A. correct with respect to adding the small stock premium and correct with respect to the weighted average cost of capital.

   B. correct with respect to adding the small stock premium and incorrect with respect to the weighted average cost of capital.

   C. incorrect with respect to adding the small stock premium and incorrect with respect to the weighted average cost of capital.

5. The indicated value of Thunder's equity using the build-up method and the capitalized cash flow method (CCM) based on free cash flow to equity is *closest* to:

   A. $29.41 million.

   B. $38.46 million.

   C. $125.00 million.

6. Two companies are considering the acquisition of Target Company. Buyer A is a strategic buyer and Buyer B is a financial buyer. The following information pertains to Target Company:

   Sales = £28,000,000

   Reported EBITDA = £4,500,000

   Reported executive compensation = £1,000,000

   Normalized executive compensation = £500,000

   Reduced SG&A from eliminating duplicate general and administrative functions = £600,000

   Calculate the pro forma EBITDA estimates that the strategic and financial buyers would each develop in an acquisitions analysis of Target Company.

The following information relates to questions 7-12

The senior vice president of acquisitions for Northland Industries, Angela Lanton, and her head analyst, Michael Powell, are evaluating several potential investments. Northland is a diversified holding company for numerous businesses. One of Northland's divisions is a manufacturer of fine papers, and that division has alerted Lanton about Oakstar Timber, a supplier that may be available for purchase. Oakstar's sole owner, Felix Tanteromo, has expressed interest in exchanging his ownership of Oakstar for a combination of cash and Northland Industries securities.

Oakstar's main asset is 10,000 hectares of timberland in western Canada. The land is a combination of new and old growth Douglas fir trees. The value of this timberland has been steadily increasing since Oakstar acquired it. Oakstar manages the land on a sustained yield basis (i.e., so it continues to produce timber indefinitely) and contracts with outside forestry companies to evaluate, harvest, and sell the timber. Oakstar's income is in the form of royalties (fees paid to Oakstar based on the number of cubic meters harvested). Oakstar's balance sheet as of 31 December 20X0, in Canadian dollars, is as follows.

Oakstar Timber Balance Sheet
Year Ended 31 December 20X0

Assets	
Cash	C$500,000
Inventory	25,000
Accounts receivable	50,000
Plant and equipment (cost less depreciation)	750,000