

**LO.a: Compare the free cash flow to the firm (FCFF) and free cash flow to equity (FCFE) approaches to valuation.**

1. John Doe is an analyst at Brickrock Capital. He is estimating the value of Horti Goods Ltd., an appliance manufacturer. He develops free cash flow forecasts for the company and wants to value it using FCFF and FCFE approaches. The *best* discount rate to use is:
  - A. weighted average cost of capital for FCFF and cost of equity for FCFE.
  - B. weighted average cost of capital for FCFE and cost of equity for FCFF.
  - C. cost of equity for both FCFE and FCFF.
2. Which of the following statements about the free cash flow approach is *most likely* correct?
  - A. FCFF represents cash flows available to equity and debt holders but not preferred stockholders.
  - B. FCFE represents cash flow available to equity shareholders after dividends have been paid.
  - C. FCFF represents cash flow generated by the operating assets of the business.
3. The equity value of a firm is the present value of its operating assets:
  - A. plus excess cash and minus market value of debt.
  - B. minus market value of debt and cash
  - C. plus market value of debt

**LO.b: Explain the ownership perspective implicit in the FCFE approach.**

4. Which of the following situations *most likely* warrants the use of the free cash flow method?
  - A. The company pays dividends which grow at a stable rate.
  - B. The investor wants to influence the timing or amount of cash flow distribution to firm's shareholders.
  - C. The investor takes a noncontrol perspective.

**LO.c: Explain the appropriate adjustments to net income, earnings before interest and taxes (EBIT), earnings before interest, taxes, depreciation, and amortization (EBITDA), and cash flow from operations (CFO) to calculate FCFF and FCFE.**

5. Which of the following adjustments is *not* required while calculating free cash flow to equity from net income?
  - A. Subtract after tax interest expense.
  - B. Subtract the value of principal repayments.
  - C. Subtract the increase in the value of receivables.
6. To calculate FCFF from CFO:
  - A. add after-tax interest expense and subtract fixed capital investment.
  - B. subtract working capital investment.
  - C. subtract both fixed capital investment and working capital investment.
7. To estimate FCFF from EBITDA (1-Tax rate) which of the following adjustments are required?

- A. add after-tax interest expense and working capital investment.
- B. subtract fixed capital investment and working capital investment.
- C. add depreciation times tax rate, subtract fixed capital investment and working capital investment.

**LO.d: Calculate FCFF and FCFE.**

8. Sally Brook is analyzing Nova Electronics for valuation purposes. The financial statements for the years 2015 and 2016 are given below:

Income Statement (in \$ Millions)			Balance Sheet (in \$ Millions)		
	2016	2015		2016	2015
Sales	1,500	1,200	Cash	600	330
COGS	600	450	Accounts receivable	800	650
Gross Profit	900	750	Inventory	450	400
SG&A	250	200	<b>Current Assets</b>	<b>1,850</b>	<b>1,380</b>
Depreciation	100	80	PPE (Gross)	2,990	2,800
Interest expense	50	40	Acc. depreciation	220	120
Profit before tax	500	430	PPE (Net)	2,770	2,680
Taxes (30%)	150	129	<b>Total Assets</b>	<b>4,620</b>	<b>4,060</b>
Profit after tax	350	301			
			Accounts payable	950	860
			Short term debt	1500	1310
			<b>Current liabilities</b>	<b>2,450</b>	<b>2,170</b>
			Long term debt	780	850
			Common Stock	500	500
			Retained earnings	890	540
			<b>Total liabilities and equity</b>	<b>4,620</b>	<b>4,060</b>

The FCFF and FCFE of the company in millions for 2016 are:

	FCFF	FCFE
A.	\$185	\$270
B.	\$95	\$180
C.	\$150	\$150

9. Nexter Corp.'s financial details are given as follows:

Cash flow from operations:	\$1,500
Depreciation:	\$600
WC Inv:	\$200
FC Inv:	\$300

The company's free cash flow to firm is *closest* to:

- A. \$1,200
- B. \$1,600

C. \$1,000

**LO.e: Describe approaches for forecasting FCFF and FCFE.**

10. Which of the following statements about forecasting free cash flow is *most likely* true?
- A. FCFF and FCFE always grow at the same rate.
  - B. Free cash flows can be forecasted either at a constant growth rate or under a more complicated method where each component is forecasted separately.
  - C. When forecasting free cash flow to equity, firm's target debt ratios are not considered.

**LO.f: Compare the FCFE model and dividend discount models.**

11. Which of the following statements is *most likely* a difference between the free cash flow approach and dividend discount models?
- A. Dividend discount models assume a control perspective whereas free cash flow models assume a minority perspective.
  - B. Free cash flow models are suitable for companies whose dividends do not align with free cash flows.
  - C. Dividend discount models are best suited for companies with a dividend history whereas free cash flow models are not suitable for such companies.

**LO.g: Explain how dividends, share repurchases, share issues, and changes in leverage may affect future FCFF and FCFE.**

12. An increase in dividends declared will *most likely*:
- A. decrease FCFE only.
  - B. decrease FCFF and FCFE.
  - C. have no effect on FCFE or FCFF.

**LO.h: Evaluate the use of net income and EBITDA as proxies for cash flow in valuation.**

13. A potential problem with using EBITDA as a proxy for free cash flow is:
- A. EBITDA does not include depreciation expense.
  - B. EBITDA does not reflect amounts related to working capital or fixed capital investments.
  - C. EBITDA is not the company's net profit.

**LO.i: Explain the single-stage (stable-growth), two-stage, and three-stage FCFF and FCFE models and select and justify the appropriate model given a company's characteristics.**

14. A two stage free cash flow model is *most* useful for:
- A. a company that is in a mature phase of its lifecycle with growth at a stable rate expected for the foreseeable future.
  - B. a company with a valuable patent due to expire in two years.
  - C. a startup company.

**LO.j: estimate a company's value using the appropriate free cash flow model(s);**

15. Sam White is developing cash flow forecasts for Forza Ltd. The cash flows for the next three years are given below:

	Year 1	Year 2	Year 3
FCFF	\$500	\$550	\$600

Cash flows are expected to grow forever at 5% annually after year 3. The company has \$1500 outstanding in debt and has cash and equivalents equal to \$1,000. The company's cost of equity is 9% and the WACC is 6%. The value of equity using the FCFF valuation approach is *closest* to:

- A. \$57,750
- B. \$53,860
- C. \$52,860

16. Bellavine Co. generated FCFE of \$1,800 last year. The cash flow is expected to grow at 8% for the next three years after which it will grow at 3% annually. The market value of the company's debt outstanding is \$2,500 and the value of its cash and equivalents is \$500. The company's cost of equity is 8% and its WACC is 5%. The value of equity using FCFE is *closest* to:

- A. \$40,480
- B. \$42,980
- C. \$42,480

**LO.k: Explain the use of sensitivity analysis in FCFF and FCFE valuations.**

17. Rob Lowe is valuing the equity of Vic Beverages. He estimates FCFE for 2016 by using a constant-growth model. The estimated value for FCFE for 2015 is \$5. Lowe uses FCFE growth rate of 5% and required rate of return of 10%. With these variables the estimated value per share for 2016 is \$105. Lowe then conducts a sensitivity analysis by taking the base values of FCFE growth rate and required rate of return and highest and lowest estimates of these variables based on economic and competitive environment. The following table shows the results:

Sensitivity Analysis for Vic Beverages

Variable	Base-Case Estimate	Valuation with Base-Case	Valuation with Low Estimate	Valuation with High Estimate
FCFE growth rate	5%	\$105	\$87	\$133
Required rate of return on equity	10%	\$105	\$131	\$88

The *most* likely conclusion that can be drawn is:

- A. The company's value is not sensitive to the input variables.
- B. The company's value is sensitive to input variables.
- C. The company's value is least sensitive to the range of estimate for FCFE growth rate.

**LO.l: Describe approaches for calculating the terminal value in a multistage valuation model.**

18. An analyst forecasts FCFE for Trend Corp. for years 2016 through 2020. The EPS in 2020 is projected to be \$3.5, and the average trailing P/E for the industry at the beginning of 2021 is 8. Expected EPS for 2021 is \$4. The terminal value at the end of 2020 is *closest* to:

- A. \$28.
- B. \$32.
- C. \$30.

**LO.m: Evaluate whether a stock is overvalued, fairly valued, or undervalued based on a free cash flow valuation model.**

19. John estimates the equity value of Novelty Fibers using both FCFE and FCFF approaches. Based on FCFE the value is estimated to be \$58 whereas using FCFF the value is estimated to be \$65. The stock is currently trading at \$61. The stock is:

- A. undervalued according to FCFE but overvalued according to FCFF.
- B. undervalued according to FCFF but overvalued according to FCFE.
- C. undervalued according to FCFF but fairly valued according to FCFE.

**Solutions**

1. **A** is correct. FCFF is discounted using WACC whereas FCFE is discounted using cost of equity. Section 2.1.
2. **C** is correct. FCFF represents cash flow generated by the operating assets of the business which is then used to pay debt holders, preferred stockholders and common shareholders. Hence Option A is incorrect. Option B is incorrect because FCFE is the cash flow available to common stock holders after all operating expenses, interest and principal payments have been made, and investments in working and fixed capital done. Dividends are the uses of FCFE. Section 2.1.
3. **A** is correct. The value of equity is found by subtracting the market value of debt from the value of operating assets and any excess cash and marketable securities. Section 2.1.
4. **B** is correct. The free cash flow method is used when the investor takes a control perspective. With control he can influence the uses of cash flow. Options A & C are conditions for the application of the DDM. Section 1.
5. **A** is correct. The interest expense and its tax deduction are already accounted for in the net income therefore no adjustment is needed to calculate FCFE. The value of debt repayments and working capital investment is subtracted from net income to calculate FCFE. Section 3.4.
6. **A** is correct. After-tax interest expense should be added to and fixed capital investment should be subtracted from CFO to obtain an estimate of FCFF. Section 3.2.
7. **C** is correct. FCFF equals after-tax EBITDA plus depreciation times tax rate minus investments in fixed capital and working capital. Section 3.5.
8. **A** is correct. The workings in \$ millions are as follows:

Net Income	350	Net Income	350
		Add: After tax Interest [50 x 0.7]	35
Add: depreciation	100		
less WC Inv [(800+450-950)-(650+400-860)]	110	Add: Depreciation	100
		less WC Inv[(800+450-950)-(650+400-860)]	110
less: FC Inv (2990-2800)	190	less: FC Inv (2990-2800)	190
Add: Net borrowing	120		
<b>FCFE</b>	<b>270</b>	<b>FCFF</b>	<b>185</b>

Sections 3.1, 3.4.
9. **A** is correct. Cash flow from operations is calculated after subtracting WC Inv and adding back depreciation. Therefore, the only adjustment that needs to be made is to subtract FCInv.  $FCFF = 1,500 - 300 = \$1,200$ . Section 3.2.

10. **B** is correct. Free cash flows can be forecasted at a constant growth rate or by forecasting each component individually. Under constant growth rate the underlying assumption is that all components grow at a constant rate. The growth rate used for FCFE is usually different than that used for FCFF. Section 3.7.
11. **B** is correct. Free cash flow models assume a control perspective whereas dividend discount models assume a minority perspective. Free cash flow models can be applied to companies with a dividend history. Free cash flow models are suitable for companies whose dividends differ markedly from their capacity to pay dividends. Section 1.
12. **C** is correct. Dividends do not affect free cash flow as they are a distribution of free cash flow and therefore a use of available cash. Section 3.6.
13. **B** is correct. EBITDA does not reflect the effects of working capital and fixed capital investments as they do not appear on the income statement. Section 3.8.
14. **B** is correct. A company that has an exclusive patent will experience different growth rates before and after the expiration of the patent, therefore a two stage model is appropriate. A mature company will likely see growth at a constant rate whereas a startup will go through multiple stages of growth. Section 4.3.
15. **B** is correct. The calculation is as follows:

	<b>1</b>	<b>2</b>	<b>3</b>
FCFF in \$	500.0	550.0	600.0
TV			63,000.0
Total	500.0	550.0	63,600.0
PV (6%)	471.7	489.5	53,399.8
Total PV	54,361.0		
less: debt	(1,500.0)		
Add: cash and equivalents	1,000.0		
<b>Equity Value in \$</b>	<b>53,861.0</b>		

Section 4.3.

16. **C** is correct. The calculation is as follows:

	<b>1</b>	<b>2</b>	<b>3</b>
FCFE	1,944.0	2,099.5	2,267.5
TV (g=3%, r=8%)			46,710.1
Total	1,944.0	2,099.5	48,977.6
PV (r=8%)	1,800.0	1,800.0	38,880.0
<b>Equity value</b>	<b>\$42,480.0</b>		

Section 4.3.

17. **B** is correct. The value of the company is sensitive to both the input variables of growth rate and required rate of return on equity. Section 4.2.

18. **A** is correct. Using the trailing earnings of \$3.5 and trailing P/E of 8, the terminal value in year 2020 is  $3.5 \times 8 = \$28$ . Section 4.3.
19. **B** is correct. The stock's market price is higher than its FCFE value therefore it is overvalued according to FCFE. Its market price is lower than the FCFF value therefore it is undervalued according to FCFF.