

Ch. 6

Free Cash Flow Valuation

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THINK AS IF YOU OWN THE ENTIRE BUSINESS

Your Business

- Sales of \$750k
 - \$100k still to be collected
- Cost of goods sold of \$500k
 - \$75k still to be paid
- SG&A expense of \$100k
- Interest expense of \$5k
- Equipment purchase of \$75k
 - Depreciate over of 5 years
- Tax rate of 35%

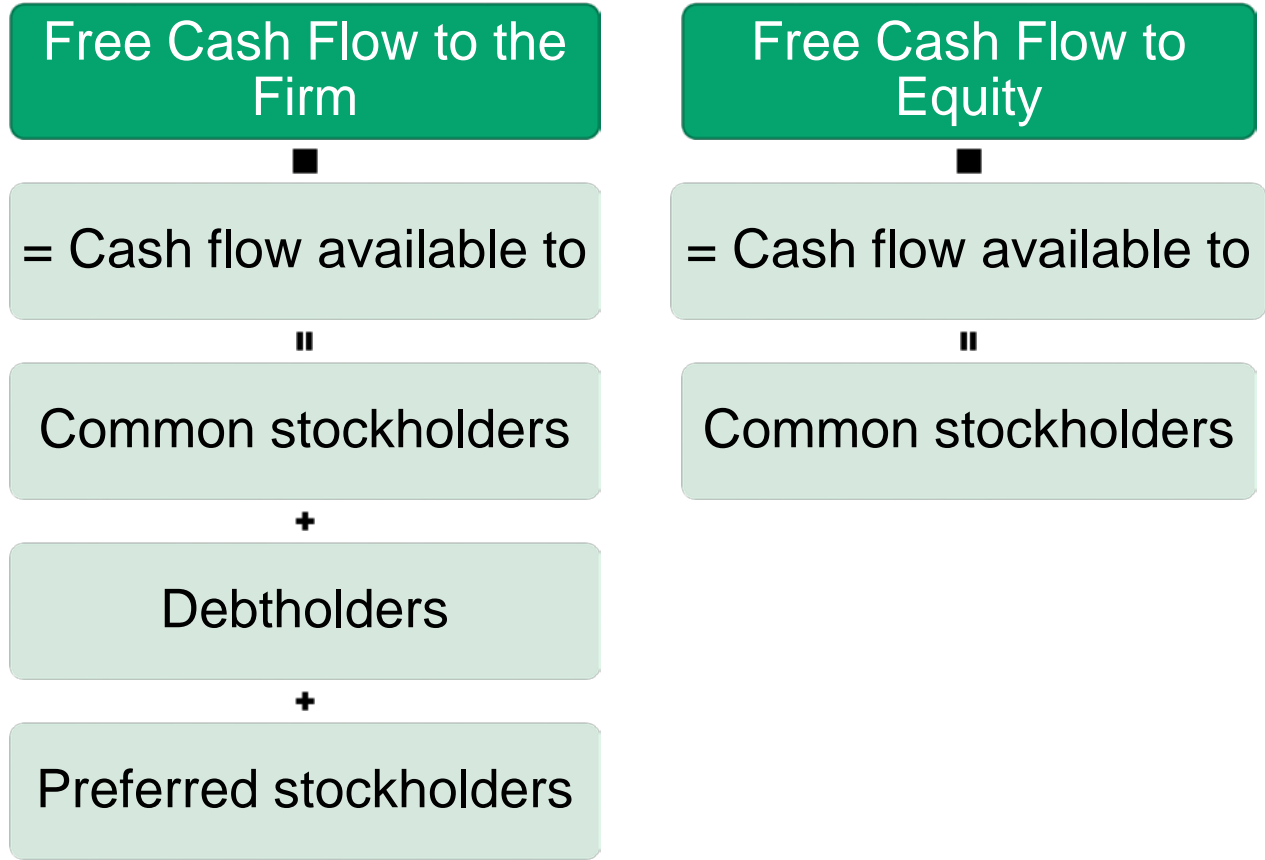
Your Income Statement

Sales	\$750
- <u>COGS</u>	<u>(\$500)</u>
Gross Profit	\$250
- SG&A	(\$100)
- <u>Depreciation</u>	<u>(\$15)</u>
= EBIT	\$135
- <u>Interest exp.</u>	<u>(\$5)</u>
= Taxable Inc	\$130
- <u>Taxes</u>	<u>(\$46)</u>
= Net Income	\$84

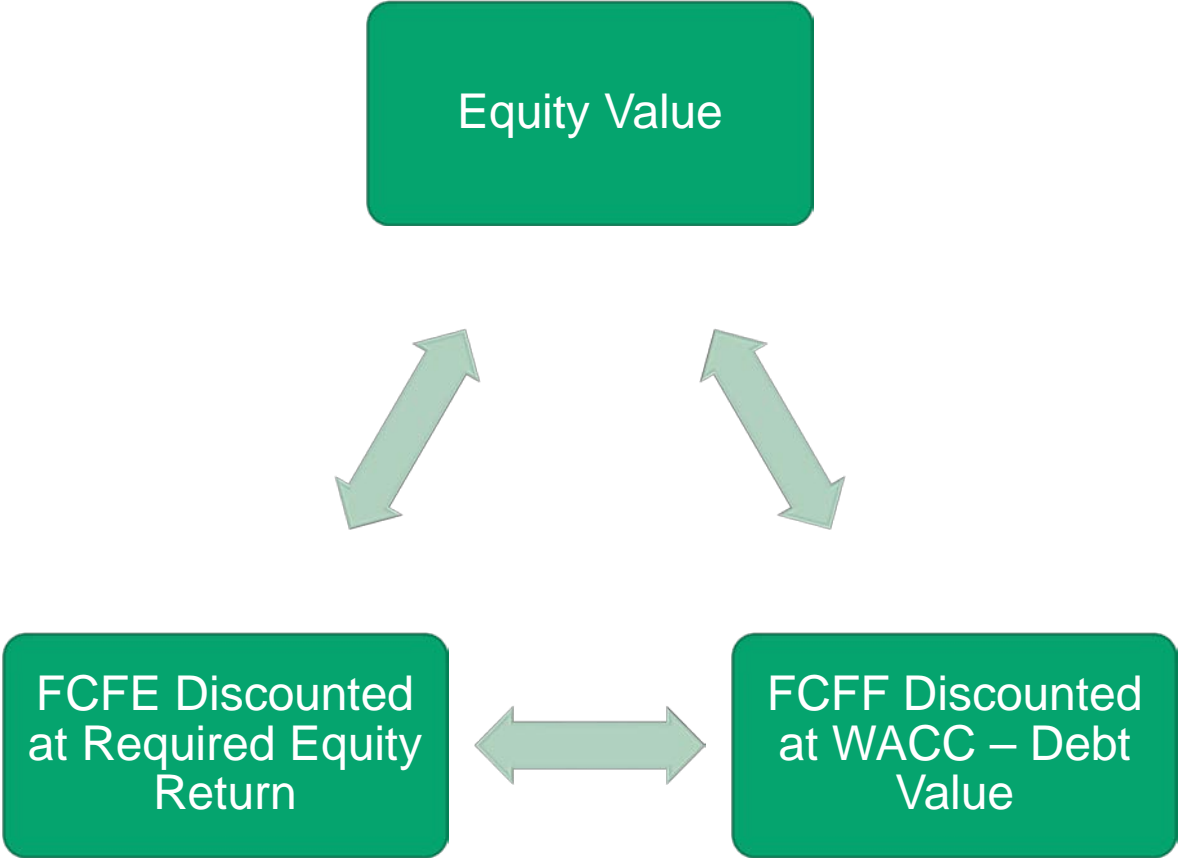
Your REAL Cash Flows

Cash Sales	\$650
COGS	(\$425)
Equipment cost	(\$75)
SG&A	(\$100)
Interest exp.	(\$5)
<u>Taxes</u>	<u>(\$46)</u>
= Cash Flow	-\$1

FREE CASH FLOW



FCFF VS. FCFE APPROACHES TO EQUITY VALUATION



FCFF VS. FCFE APPROACHES TO EQUITY VALUATION

$$\text{Firm value} = \sum_{t=1}^{\infty} \frac{\text{FCFF}_t}{(1 + \text{WACC})^t}$$

Equity value = Firm value – Debt value

$$\text{Equity value} = \sum_{t=1}^{\infty} \frac{\text{FCFE}_t}{(1 + r)^t}$$

SINGLE-STAGE FREE CASH FLOW MODELS

$$\text{Firm value} = \frac{\text{FCFF}_1}{\text{WACC} - g}$$

$$\text{Equity value} = \text{Firm value} - \text{Debt value}$$

$$\text{Equity value} = \frac{\text{FCFE}_1}{r - g}$$

EXAMPLE: SINGLE-STAGE FCFF MODEL

Current FCFF	\$6,000,000
WACC	10.23%
Market value to debt	\$30,000,000
Long-term growth in FCFF	5%
Shares Outstanding	2,900,000

$$\text{Firm value} = \frac{\text{FCFF}_1}{\text{WACC} - g}$$

$$\text{Firm value} = \frac{\$6,000,000 (1.05)}{0.1023 - 0.05} = \$120.5 \text{ million}$$

$$\text{Equity value} = \$120.5 \text{ million} - \$30 \text{ million} = \$90.5 \text{ million}$$

$$\text{Equity value per share} = \$90.5 \text{ million} / 2.9 \text{ million} = \$31.21$$

CALCULATING FCFF

Using Net Income

$$\text{FCFF} = \text{NI} + \text{NCC} + \text{Int} (1 - \text{Tax rate}) - \text{FCInv} - \text{WCInv}$$

Using EBIT or EBITDA

$$\text{FCFF} = \text{EBIT} (1 - \text{Tax rate}) + \text{Dep} - \text{FCInv} - \text{WCInv}$$

$$\text{FCFF} = \text{EBITDA} (1 - \text{Tax rate}) + \text{Dep} (\text{Tax rate}) - \text{FCInv} - \text{WCInv}$$

Using CFO

$$\text{FCFF} = \text{CFO} + \text{Int} (1 - \text{Tax rate}) - \text{FCInv}$$

NONCASH ADJUSTMENTS

Depreciation,
Amortization

- Added back

Restructuring Expense

- Added back

Restructuring Income

- Subtracted out

Capital Gains

- Subtracted out

Capital Losses

- Added back

Deferred Tax Assets/
Liabilities

- We will assume mean reversion

CALCULATING FCFE FROM FCFF, NET INCOME, AND CFO

FCFE from net income (NI) and FCFF:

$$\text{FCFF} = \text{NI} + \text{NCC} + \text{Int}(1 - \text{Tax rate}) - \text{FCInv} - \text{WCInv}$$

$$\text{FCFE} = \text{NI} + \text{NCC} - \text{FCInv} - \text{WCInv} + \text{Net borrowing}$$

FCFE from CFO and FCFF:

$$\text{FCFF} = \text{CFO} + \text{Int}(1 - \text{Tax rate}) - \text{FCInv}$$

$$\text{FCFE} = \text{CFO} - \text{FCInv} + \text{Net borrowing}$$

$$\text{FCFE} = \text{FCFF} - \text{Int}(1 - \text{Tax rate}) + \text{Net borrowing}$$

EXAMPLE: CALCULATING FCFF

EBITDA	\$1,000
Depreciation expense	\$400
Interest expense	\$150
Tax rate	30%
Purchases of fixed assets	\$500
Change in working capital	\$50
Net borrowing	\$80
Common dividends	\$200

$$\text{FCFF} = \text{EBITDA} (1 - \text{Tax rate}) + \text{Dep} (\text{Tax rate}) - \text{FCInv} - \text{WCInv}$$

$$\text{FCFF} = \$1000(1 - 0.30) + \$400(0.30) - \$500 - \$50 = \$270$$

$$\text{EBIT} = \text{EBITDA} - \text{Dep} = \$1000 - \$400 = \$600$$

$$\text{FCFF} = \text{EBIT} (1 - \text{Tax rate}) + \text{Dep} - \text{FCInv} - \text{WCInv}$$

$$\text{FCFF} = \$600(1 - 0.30) + \$400 - \$500 - \$50 = \$270$$

EXAMPLE: CALCULATING FCFE FROM
FCFF, NET INCOME, AND CFO

EBITDA	\$1,000
Depreciation expense	\$400
Interest expense	\$150
Tax rate	30%
Purchases of fixed assets	\$500
Change in working capital	\$50
Net borrowing	\$80
Common dividends	\$200

$$\text{FCFE} = \text{FCFF} - \text{Int}(1 - \text{Tax rate}) + \text{Net borrowing}$$

$$\text{FCFE} = \$270 - \$150(1 - 0.30) + \$80 = \$245$$

$$\text{FCFE} = \text{CFO} - \text{FCInv} + \text{Net borrowing}$$

$$\text{FCFE} = \$665 - \$500 + \$80 = \$245$$

ISSUES IN FCF ANALYSIS

Financial Statement Discrepancies

Dividends vs. FCFE

Effect of Shareholder Cash Flows and Leverage

FCFF and FCFE vs. EBITDA and Net Income

Country Adjustments

Sensitivity Analysis

Nonoperating Assets

SIMPLE TWO-STAGE FCF MODELS

$$\text{Firm value} = \sum_{t=1}^n \frac{\text{FCFF}_t}{(1 + \text{WACC})^t} + \frac{\text{FCFF}_{n+1}}{(\text{WACC} - g)} \frac{1}{(1 + \text{WACC})^n}$$

$$\text{Equity value} = \sum_{t=1}^n \frac{\text{FCFE}_t}{(1 + r)^t} + \frac{\text{FCFE}_{n+1}}{(r - g)} \frac{1}{(1 + r)^n}$$

EXAMPLE: SIMPLE
TWO-STAGE FCFE
MODEL

Current sales per share	\$10
Sales growth for first three years	20%
Sales growth for year 4 and thereafter	5%
Net income margin	10%
FCInv/Sales growth	40%
WCInv/Sales growth	25%
Debt financing of FCInv and WCInv growth	30%
Required return on equity	12%

$$\text{FCFE} = (\text{Sales} \times \text{Net income margin}) - \Delta\text{FCInv} - \Delta\text{WCInv} + \Delta\text{Debt financing}$$

$$\text{FCFE} = (\$12.00 \times 10\%) - (\$2 \times 40\%) - (\$2 \times 25\%) + (\$2 \times 65\% \times 30\%)$$

$$\text{FCFE} = (\$1.20) - (\$0.80) - (\$0.50) + (\$0.39) \quad \text{FCFE} = \$0.29$$

EXAMPLE: SIMPLE TWO-STAGE FCFE MODEL

	<i>Year</i>			
	1	2	3	4
Percentage sales growth	20%	20%	20%	5%
Sales per share	\$12.000	\$14.400	\$17.280	\$18.144
EPS	\$1.200	\$1.440	\$1.728	\$1.814
FCInv per share	\$0.800	\$0.960	\$1.152	\$0.346
WCInv per share	\$0.500	\$0.600	\$0.720	\$0.216
Debt financing per share	\$0.390	\$0.468	\$0.562	\$0.168
FCFE per share	\$0.290	\$0.348	\$0.418	\$1.421
Growth in FCFE		20.0%	20.0%	240.3%

EXAMPLE: SIMPLE TWO-STAGE FCFE MODEL

$$\text{Equity value} = \sum_{t=1}^n \frac{\text{FCFE}_t}{(1+r)^t} + \frac{\text{FCFE}_{n+1}}{(r-g)} \frac{1}{(1+r)^n}$$

$$\text{Equity value} = \frac{\$0.29}{(1.12)^1} + \frac{\$0.348}{(1.12)^2} + \frac{\$0.418}{(1.12)^3} + \frac{\$1.421}{(0.12 - 0.05)} \frac{1}{(1.12)^3}$$

$$\text{Equity value} = \$0.2589 + \$0.2774 + \$0.2975 + \$14.4491 = \$15.28$$