

# **Discounted Cash Flow: Forecast Drivers**

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# Last Time

## Discounted Cash Flow (DCF)

- Free Cash Flow

# This Time Discounted Cash Flow (DCF)

- Forecast Drivers

# Forecast Drivers

$$\begin{aligned} \text{FCF} = & (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ & + \text{Depreciation} - \text{Capital Expenditures} \\ & - \text{Change in Net Working Capital} \end{aligned}$$



$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ + \text{Depreciation} - \text{Capital Expenditures} \\ - \text{Change in Net Working Capital}$$

$$\text{Revenue} = \text{Market Size} \times \text{Market Share} \times \text{Price}$$

$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ + \text{Depreciation} - \text{Capital Expenditures} \\ - \text{Change in Net Working Capital}$$

$$\text{Revenue} = \text{Market Size} \times \text{Market Share} \times \text{Price}$$

#### Project Assumptions

#### Revenue Forecasts

##### Market Forecasts

Initial Market Size (Units, million)

Market Growth Rate

Market Size (Units, million)

Year					
0 (F2008)	1	2	3	4	5

1.00					
	2500.00%	128.0%	9.4%	3.5%	
1.0	26.0	59.3	64.9	67.1	

$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ + \text{Depreciation} - \text{Capital Expenditures} \\ - \text{Change in Net Working Capital}$$

$$\text{Revenue} = \text{Market Size} \times \text{Market Share} \times \text{Price}$$

#### Project Assumptions

#### Revenue Forecasts

##### Market Forecasts

Initial Market Size (Units, million)

Market Growth Rate

Market Size (Units, million)

(Actual Market Size, Units Mil)

Year					
0 (F2008)	1	2	3	4	5

1.00				
	2500.00%	128.0%	9.4%	3.5%
1.0	26.0	59.3	64.9	67.1
1.0	60.0	116.3	195.4	229.0



$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) + \text{Depreciation} - \text{Capital Expenditures} - \text{Change in Net Working Capital}$$

$$\text{Revenue} = \text{Market Size} \times \text{Market Share} \times \text{Price}$$

#### Project Assumptions

#### Revenue Forecasts

##### Market Forecasts

Initial Market Size (Units, million)

Market Growth Rate

Market Size (Units, million)

(Actual Market Size, Units Mil)

##### Corp Market Share

Initial Market Share

Market Share Annual Growth Rate

Market Share

Year					
0 (F2008)	1	2	3	4	5

1.00					
	2500.00%	128.0%	9.4%	3.5%	
1.0	26.0	59.3	64.9	67.1	
1.0	60.0	116.3	195.4	229.0	

25.00%					
	5.00%	5%	5%	5%	
25.0%	26.3%	27.6%	28.9%	30.4%	

$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) + \text{Depreciation} - \text{Capital Expenditures} - \text{Change in Net Working Capital}$$

$$\text{Revenue} = \text{Market Size} \times \text{Market Share} \times \text{Price}$$

#### Project Assumptions

#### Revenue Forecasts

##### Market Forecasts

Initial Market Size (Units, million)

Market Growth Rate

Market Size (Units, million)

(Actual Market Size, Units Mil)

##### Corp Market Share

Initial Market Share

Market Share Annual Growth Rate

Market Share

##### Pricing Strategy

Initial Unit Price (\$/unit)

Bi-Annual Price Increases (\$/unit)

Unit Price (\$/unit)

Year					
0 (F2008)	1	2	3	4	5

1.00					
	2500.00%	128.0%	9.4%	3.5%	
1.0	26.0	59.3	64.9	67.1	
1.0	60.0	116.3	195.4	229.0	

25.00%					
	5.00%	5%	5%	5%	
25.0%	26.3%	27.6%	28.9%	30.4%	

200.00					
	-	49.99	-	49.99	
200.00	200.00	249.99	249.99	299.98	

$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ + \text{Depreciation} - \text{Capital Expenditures} \\ - \text{Change in Net Working Capital}$$

$$\text{Costs} = \text{Cost Margin} \times \text{Revenue}$$

#### Project Assumptions

#### Operating Expenses

COGS

COGS / Sales (% Sales)

SG&A

1% of 2008 Company SG&A (\$mil)

SG&A Expense Growth Rate

Year					
0 (F2008)	1	2	3	4	5

80.66%	80.66%	80.66%	80.66%	80.66%	80.66%
--------	--------	--------	--------	--------	--------

69.59
-------

25.00%	25.00%	25.00%	25.00%
--------	--------	--------	--------

$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) + \text{Depreciation} - \text{Capital Expenditures} - \text{Change in Net Working Capital}$$

$$\text{Costs} = \text{R\&D Expenditures}$$

#### Project Assumptions

#### Operating Expenses

##### COGS

COGS / Sales (% Sales)

##### SG&A

1% of 2008 Company SG&A (\$mil)

SG&A Expense Growth Rate

##### R&D

R&D Upfront (\$mil)

R&D for Versioning (\$mil)

Year					
0 (F2008)	1	2	3	4	5

80.66%	80.66%	80.66%	80.66%	80.66%	80.66%
--------	--------	--------	--------	--------	--------

69.59
-------

25.00%	25.00%	25.00%	25.00%
--------	--------	--------	--------

200.00
--------

25.00	25.00	25.00	25.00	25.00
-------	-------	-------	-------	-------

$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ + \text{Depreciation} - \text{Capital Expenditures} \\ - \text{Change in Net Working Capital}$$

## Capital Expenditures

### Project Assumptions

#### Capital Expenditures & PP&E Information

Initial Investment (Fixed Cost, \$mil)

Future Investment (% of initial Investment)

Future Investment (Annual Growth)

Year					
0 (F2008)	1	2	3	4	5
227.70					
	10.0%				
		5.0%	1.0%	1.0%	1.0%

$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ + \text{Depreciation} - \text{Capital Expenditures} \\ - \text{Change in Net Working Capital}$$

## Capital Expenditures

### Project Assumptions

### Capital Expenditures & PP&E Information

Initial Investment (Fixed Cost, \$mil)

Future Investment (% of initial Investment)

Future Investment (Annual Growth)

PP&E Liquidation Value

	Year				
0 (F2008)	1	2	3	4	5
227.70					
	10.0%				
		5.0%	1.0%	1.0%	1.0%
50.00%	50.0%	50.0%	50.0%	50.0%	50.0%

$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ + \text{Depreciation} - \text{Capital Expenditures} \\ - \text{Change in Net Working Capital}$$

## Depreciation

### Project Assumptions

#### Capital Expenditures & PP&E Information

Initial Investment (Fixed Cost, \$mil)

Future Investment (% of initial Investment)

Future Investment (Annual Growth)

PP&E Liquidation Value

PP&E life for depreciation (Years)

\*Straight line depreciation

	Year				
0 (F2008)	1	2	3	4	5
227.70					
	10.0%				
		5.0%	1.0%	1.0%	1.0%
50.00%	50.0%	50.0%	50.0%	50.0%	50.0%
5.00	5	5	5	5	5

$$\begin{aligned} \text{FCF} = & (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ & + \text{Depreciation} - \text{Capital Expenditures} \\ & - \text{Change in Net Working Capital} \end{aligned}$$

$$\text{Net Working Capital} = \text{Cash} + \text{Inventory} + \text{AR} - \text{AP}$$



$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ + \text{Depreciation} - \text{Capital Expenditures} \\ - \text{Change in Net Working Capital}$$

$$\text{Net Working Capital} = \text{Cash} + \text{Inventory} + \text{AR} - \text{AP}$$

#### Project Assumptions

#### Working Capital Assumptions

##### Cash Requirements

% of SG&A

% R&D Expenditures

Year					
0 (F2008)	1	2	3	4	5

50.00%	50%	50%	50%	50%	50%
100.00%	100%	100%	100%	100%	100%

$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ + \text{Depreciation} - \text{Capital Expenditures} \\ - \text{Change in Net Working Capital}$$

$$\text{Net Working Capital} = \text{Cash} + \text{Inventory} + \text{AR} - \text{AP}$$

#### Project Assumptions

#### Working Capital Assumptions

##### Cash Requirements

% of SG&A

% R&D Expenditures

##### Inventory

Inventory Days (365 x Inventory / COGS)

Excess Inventory liquidation value (% of Inventory Cost)

Year					
0 (F2008)	1	2	3	4	5

50.00%	50%	50%	50%	50%	50%
100.00%	100%	100%	100%	100%	100%

7.58	7.58	7.58	7.58	7.58	7.58
					25.00%

$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ + \text{Depreciation} - \text{Capital Expenditures} \\ - \text{Change in Net Working Capital}$$

$$\text{Net Working Capital} = \text{Cash} + \text{Inventory} + \text{AR} - \text{AP}$$

#### Project Assumptions

#### Working Capital Assumptions

##### Cash Requirements

% of SG&A

% R&D Expenditures

##### Inventory

Inventory Days (365 x Inventory / COGS)

Excess Inventory liquidation value (% of Inventory Cost)

##### Accounts Receivable

Days Receivable (365 x Accounts Receivable / Sales)

Year					
0 (F2008)	1	2	3	4	5

50.00%	50%	50%	50%	50%	50%
100.00%	100%	100%	100%	100%	100%

7.58	7.58	7.58	7.58	7.58	7.58
					25.00%

38.49	38.49	38.49	38.49	38.49	38.49
-------	-------	-------	-------	-------	-------

$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ + \text{Depreciation} - \text{Capital Expenditures} \\ - \text{Change in Net Working Capital}$$

$$\text{Net Working Capital} = \text{Cash} + \text{Inventory} + \text{AR} - \text{AP}$$

#### Project Assumptions

#### Working Capital Assumptions

##### Cash Requirements

% of SG&A

% R&D Expenditures

##### Inventory

Inventory Days (365 x Inventory / COGS)

Excess Inventory liquidation value (% of Inventory Cost)

##### Accounts Receivable

Days Receivable (365 x Accounts Receivable / Sales)

##### Accounts Payable

Days Payable (365 x Accounts Payable / COGS)

Year					
0 (F2008)	1	2	3	4	5

50.00%	50%	50%	50%	50%	50%
100.00%	100%	100%	100%	100%	100%

7.58	7.58	7.58	7.58	7.58	7.58
					25.00%

38.49	38.49	38.49	38.49	38.49	38.49
-------	-------	-------	-------	-------	-------

61.54	61.54	61.54	61.54	61.54	61.54
-------	-------	-------	-------	-------	-------

$$\begin{aligned} \text{FCF} = & (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ & + \text{Depreciation} - \text{Capital Expenditures} \\ & - \text{Change in Net Working Capital} \end{aligned}$$

$$\begin{aligned} \Delta \text{ Net Working Capital} = & \text{Net Working Capital (t)} \\ & - \text{Net Working Capital (t-1)} \end{aligned}$$

where  $\Delta$  = change over one period

$$\text{FCF} = (\text{Revenue} - \text{Costs} - \text{Depreciation}) \times (1 - t_c) \\ + \text{Depreciation} - \text{Capital Expenditures} \\ - \text{Change in Net Working Capital}$$

## Taxes

We want the marginal tax rate (MTR)  
=  
Tax rate on additional \$ of earnings  
25.5%

**This is Nonsense!**

**This is Nonsense!**

Impossible to make accurate forecasts!



**This is Nonsense!**

Impossible to make accurate forecasts!

I agree, but that's not the point!!!!

**Lesson:** Point of DCF is to focus discussion and analysis on relevant issues

**Lesson:** Successful valuation (i.e., decision making) depends critically on input from non-finance personnel

# Summary

# Lessons

- **Forecast Drivers** are the assumptions used to populate our free cash flow forecasts
- Goal is to establish framework for discussion
  - Think about value drivers

# Coming up next

- Discounted Cash Flow (DCF)
  - Forecasting free cash flow