

**Financial Statement Analysis & Valuation, 5<sup>th</sup> Edition  
by Easton, McAnally, Sommers, & Zhang**

**Practice Quiz Solutions**

**Module 14 – Operating Income Based Valuation**

1. Penn Company reports net operating profit after tax (NOPAT) of \$3,306 million in 2017. Its net operating assets at the beginning of 2017 are \$10,215 million.

Assuming a 6.66% weighted average cost of capital (WACC), what is Penn's residual operating income for 2017?

- a. \$ 864 million
- b. \$2,626 million
- c. \$1,699 million
- d. \$3,305 million

Answer: b

$\$3,306 \text{ million} - (6.66\% \times \$10,215 \text{ million}) = \$2,626 \text{ million}.$

2. In its 2017 fiscal year annual report, BrandCo reports 2017 net operating income after tax (NOPAT) of \$4,140 million. As of the beginning of fiscal year 2017 it reports net operating assets of \$13,529 million.

At what level of WACC would BrandCo not report positive residual operating income for 2017?

- a. 5.8%
- b. 12.3%
- c. 19.1%
- d. 30.6%

Answer: d

BrandCo will earn a positive ROPI up to a WACC of 30.6%.

At this level of WACC,  $\text{ROPI} = (\$13,529 \text{ million}) \times 30.6\% = \$4,140$ , the level of NOPAT.

3. Following are forecasts of Baker Company's sales, net operating profit after tax (NOPAT), and net operating assets (NOA) as of January 31, 2017.

(in millions)	Reported 2017	Horizon Period				Terminal Period
		2018	2019	2020	2021	
Sales	\$2,785	\$3,838	\$5,289	\$7,288	\$10,043	\$10,244
NOPAT	330	455	627	864	1,190	1,214
NOA	533	735	1,012	1,395	1,922	1,961

Assuming a terminal period growth rate of 2%, a discount rate (WACC) of 13%, common shares outstanding of 103.3 million, and net nonoperating obligations (NNO) of \$(462) million (negative NNO reflects net investments rather than net obligations), estimate the value of a share of Baker common stock using the residual operating income (ROPI) model as of January 31, 2017.

- \$79.90
- \$78.27
- \$74.32
- \$69.78

Answer: a

Baker Company (\$ millions)	Current 2017	Forecast Horizon				Terminal Year
		2018	2019	2020	2021	
Sales.....	\$2,785	\$3,838	\$5,289	\$7,288	\$10,043	\$10,244
NOPAT .....	330	455	627	864	1,190	1,214
NOA.....	533	735	1,012	1,395	1,922	1,961
ROPI Model						
ROPI (NOPAT – [NOA <sub>Beg</sub> × r <sub>w</sub> ]) .....		\$ 386	\$ 531	\$ 732	\$ 1,009	\$ 964
Discount factor [1 / (1 + r <sub>w</sub> ) <sup>t</sup> ] .....		0.88496	0.78315	0.69305	0.61332	
Present value of horizon ROPI .....		342	416	507	619	
Cum present value of horizon ROPI .....	\$1,884					
Present value of terminal ROPI .....	5,375					
NOA .....	533					
Total firm value .....	\$7,792					
Less NNO (Plus negative NNO) .....	(462)					
Firm equity value .....	<u>8,254</u>					
Shares outstanding (millions) .....	103.3					
Stock value per share .....	\$ 79.90					

4. Assume the following is the balance sheet for 3M Company.

<b>Balance Sheet at December 31</b>		
<b>(\$ millions)</b>	<b>2016</b>	<b>2015</b>
<b>Assets</b>		
Cash and cash equivalents	\$ 1,072	\$ 2,757
Accounts receivable, net	2,538	2,792
Inventories	2,162	1,897
Other current assets	<u>1,343</u>	<u>1,274</u>
Total current assets	7,115	8,720
Investments	272	227
Property, plant and equipment, net	5,593	5,711
Goodwill	3,473	2,655
Intangible assets, net	486	277
Prepaid pension and postretirement benefits	2,905	2,591
Other assets	<u>669</u>	<u>527</u>
Total assets	<u>\$20,513</u>	<u>\$20,708</u>
<b>Liabilities and Stockholders' equity</b>		
Current portion of long-term debt	\$ 1,072	\$ 2,094
Accounts payable	1,256	1,168
Accrued payroll	469	487
Accrued income taxes	989	867
Other current liabilities	<u>1,452</u>	<u>1,455</u>
Total current liabilities	5,238	6,071
Long-term debt	1,309	727
Other liabilities	<u>3,866</u>	<u>3,532</u>
Total liabilities	10,413	10,330
<b>Stockholders' equity</b>		
Common stock	9	9
Capital in excess of par value	267	287
Retained earnings	17,358	15,781
Treasury stock	(6,965)	(5,503)
Accumulated other comprehensive income	<u>(569)</u>	<u>(196)</u>
Stockholders' equity	<u>10,100</u>	<u>10,378</u>
Total liabilities and stockholders' equity	<u>\$20,513</u>	<u>\$20,708</u>

Compute net operating assets (NOA) for 2016.

- a. \$12,481 million
- b. \$13,465 million
- c. \$11,137 million
- d. \$16,075 million

Answer: c

$$\begin{aligned}
 \text{NOA} &= \$20,513 - 1,072 - \$272 - \$1,256 - \$469 - \$989 - \$1,452 - \$3,866 \\
 &= \$11,137 \text{ million}
 \end{aligned}$$

5. Assume the following is the income statement for 3M Company.

<b>Income Statement Year Ended December 31</b>	
<b>(\$ millions)</b>	<b>2016</b>
Net sales	
Operating expenses	\$21,167
Cost of sales	10,381
Selling, general and administrative expenses	4,535
Research, development and related expenses	<u>1,242</u>
Total	<u>16,158</u>
Operating income	5,009
Interest expense, net	<u>26</u>
Income before taxes and noncontrolling interest	4,983
Provision for income taxes	1,694
Noncontrolling interest	<u>55</u>
Net income	<u>\$ 3,234</u>

Compute net operating profit after tax (NOPAT) for 2016, assuming a federal and state statutory tax rate of 37%.

- a. \$3,315 million
- b. \$3,305 million
- c. \$5,009 million
- d. \$3,289 million

Answer: b

$$\begin{aligned}\text{NOPAT} &= \$5,009 - (\$1,694 + [\$26 \times 37\%]) \\ &= \$3,305 \text{ million}\end{aligned}$$

6. Assume that the following are forecasts of 3M Company's sales, net operating profit after tax (NOPAT), and net operating assets (NOA) as of December 31, 2017.

(in millions)	Reported 2017	Horizon Period				Terminal Period
		2018	2019	2020	2021	
Sales	\$21,167	\$22,395	\$23,694	\$25,068	\$26,522	\$26,787
NOPAT	3,306	3,498	3,701	3,916	4,143	4,184
NOA	11,137	11,787	12,471	13,194	13,959	14,098

Assuming a terminal period growth rate of 1%, a discount rate (WACC) of 7%, common shares outstanding of 754.5 million, and net nonoperating obligations (NNO) of \$1,037 million, estimate the value of a share of 3M's common stock using the residual operating income (ROPI) model as of December 31, 2017.

- \$71.32
- \$75.41
- \$80.67
- \$83.14

Answer: c

3M (\$millions)	Current	Forecast Horizon				Terminal Year
	2017	2018	2019	2020	2021	
Sales.....	\$21,167	\$22,395	\$23,694	\$25,068	\$26,522	\$26,787
NOPAT .....	3,306	3,498	3,701	3,916	4,143	4,184
NOA .....	11,137	11,787	12,471	13,194	13,959	14,098

ROPI Model

ROPI (NOPAT – [NOA <sub>Beg</sub> × r <sub>w</sub> ]) .....		\$ 2,718	\$ 2,876	\$ 3,043	\$ 3,219	\$ 3,207
Discount factor [1 / (1 + r <sub>w</sub> ) <sup>t</sup> ] .....		0.93458	0.87344	0.81630	0.76290	
Present value of horizon ROPI .....		2,540	2,512	2,484	2,456	
Cum present value of horizon ROPI	\$ 9,992					
Present value of terminal ROPI .....	40,777					
NOA .....	11,137					
Total firm value .....	61,906					
Less NNO .....	1,037					
Firm equity value .....	<u>\$60,869</u>					
Shares outstanding (millions) .....	754.5					
Stock value per share .....	<u>\$ 80.67</u>					

7. Assume the following is the balance sheet for Intel Corporation.

<b>Balance Sheet At December 31 (\$ millions)</b>	<b>2016</b>	<b>2015</b>
<b>Assets</b>		
Cash and cash equivalents	\$ 7,324	\$ 8,407
Short-term investments	5,448	8,765
Accounts receivable, net	3,914	2,999
Inventories	3,126	2,621
Deferred tax assets	1,149	979
Other current assets	<u>233</u>	<u>287</u>
Total current assets	\$21,194	\$24,058
Property, plant and equipment, net	17,111	15,768
Marketable equity securities	537	656
Other long-term investments	4,135	2,563
Goodwill	3,873	3,719
Deferred taxes and other assets	<u>1,464</u>	<u>1,379</u>
Total assets	<u>\$48,314</u>	<u>\$48,143</u>
<b>Liabilities and Stockholders' equity</b>		
Current portion of long-term debt	\$ 313	\$ 201
Accounts payable	2,249	1,943
Accrued compensation	2,110	1,858
Accrued advertising	1,160	894
Deferred income on shipments to distributors	632	592
Other accrued liabilities	810	1,355
Income taxes payable	<u>1,960</u>	<u>1,163</u>
Total current liabilities	9,234	8,006
Long-term debt	2,106	703
Deferred tax liabilities	703	855
Other long-term liabilities	89	0
<b>Stockholders' equity</b>		
Preferred stock	--	--
Common stock	6,245	6,143
Accumulated other comprehensive income	127	148
Retained earnings	<u>29,810</u>	<u>32,288</u>
Stockholders' equity	<u>36,182</u>	<u>38,579</u>
Total liabilities and stockholders' equity	<u>\$48,314</u>	<u>\$48,143</u>

Compute Intel's net nonoperating assets (NNO) for year-end 2016.

- a. \$ (7,701) million
- b. \$ 3,879 million
- c. \$ 19,863 million
- d. \$(15,025) million

Answer: d

$$\begin{aligned}
 \text{2016 NNO} &= \text{Nonoperating liabilities} && - && \text{Nonoperating assets} \\
 &= (\$313 + \$2,106) && - && (\$7,324 + \$5,448 + \$537 + \$4,135) = \$ (15,025) \text{ million}
 \end{aligned}$$