4-1 Greene Sisters has a DSO [Daily Sales Outstanding] of 20 days. The company’s average daily sales are $20,000. What is the level of its accounts receivable? Assume there are 365 days in the year.

\[
\text{DSO} = 20; \quad \text{Average Daily Sale} = \frac{\$20,000}{365} = \text{Sale}.
\]

\[
\text{DSO} = \frac{\text{AIR}}{\text{Average Daily Sale}} = 20 \Rightarrow 20 \times \frac{\text{AIR}}{\text{Sale}} = 20 \times \text{Sale}.
\]

\[
20 \times 20,000 = \text{AIR}
\]

\[
\$400,000 = \text{AIR}
\]

4-2 Vigo Vacations has an equity multiplier of 2.5. The company’s assets are financed with some combination of long-term debt and common equity. What is the company’s debt ratio?

\[
2.5 = \text{Equity Multiplier} = \frac{\text{A/E}}{\# \text{times equity turns over in assets}}
\]

\[
\text{DR} = \frac{\text{D/A}}{\text{E/A}}
\]

\[
\frac{1}{\text{A/E}} = \frac{\text{E/A}}{\text{D/A}}
\]

\[
1 - \frac{\text{E/A}}{\text{A}} = 1 - \frac{1}{\text{A/E}} = 1 - \frac{1}{2.5} = 1 - 0.40 = 0.60 \text{ or } 60\%
\]

4-4 A Company has an EPS of $1.50, a cash flow per share of $3.00, and a price/cash flow ratio of 8.0 times. What is its P/E ratio?

\[
\text{EPS} = \$1.50; \quad \text{CFPS} = \$3.00; \quad \text{P/CF} = 8 \times
\]

\[
\frac{\text{P}}{\text{CF}} = 8 \quad \Rightarrow \quad \text{P} = \$24
\]

\[
\text{P/E} = \frac{\$24}{\$1.50} = 16.0
\]

4-6 Donaldson & Son has a ROA of 10%, a 2% profit margin, and a return on equity equal to 15%. What is the company’s total assets turnover? What is the firm’s equity multiplier?

\[
\text{ROA} = 10\%; \quad \text{PM} = 2\%; \quad \text{ROE} = 15\%
\]

\[
\text{PM} = \frac{\text{NI}}{\text{Sales}} \Rightarrow \text{ROA} = \frac{\text{NI}}{\text{TA}} = \frac{\text{NI}}{\text{Sales}} \times \frac{\text{Sales}}{\text{TA}}
\]

\[
\frac{\text{NI}}{\text{TA}} = \text{PM} \times \frac{\text{TA}}{\text{NI}}
\]

\[
10\% = 2\% \times \text{TA} \times \text{NI} \Rightarrow \text{TA} = 5
\]

\[
\text{Now, ROE} = \text{PM} \times \text{TA} \times \text{NI} \times \text{EM} \quad \text{[Equity Multiplier]}
\]

\[
15\% = 2\% \times 5 \times \text{EM}
\]

\[
15\%/2\% = \text{EM} = 1.5
\]
4-8 Assume you are given the following relationships for the Clayton Corporation.  

Sales/Total Assets \(1.5X\) \(= TATO\)  
Return on Assets \([ROA]\) \(3\%\)  
Return on Equity \([ROE]\) \(5\%\)  

Calculate Clayton’s profit margin and debt ratio.  

\[\text{Du Pont Equation: } \text{ROA} = \text{PM} \times \text{TATO} \]  
\[3\% = \text{PM} \times 1.5 \Rightarrow \text{PM} \approx 3\% \times 2\% \]  

Similar,  

\[\text{Du Pont Equation: } \text{ROE} = \text{ROA} \times \text{EM} \]  
\[5\% = 3\% \times \text{EM} \Rightarrow \text{EM} = \frac{5}{3} = \frac{TA}{E} \]  

\[\Rightarrow \frac{E}{TA} = \frac{3}{5} \text{ or } 60\% \]  
\[1 - \frac{E}{TA} = \text{DR} \]  
So,  
\[\text{DR} = 1 - 60\% = 40\% \]  

4-9 The Nelson Company has $1,312,500 in current assets and $525,000 in current liabilities. Its initial inventory level is $375,000 and it will raise funds as additional notes payable and use them to increase inventory. How much can Nelson’s short-term debt (notes payable) increase without pushing its current ratio below 2.0 [i.e. violate a debt covenant]? What will be the firm’s quick ratio after Nelson has raised the maximum amount of short-term funds?  

\[\text{CR} = \frac{CA}{CL} = \frac{\$1,312,500}{\$525,000} = 2.5\]  

Minimum CR \[\frac{2}{1} = \frac{\$1,312,500 + \Delta NP}{\$525,000 + \Delta NP} \]  

\[\$1,312,500 + \Delta NP = 2 \left( \frac{\$525,000 + \Delta NP}{2} \right) \]  
\[\$1,312,500 + \Delta NP = 2 \times \$1,050,000 + 2 \Delta NP \]  
\[\Delta NP = \$262,500 \]  

So, Short-term debt \((\Delta NP)\) can increase by a maximum of $262,500 without violating the debt covenant (i.e. CR ≥ 2).  

Assuming this amount will be used to increase current assets. Since the amount is assumed to be used to fund inventory,  

\[\text{New inventory} = \$375,000 + \$262,500 = \$637,500 \]  

\[\text{CA} = \$1,312,500 + \$262,500 = \$1,575,000 \]  

\[\text{QR} = \frac{\$1,575,000 - \$637,500}{\$525,000 + \$262,500} = 1.19 \]
Data for Morton Chip Company and its industry averages follow:

a. Calculate the indicated ratios for Morton.
b. Construct the extended Du Pont equation for both Morton and the industry.
c. Outline Morton’s strengths and weaknesses as revealed by your analysis.
d. Suppose Morton had doubled its sales as well as its inventories, accounts receivable, and common equity during 2007. How would that information affect the validity of your ratio analysis? [Hint: Think about averages and the effects of rapid growth on ratios if averages are not used. No calculations are needed.]

Morton Chip Company: Balance Sheet as of December 31, 2007 (In Thousands)

<table>
<thead>
<tr>
<th></th>
<th>Morton Chip Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>$77,500</td>
</tr>
<tr>
<td>Receivables</td>
<td>336,000</td>
</tr>
<tr>
<td>Inventories</td>
<td>241,500</td>
</tr>
<tr>
<td>Total CA</td>
<td>$655,000</td>
</tr>
<tr>
<td>Net Fixed Assets</td>
<td>292,500</td>
</tr>
<tr>
<td>Total Assets</td>
<td>$947,500</td>
</tr>
<tr>
<td>Accounts Payable</td>
<td>$129,000</td>
</tr>
<tr>
<td>Notes Payable</td>
<td>84,000</td>
</tr>
<tr>
<td>Other Current Liabilities</td>
<td>117,000</td>
</tr>
<tr>
<td>Total CL</td>
<td>$330,000</td>
</tr>
<tr>
<td>Long-Term Debt</td>
<td>256,500</td>
</tr>
<tr>
<td>Common Equity</td>
<td>361,000</td>
</tr>
<tr>
<td>Total Liabilities + Equity</td>
<td>$947,500</td>
</tr>
</tbody>
</table>

Morton Chip Company: Income Statement for Year Ended December 31, 2007 (In Thousands)

<table>
<thead>
<tr>
<th></th>
<th>Morton Chip Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$1,607,500</td>
</tr>
<tr>
<td>Cost of Goods Sold</td>
<td>1,392,500</td>
</tr>
<tr>
<td>Selling, general, and Admin. Expenses</td>
<td>145,000</td>
</tr>
<tr>
<td>EBIT</td>
<td>$ 70,000</td>
</tr>
<tr>
<td>Interest Expense</td>
<td>24,500</td>
</tr>
<tr>
<td>EBT</td>
<td>$ 45,500</td>
</tr>
<tr>
<td>Federal and State Income Taxes [40%]</td>
<td>18,200</td>
</tr>
<tr>
<td>Net Income</td>
<td>$ 27,300</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Morton Chip Company</th>
<th>Industry Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA/CL</td>
<td>2.0X</td>
<td></td>
</tr>
<tr>
<td>DSO</td>
<td>35.0 days</td>
<td></td>
</tr>
<tr>
<td>Sales/Inventory [Inventory Turnover]</td>
<td>6.7X</td>
<td></td>
</tr>
<tr>
<td>Sales/Fixed Assets [Fixed Asset Turnover]</td>
<td>12.1X</td>
<td></td>
</tr>
<tr>
<td>Sales/Total Assets [Total Asset Turnover]</td>
<td>3.0X</td>
<td></td>
</tr>
<tr>
<td>Net Income/Sales [Profit Margin on Sales]</td>
<td>3.6%</td>
<td></td>
</tr>
<tr>
<td>NI/Equity [ROE]</td>
<td>9.0%</td>
<td></td>
</tr>
<tr>
<td>Total Debt/Total Assets [Debt Ratio]</td>
<td>60.0%</td>
<td></td>
</tr>
</tbody>
</table>
Note: DSO is based on a 365-day year.

\[ CR = \frac{CA}{CL} = \frac{\$655,800}{\$30,100} = 19.8x \]
\[ DSO = \frac{A/8}{Sales/365} = \frac{\$336,820}{\$4,404,111} = 76 \text{ days} \]
\[ \frac{Sales/Inventory}{Sales/\text{Fixed Assets}} = \frac{\$1,607,500}{\$292,500} = 5.50x \]
\[ \frac{Sales/TA}{\text{Fixed Assets}} = \frac{\$1,607,500}{\$947,500} = 1.70x \]
\[ \frac{NI/Sales}{Sales/\text{Fixed Assets}} = \frac{\$27,300}{\$1,607,500} = 1.7\% \]
\[ \frac{NI/TA}{\text{Fixed Assets}} = \frac{\$273,000}{\$947,500} = 2.9\% \]
\[ \frac{NI/E}{\text{Fixed Assets}} = \frac{\$27,300}{\$361,800} = 7.6\% \]
\[ DR = \frac{D/TA}{\text{Fixed Assets}} = \frac{\$582,500}{\$947,500} = 61.9\% \]

(b) DuPont Equation:

\[ ROE = PM \times TAT \times EM \]
\[ 7.6\% = 1.7\% \times 1.7 \times \frac{\$947,500}{\$361,800} \]
\[ = 1.7\% \times 1.7 \times 2.62 \]

Industry: 9.0\% = 1.2\% \times 3 \times 3.5

Morton has a better PM, but greater DSO, Fixed asset turnover, TAT, than the industry.
C) Wrap-up Morton's daily sale, outstanding is more than twice as long as the industry average— which may indicate the firm is financing a great deal of its sale through accounts receivable. Morton should consider tightening its credit policy and instituting better collection policies.

The total asset turnover ratio is below the industry average indicating higher asset levels per unit of sales. Morton should seek to address this issue by increasing sales and/or decreasing assets particularly in the area of AR. Note though that a trade-off may be a trade-off to tighter credit and AR, but it is likely to decrease sales. On the other hand, higher sales is due to customers who represent a higher profit margin, but when looking at the DuPont eq margin, it is apparent the advantage is lost due to the higher level of assets than the industry average.
4-13

If 2007 represents a period of supernormal growth for the firm, ratios based on this year will be distorted and a comparison between them and the industry average will have little meaning. Potential investors who look only at 2006 ratios will be misled and a return to normal conditions in 2008 could hurt the firm's stock price if shareholders have come to expect continuing growth at an above average level.

Note: Supernormal growth is much easier to demonstrate for a small, emerging company. However, as the firm matures, and the asset base increases, it may be difficult to generate the same ROA. Consequently, investing in small, emerging growth companies is viewed as having a greater degree of risk relative to earning consistency and growth.