Working Capital and Cash Conversion Cycle

Jarrod Goentzel
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Balance sheet

• Snapshot of the firm’s value

• Assets
  – Current: cash, marketable securities, accounts receivable, inventories
  – Long-term: property, plant, equipment (less accumulated depreciation)
  – Intangible: patents, goodwill...“growth assets”

• Liabilities
  – Current: accounts payable, notes payable,...
  – Long-term: notes, bonds, deferred income taxes,...

• Shareholders’ equity (a.k.a. net worth)
  – Stock: preferred, common
  – Retained earnings
Income statement

- Describes performance between snapshots
- Explains why retained earnings has changed over time

Revenue or Sales (net of markdowns)
Cost of goods sold (COGS)
**GROSS INCOME**
Operating expenses (a.k.a. Selling, general & administrative, or SG&A)
**OPERATING INCOME**
Depreciation & amortization
**OPERATING INCOME**
Interest expense
Other non-operating expenses/income
Income taxes
Extraordinary items
**NET INCOME**

Working capital

- Working capital is required to...
  - operate the business
  - serve the customers
  - deal with some variation in the timing of cash flows

- Working capital is a basic measure of both a company’s efficiency and its short-term financial health
  - Too much: may indicate inefficient use of resources, low return
  - Not enough: may indicate potential cash flow problems, high risk

- Working capital analysis considers the...
  - Magnitude of each component
  - Timing of the cash flows
Working capital

- **Working Capital = Current Assets - Current Liabilities**
  - Cash conversion cycle: Accounts Receivable, Inventory, Accounts Payable
  - Other: Cash, short term investments, short term debt

- **Working capital requirements are an investment**
  - Firm finances A/R and inventory
  - Firm receives financing from suppliers in the form of A/P
  - WC Requirement = A/R + Inventory – A/P + Other

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Working capital requirements exercise

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<tbody>
<tr>
<td>Sales (Net)</td>
<td></td>
<td>2.013</td>
<td>3.198</td>
<td>155,427</td>
<td>155,929</td>
<td>249,484</td>
<td>227,030</td>
</tr>
<tr>
<td>Cost of Goods Sold</td>
<td></td>
<td>1.451</td>
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<td>130,909</td>
<td>131,657</td>
<td>189,845</td>
<td>170,529</td>
</tr>
<tr>
<td>Inventories - Total</td>
<td></td>
<td>340</td>
<td>954</td>
<td>14,039</td>
<td>13,642</td>
<td>18,399</td>
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<tr>
<td>Receivables - Total (Net)</td>
<td></td>
<td>49</td>
<td>227</td>
<td>22,813</td>
<td>25,606</td>
<td>77,844</td>
<td>73,352</td>
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<td>Accounts Payable</td>
<td></td>
<td>304</td>
<td>776</td>
<td>23,621</td>
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</tr>
</tbody>
</table>

Working Capital Required
Working Capital Investment 2014

Data Source: S&P Capital IQ
Working capital

• Working Capital = Current Assets - Current Liabilities
  – Cash conversion cycle: Accounts Receivable, Inventory, Accounts Payable
  – Other: Cash, short term investments, short term debt
• Working capital requirements are an investment
  – WC Requirement = A/R + Inventory – A/P + Other
• In order to reduce working capital requirements
  – Collect payment as quickly as possible
  – Keep stock levels as low as possible
  – Delay paying suppliers as long as possible

SC Finance Practices & Impact on WC

<table>
<thead>
<tr>
<th>Practice</th>
<th>Working Capital</th>
<th>Potential Tradeoff</th>
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<tr>
<td>Extended payment terms from suppliers</td>
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<tr>
<td>Discount for early payment by customers</td>
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<td></td>
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<tr>
<td>Finance raw materials &amp; WIP for small suppliers</td>
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<tr>
<td>3PL finances Vendor Managed Inventory (VMI)</td>
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<tr>
<td>Inventory / production loan from financial institution</td>
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<tr>
<td>Discount for early payment to suppliers</td>
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<td></td>
</tr>
<tr>
<td>Factoring confirmed receivables/Letters of Credit</td>
<td></td>
<td></td>
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<tr>
<td>Extended payment terms for customers</td>
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<tr>
<td>Utilize partner credit relationship for better financing terms</td>
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Adapted from Jim Rice
CCC: CASH CONVERSION CYCLE

CCC: Cash Conversion Cycle (or Cash-to-Cash Cycle)

- The terms Cash Conversion Cycle and Cash-to-Cash Cycle are used interchangeably
- Focuses on A/R, A/P, and inventory
- It is the amount of time (in days) that a company takes to sell inventory, collect receivables and pay accounts payable
- The combined cycle indicates how much cash is tied up in the company’s operations (procurement, production, sales, etc.)

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**Days of Inventory Outstanding (DIO)**

DIO = Average Inventory/One Day COGS  
= Average Inventory/(COGS/365)

- A financial measure indicating how long it takes a company to turn its inventory (including raw materials, WIP, and finished goods) into sales
- Inventory is recorded at cost, so COGS is used
- DIO is also known as Days Sales in Inventory (DSI)
- It is the inverse of Inventory Turnover (e.g. DIO of 91 days is the same as Inventory Turnover of 4)
- In general, lower DIO is better, provided the company is not missing out on sales due to lack of inventory

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**Days of Payables Outstanding (DPO)**

DPO = Average Accounts Payable/One Day COGS  
= Average Accounts Payable/(COGS/365)

- A financial measure indicating how long a company is takes to pay its suppliers
- Accounts Payables are recorded at cost of the materials, so COGS is used
- In general, higher DPO is better, provided the company is not damaging supplier relationships or performance by delaying payment
**Days of Sales Outstanding (DSO)**

DSO = Average Accounts Receivable/One Day Sales  
= Average Accounts Receivable/(Sales/365)

- A financial measure indicating how long a company takes to collect the cash after making a sale
- Accounts Receivable are credit sales to customers, so Total (credit) Sales is used
  - Note that if the business uses cash, then one should separate out credit sales because cash sales are not ‘outstanding’
- In general, lower DSO is better, provided the company is not missing out on sales due to lack of customer credit

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**Cash Conversion Cycle (CCC)**

- **DIO** - Days Inventory Outstanding  
- **DSO** - Days Sales Outstanding  
- **DPO** - Days Purchases Outstanding

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CCC can be negative example: Dell in 1990s

Raw material or finished good arrived at Dell

Product sold to customer

Collect money

Pay the supplier

Cash Conversion Cycle is negative

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CCC Exercise: Automotive Industry

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Avg Inventory
Avg A/R
Avg A/P

DIO
DSO
DPO
CCC

Data Source: S&P Capital IQ
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CCC: Automotive Industry

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<td>21,492</td>
<td>20,095</td>
<td>16,679</td>
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Avg Inventory 647.0 10,340.5 7,787.0 18,090.0 12,571.0
Avg A/R 138.0 24,209.5 90,064.0 75,598.0 24,904.0
Avg A/P 541.0 23,075.0 19,783.0 20,793.5 9,506.0
DIO 113.3 38.4 23.8 38.8 59.6
DSO 15.6 56.7 228.2 121.5 81.8
DPO 94.7 64.0 60.5 44.6 45.1
CCC 34.3 31.1 191.5 115.8 96.3

Data Source: S&P Capital IQ
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Working Capital Survey

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<thead>
<tr>
<th>COMPANY</th>
<th>CCC 100% CHANCE</th>
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<tr>
<td>Food and Staples Retailing Industry</td>
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<tr>
<td>Casey's General Stores, Inc.</td>
<td>(1)</td>
<td>11%</td>
<td>(2)</td>
<td>1</td>
<td>14%</td>
<td>1</td>
<td>13</td>
<td>1%</td>
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<td>1</td>
<td>-13%</td>
<td>0</td>
<td>-39</td>
<td>-6%</td>
<td>41</td>
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<td>25%</td>
<td>2</td>
<td>3%</td>
<td>3</td>
<td>3</td>
<td>0%</td>
<td>3</td>
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<td>CVS Health Corporation</td>
<td>63</td>
<td>-5%</td>
<td>63</td>
<td>25</td>
<td>25</td>
<td>38</td>
<td>38</td>
<td>2%</td>
</tr>
<tr>
<td>Rite Aid Corporation</td>
<td>48</td>
<td>3%</td>
<td>49</td>
<td>14</td>
<td>2%</td>
<td>13</td>
<td>60</td>
<td>6%</td>
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<tr>
<td>United Natural Foods, Inc.</td>
<td>53</td>
<td>5%</td>
<td>53</td>
<td>24</td>
<td>16%</td>
<td>20</td>
<td>54</td>
<td>6%</td>
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<tr>
<td>Median Performance</td>
<td>16</td>
<td>14%</td>
<td>13</td>
<td>9%</td>
<td>4%</td>
<td>10</td>
<td>31</td>
<td>36%</td>
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http://www.thehackettgroup.com/research/2015/uswcsurvey/

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## Working Capital Survey

### Household Products Industry

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<tbody>
<tr>
<td>The Procter &amp; Gamble Company</td>
<td>12</td>
<td>12</td>
<td>-2%</td>
<td>29</td>
<td>59</td>
<td>-5%</td>
<td>61</td>
<td>73</td>
<td>-4%</td>
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<tr>
<td>Kimberly-Clark Corporation</td>
<td>17</td>
<td>22</td>
<td>-12%</td>
<td>42</td>
<td>53</td>
<td>-16%</td>
<td>63</td>
<td>74</td>
<td>-4%</td>
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<tr>
<td>Clorox &amp; Dwight Co. Inc.</td>
<td>20</td>
<td>36</td>
<td>-5%</td>
<td>38</td>
<td>49</td>
<td>-7%</td>
<td>52</td>
<td>58</td>
<td>-5%</td>
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<td>Spectrum Brands Holdings, Inc.</td>
<td>56</td>
<td>58</td>
<td>-16%</td>
<td>43</td>
<td>80</td>
<td>-8%</td>
<td>87</td>
<td>96</td>
<td>-7%</td>
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<td>Energizer Holdings Inc.</td>
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<td>82</td>
<td>2%</td>
<td>98</td>
<td>98</td>
<td>2%</td>
<td>95</td>
<td>93</td>
<td>19%</td>
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<td>Central Garden &amp; Pet Company</td>
<td>120</td>
<td>104</td>
<td>-14%</td>
<td>126</td>
<td>78</td>
<td>-12%</td>
<td>52</td>
<td>32</td>
<td>2%</td>
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<tr>
<td><strong>Median Performance</strong></td>
<td>26</td>
<td>27</td>
<td>-7%</td>
<td>29</td>
<td>60</td>
<td>-5%</td>
<td>63</td>
<td>53</td>
<td>2%</td>
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## Working Capital Survey

### Pharmaceuticals Industry

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<tbody>
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<td>171</td>
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<td>131</td>
<td>21%</td>
<td>113</td>
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<td>24%</td>
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<td>Johnson &amp; Johnson</td>
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<td>89</td>
<td>-30%</td>
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<td>131</td>
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<td>129</td>
<td>122</td>
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<tr>
<td>Merck &amp; Co. Inc.</td>
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<td>152</td>
<td>-16%</td>
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<td>134</td>
<td>-4%</td>
<td>142</td>
<td>63</td>
<td>21%</td>
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<tr>
<td>Biogen Idec</td>
<td>156</td>
<td>160</td>
<td>-2%</td>
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<td>145</td>
<td>42%</td>
<td>162</td>
<td>68</td>
<td>61%</td>
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<td>Eli Lilly and Company</td>
<td>179</td>
<td>189</td>
<td>6%</td>
<td>54</td>
<td>202</td>
<td>7%</td>
<td>218</td>
<td>82</td>
<td>6%</td>
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<td>Merck Inc.</td>
<td>291</td>
<td>269</td>
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<td>295</td>
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<td>290</td>
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<td>-6%</td>
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<td>149</td>
<td>6%</td>
<td>62</td>
<td>149</td>
<td>8%</td>
<td>138</td>
<td>78</td>
<td>-18%</td>
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DPO may not as critical for financial performance


ABSTRACT

A firm's cash flow policies, which manage working capital in the form of cash receivables from customers, inventory holdings, and cash payments to suppliers, are inexorably linked to the firm's operations. Building on earlier research, this study: (i) extends prior studies by examining the relationships between changes in cash flow measures and changes in firm financial performance using a longitudinal sample of firm data; and (ii) investigates the direction of the relationship between quarterly changes in cash flow positions and firm financial performance. This study is conducted using the Generalized Estimating Equations (GEE) methodology to analyze a longitudinal sample of eight quarters of cash flow and financial performance data from 1233 manufacturing firms. The analyses find that changes in the widely used Cash Conversion Cycle (CCC) metric do not relate to changes in firm performance; however, changes in the less used Operating Cash Cycle (OCC) metric are found to be significantly associated with changes in Tobin's q. This examination of how changes in specific cash flow measures relate to changes in Tobin's q shows that both reductions in Accounts Receivables (measured as Days of Sales Outstanding [DSO]) and reductions in Inventory (measured as Days of Inventory Outstanding [DIO]) relate to firm financial performance improvements that persist for several quarters. Endogeneity tests of whether a firm's cash flow management strategy leads to changes in firm performance or if the cash flow strategy is a byproduct of firm performance suggest that reductions in DSO lead to improved firm financial performance.

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