

Working Capital and Cash Conversion Cycle

Jarrold Goentzel
goentzel@mit.edu

Jarrold Goentzel

Balance sheet

- Snapshot of the firm's value
- Assets
 - Current: cash, marketable securities, accounts receivable, inventories current year
 - Long-term: property, plant, equipment (less accumulated depreciation) future years
 - 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

Jarrold Goentzel

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

EBITDA

Depreciation & amortization

OPERATING INCOME

EBIT

Interest expense

Other non-operating expenses/income

Income taxes

Extraordinary items

NET INCOME

Jarrold Goentzel

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

Jarrold Goentzel

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

Jarrold Goentzel

Working capital requirements exercise

Ticker Fiscal Year	TSLA 2013	TSLA 2014	GM 2013	GM 2014	TM 2013	TM 2014
Sales (Net)	2,013	3,198	155,427	155,929	249,484	227,030
Cost of Goods Sold	1,451	2,085	130,909	131,657	189,845	170,329
Inventories - Total	340	954	14,039	13,642	18,399	17,819
Receivables - Total (Net)	49	227	22,813	25,606	77,844	73,352
Accounts Payable	304	778	23,621	22,529	21,492	20,095

Working Capital Required
Working Capital Investment 2014

Data Source: S&P Capital IQ
Jarrold Goentzel

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

Jarrold Goentzel

SC Finance Practices & Impact on WC

Practice	Working Capital		Potential Tradeoff
	+	-	
Extended payment terms from suppliers			
Discount for early payment by customers			
Finance raw materials & WIP for small suppliers			
3PL finances Vendor Managed Inventory (VMI)			
Inventory / production loan from financial institution			
Discount for early payment to suppliers			
Factoring confirmed receivables/Letters of Credit			
Extended payment terms for customers			
Utilize partner credit relationship for better financing terms			

Jarrold Goentzel

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.)

Jarrod Goentzel

Days of Inventory Outstanding (DIO)

$$\begin{aligned} \text{DIO} &= \text{Average Inventory}/\text{One Day COGS} \\ &= \text{Average Inventory}/(\text{COGS}/365) \end{aligned}$$

- 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

Jarrold Goentzel

Days of Payables Outstanding (DPO)

$$\begin{aligned} \text{DPO} &= \text{Average Accounts Payable}/\text{One Day COGS} \\ &= \text{Average Accounts Payable}/(\text{COGS}/365) \end{aligned}$$

- 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

Jarrold Goentzel

Days of Sales Outstanding (DSO)

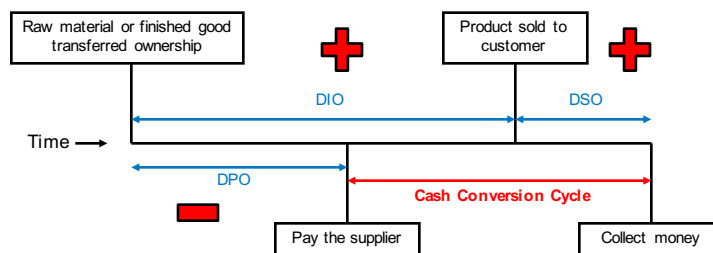
$$\text{DSO} = \text{Average Accounts Receivable} / \text{One Day Sales}$$
$$= \text{Average Accounts Receivable} / (\text{Sales} / 365)$$

- 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

Jarrod Goentzel

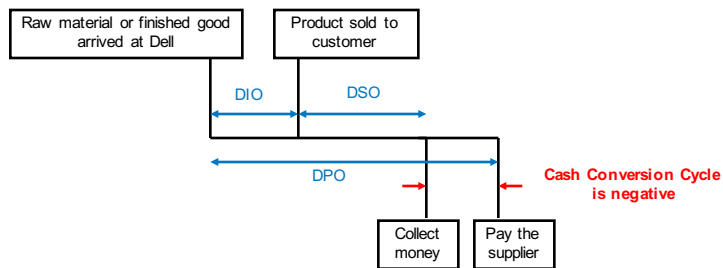
Cash Conversion Cycle (CCC)

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



Jarrod Goentzel

CCC can be negative example: Dell in 1990s



Jarrold Goentzel

CCC Exercise: Automotive Industry

Ticker	TSLA	TSLA	GM	GM	TM	TM
Fiscal Year	2013	2014	2013	2014	2013	2014
Sales (Net)	2,013	3,198	155,427	155,929	249,484	227,030
Cost of Goods Sold	1,451	2,085	130,909	131,657	189,845	170,329
Inventories - Total	340	954	14,039	13,642	18,399	17,819
Receivables - Total (Net)	49	227	22,813	25,606	77,844	73,352
Accounts Payable	304	778	23,621	22,529	21,492	20,095

Avg Inventory
Avg A/R
Avg A/P

DIO
DSO
DPO
CCC

Data Source: S&P Capital IQ
Jarrold Goentzel

CCC: Automotive Industry

Ticker	TSLA	TSLA	GM	GM	F	F	TM	TM	HMC	HMC
Fiscal Year	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Sales (Net)	2,013	3,198	155,427	155,929	146,917	144,077	249,484	227,030	114,998	111,105
Cost of Goods Sold	1,451	2,085	130,909	131,657	121,159	119,264	189,845	170,329	77,508	77,007
Inventories - Total	340	954	14,039	13,642	7,708	7,866	18,399	17,819	12,652	12,490
Receivables - Total (Net)	49	227	22,813	25,606	87,309	92,819	77,844	73,352	25,470	24,338
Accounts Payable	304	778	23,621	22,529	19,531	20,035	21,492	20,095	10,679	8,333
Avg Inventory		647.0		13,840.5		7,787.0		18,109.0		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		15.8		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

Jarrod Goentzel

Working Capital Survey

BEST **WORST** companies in working capital management by 2014 CCC

COMPANY	CCC			DSO			DIO			DPO		
	2014	1YR% CHANGE	2013	2014	1YR% CHANGE	2013	2014	1YR% CHANGE	2013	2014	1YR% CHANGE	2013
Food and Staples Retailing Industry												
Casey's General Stores, Inc.	(1)	11%	(2)	1	14%	1	13	1%	12	15	1%	15
PriceSmart Inc.	1	-68%	4	1	131%	0	39	-5%	41	39	3%	38
The Pantry, Inc.	2	25%	2	3	6%	3	8	6%	8	9	2%	9
CVS Health Corporation	43	-5%	45	25	1%	25	38	-2%	39	21	7%	20
Rite Aid Corporation	48	-3%	49	14	2%	13	60	-6%	64	26	-7%	28
United Natural Foods, Inc.	53	5%	51	24	18%	20	54	6%	51	25	21%	21
Median Performance	14	14%	13	9	-6%	10	31	-20%	39	25	4%	24

Source: 2015 US Working Capital Survey. The Hackett Group.

<http://www.thehackettgroup.com/research/2015/uswcsurvey/>

Jarrod Goentzel

Working Capital Survey

BEST **WORST** companies in working capital management by 2014 CCC

COMPANY	CCC 1 YR% CHANGE			DSO 1 YR% CHANGE			DIO 1 YR% CHANGE			DPO 1 YR% CHANGE		
	2014	2013	2012	2014	2013	2012	2014	2013	2012	2014	2013	2012
Household Products Industry												
The Procter & Gamble Company	13	9%	12	28	-2%	29	59	-5%	61	73	-6%	78
Kimberly-Clark Corporation	17	-47%	32	37	-12%	42	53	-16%	63	74	0%	74
Church & Dwight Co. Inc.	28	-23%	36	36	-5%	38	49	-7%	52	56	5%	53
Spectrum Brands Holdings, Inc.	50	-14%	58	36	-16%	43	80	-8%	87	66	-8%	72
Energizer Holdings Inc.	75	-8%	82	41	3%	39	98	2%	95	63	19%	53
Central Garden & Pet Company	120	-9%	131	44	3%	43	104	-14%	120	28	-12%	32
Median Performance	35	-8%	37	36	-7%	39	65	-5%	68	63	3%	61

Source: 2015 US Working Capital Survey. The Hackett Group.
<http://www.thehackettgroup.com/research/2015/uswcsurvey/>

Jarrod Goentzel

Working Capital Survey

BEST **WORST** companies in working capital management by 2014 CCC

COMPANY	CCC 1 YR% CHANGE			DSO 1 YR% CHANGE			DIO 1 YR% CHANGE			DPO 1 YR% CHANGE		
	2014	2013	2012	2014	2013	2012	2014	2013	2012	2014	2013	2012
Pharmaceuticals Industry												
Bristol-Myers Squibb Company	(21)	-20%	(17)	69	10%	63	151	33%	113	240	24%	193
Johnson & Johnson	63	-27%	86	54	-10%	60	131	2%	129	122	19%	103
Merck & Co. Inc.	128	-16%	152	58	-7%	62	134	-6%	142	63	21%	52
Roche Holdings, Inc.	156	56%	100	79	27%	62	145	42%	102	68	6%	64
Eli Lilly and Company	179	-5%	189	60	11%	54	203	-7%	218	83	0%	83
Zoetis Inc.	291	9%	268	75	-18%	91	279	-4%	290	63	-45%	114
Median Performance	148	0%	149	62	0%	62	149	8%	138	76	-18%	93

Source: 2015 US Working Capital Survey. The Hackett Group.
<http://www.thehackettgroup.com/research/2015/uswcsurvey/>

Jarrod Goentzel

DPO may not as critical for financial performance

Source: Kroes and Manikas. (2014) "Cash flow management and manufacturing firm financial performance: A longitudinal perspective." *Int. Journal of Production Economics*, 148, 37-50. doi:10.1016/j.ijpe.2013.11.008

A B S T R A C T

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.

Jarrod Goentzel