Chapter 17
Working Capital Management and Short-Term Financing

ANSWERS TO END-OF-CHAPTER QUESTIONS

17-1 a. Working capital is a firm's investment in short-term assets—cash, marketable securities, inventory, and accounts receivable. Net working capital is current assets minus current liabilities. Net operating working capital is operating current assets minus operating current liabilities.

b. The inventory conversion period is the average length of time it takes to convert materials into finished goods and then to sell them. It is calculated by dividing total inventory by sales per day. The receivables collection period is the average length of time required to convert a firm's receivables into cash. It is calculated by dividing accounts receivable by sales per day. The payables deferral period is the average length of time between a firm's purchase of materials and labour and the payment of cash for them. It is calculated by dividing accounts payable by credit purchases per day (COGS/365). The cash conversion cycle is the length of time between the firm's actual cash expenditures on productive resources (materials and labour) and its own cash receipts from the sale of products (that is, the length of time between paying for labour and materials and collecting on receivables.) Thus, the cash conversion cycle equals the length of time the firm has funds tied up in current assets.

c. A relaxed NOWC policy refers to a policy under which relatively large amounts of cash, marketable securities, and inventories are carried and under which sales are stimulated by a liberal credit policy, resulting in a high level of receivables.

A restricted NOWC policy refers to a policy under which holdings of cash, securities, inventories, and receivables are minimized, while a moderate current asset investment policy lies between the relaxed and restricted policies.

A moderate NOWC policy matches asset and liability maturities. It is also referred to as the maturity matching, or "self-liquidating" approach.

d. A cash budget is a schedule showing cash flows (receipts, disbursements, and cash balances) for a firm over a specified period. The net cash gain or loss for the period is calculated as total collections for the period less total payments for the same period of time.

e. Trade discounts are price reductions that suppliers offer customers for early payment of bills.

f. Permanent NOWC is the NOWC required when the economy is weak and seasonal sales are at their low point. Thus, this level of NOWC always requires financing and can be regarded as permanent. Temporary NOWC is the NOWC required above the permanent level when the economy is strong and/or seasonal sales are high.

g. A moderate short-term financing policy matches asset and liability maturities. It is also referred to as the maturity matching, or "self-liquidating" approach. When a firm finances all of its fixed assets with long-term capital but part of its permanent current assets with short-term, nonspontaneous credit this is referred to as an aggressive short-term financing policy. With a conservative short-term financing policy permanent capital is used to finance all permanent asset requirements, as well as to meet some or all of the seasonal demands.

h. Maturity matching is a financing policy that matches asset and liability maturities. This is a moderate policy.

i Accruals are continually recurring short-term liabilities, especially accrued wages and accrued taxes.

j. Trade credit is debt arising from credit sales and recorded as an account receivable by the seller and as an account payable by the buyer. Stretching accounts payable is the practice of deliberately paying accounts payable late. Free trade credit is credit received during the discount period. Credit taken in excess of free trade credit, whose cost is equal to the discount lost, is termed costly trade credit.

k. A line of credit is an arrangement in which a bank agrees to lend up to a specified maximum amount of funds during a designated period. A revolving credit agreement is a multi-year, committed line of credit extended by a bank or other lending institution.

l. Commercial paper is unsecured, short-term promissory notes of large firms, usually issued in denominations of $100,000 or more and having an interest rate somewhat below the prime rate. A bankers' acceptance is a term draft unconditionally guaranteed by a major bank.

17-2 False. Both accounts will record the same transaction amount.

17-3 If an asset's life and returns can be positively determined, the maturity of the asset can be matched to the maturity of the liability incurred to finance the asset. This matching will ensure that funds are borrowed only for the time they are required to finance the asset and that adequate funds will have been generated by the asset by the time the financing must be repaid.

A basic fallacy is involved in the above discussion, however. Borrowing to finance receivables or inventories may be on a short-term basis because these turn over 8 to 12 times a year. But as a firm's sales grow, its investment in receivables and inventories grow, even though they turn over. Hence, longer-term financing should be used to finance the permanent components of receivables and inventory investments.

17-4 From the standpoint of the borrower, short-term credit is riskier because short-term interest rates fluctuate more than long-term rates, and the firm may be unable to repay the debt. If the lender will not extend the loan, the firm could be forced into bankruptcy.

A firm might borrow short-term if it thought that interest rates were going to fall and, therefore, that the long-term rate would go even lower. A firm might also borrow short-term if it were only going to need the money for a short while and the higher interest would be offset by lower administration costs and no prepayment penalty. Thus, firms do consider factors other than interest rates when deciding on the maturity of their debt.

17-5 This statement is false. A firm cannot ordinarily control its accruals since payrolls and the timing of wage payments are set by economic forces and by industry custom, while tax payment dates are established by law.

17-6 Yes. If a firm is able to buy on credit at all, if the credit terms include a discount for early payment, and if the firm pays during the discount period, it has obtained "free" trade credit. However, taking additional trade credit by paying after the discount period can be quite costly.

17-7 Commercial paper refers to promissory notes of large, strong corporations. These notes have maturities that generally vary from one day to 9 months, and the return is usually 1½ to 3½ percentage points below the prime lending rate. Mama and Papa Gus could not use the commercial paper market.

SOLUTIONS TO END-OF-CHAPTER PROBLEMS

17-1 Nominal cost of trade credit = $\frac{3}{97} \times \frac{365}{30 - 15}$

= 0.0309 × 24.33 = 0.7526 = 75.26%.

Effective cost of trade credit = $(1.0309)^{24.33}$ - 1.0 = 1.0984 = 109.84%.

17-2 Effective cost of trade credit = $(1 + 1/99)^{12.17}$ - 1.0

= 0.130 = 13.0%.

17-3 Net purchase price of inventory = $500,000/day.

Credit terms = 2/15, net 40.

$500,000 × 15 = $7,500,000.

17-4 a. 0.4(10) + 0.6(40) = 28 days.

b. $912,500/365 = $2,500 sales per day.

$2,500(28) = $70,000 = Average receivables.

c. 0.4(10) + 0.6(30) = 22 days. $912,500/365 = $2,500 sales per day.

$2,500(22) = $55,000 = Average receivables.

Sales may also decline as a result of the tighter credit. This would further reduce receivables. Also, some customers may now take discounts, further reducing receivables.

17-5 a. $\frac{1}{99} \times \frac{365}{5}$ = 73.74%.

b. $\frac{2}{98} \times \frac{365}{50}$ = 14.90%.

c. $\frac{3}{97} \times \frac{365}{35}$ = 32.25%.

d. $\frac{2}{98} \times \frac{365}{35}$ = 21.28%.

e. $\frac{2}{98} \times \frac{365}{25} = 29.80\%$.

17-6 a. $\frac{3}{97} \times \frac{365}{45 - 20} = 45.15\%$.

Because the firm still takes the discount on Day 20, 20 is used as the discount period in calculating the cost of nonfree trade credit.

b. Paying after the discount period, but still taking the discount gives the firm more credit than it would receive if it paid within 15 days.

17-7 Sales per day = $\frac{\$6{,}935{,}000}{365} = \$19{,}000$.

Discount sales = 0.5($19,000) = $9,500.

A/R attributable to discount customers = $9,500(15) = $142,500.

A/R attributable to nondiscount customers:

Total A/R	$ 665,000
Discount customers' A/R	142,500
Nondiscount customers' A/R	$522,500

$$\begin{matrix}\text{Days sales outstanding} \\ \text{nondiscount customers}\end{matrix} = \frac{\text{A/R}}{\text{Sales per day}} = \frac{\$522{,}500}{\$9{,}500} = 55 \text{ days}.$$

Alternatively,
DSO = $665,000/$19,000 = 35 days.

$$35 = 0.5(15) + 0.5(DSO_{Nondiscount})$$
$$DSO_{Nondiscount} = 27.5/0.5 = 55 \text{ days}.$$

Thus, although nondiscount customers are supposed to pay within 45 days, they are actually paying, on average, in 55 days.

Cost of trade credit to nondiscount customers equals the rate of return to the firm:

Nominal rate = $\frac{1}{99} \times \frac{365}{55 - 15} = 0.0101(9.125) = 9.21\%$.

Effective cost = $(1 + 1/99)^{365/40} - 1 = 9.60\%$.

17-8 a.

Cash conversion cycle	=	Inventory conversion period	+	Receivables collection period	–	Payables deferral period

= 60 + 32 - 37 = 55 days.

b. Average sales per day = $9,700,000/365 = $26,575.
Investment in receivables = $26,575 × 32 = $850,400.

c. Inventory turnover = 365/60 = 6.08×.

17-9 a. Inventory conversion period = 365/Inventory turnover ratio
= 365/5 = 73 days.

Receivables collection period = DSO = 36.5 days.

Cash conversion cycle	=	Inventory conversion period	+	Receivables collection period	–	Payables deferral period

= 73 + 36.5 - 40 = 69.5 days.

b. Total assets = Inventory + Receivables + Fixed assets
= $150,000/5 + [($150,000/365) × 36.5] + $35,000
= $30,000 + $15,000 + $35,000 = $80,000.

Total assets turnover = Sales/Total assets
= $150,000/$80,000 = 1.875×.

ROA = Profit margin × Total assets turnover
= 0.06 × 1.875 = 0.1125 = 11.25%.

c. Inventory conversion period = 365/7.3 = 50 days.

Cash conversion cycle = 50 + 36.5 - 40 = 46.5 days.

Total assets = Inventory + Receivables + Fixed assets
= $150,000/7.3 + $15,000 + $35,000
= $20,548 + $15,000 + $35,000 = $70,548.

Total assets turnover = $150,000/$70,548 = 2.1262×.

ROA = $9,000/$70,548 = 12.76%.

17-10 $15,000 installment loan, 11% nominal rate.
Effective annual rate, assuming a 365-day year = ?

Add-on interest = 0.11($15,000) = $1,650.

Monthly Payment = $\frac{\$15{,}000 + \$1{,}650}{12}$ = $1,387.50.

With a financial calculator, enter N = 12, PV = 15000, PMT = -1387.50, FV = 0, and then press I to obtain 1.6432%. However, this is a monthly rate.

Effective annual rate$_{\text{Add-on}}$ = $(1 + r_d)^n - 1.0$
= $(1.016432)^{12} - 1.0$
= 1.2160 - 1.0 = 0.2160 = 21.60%.

17-11 a. Effective rate = 12%.

b.

50,000	-50,000
	- 4,500
-10,000 (compensating balance)	10,000
40,000	-44,500

With a financial calculator, enter N = 1, PV = 40000, PMT = 0, and FV = -44500 to solve for I = 11.25%.

Note that, if Hawley actually needs $50,000 of funds, he will have to borrow $\frac{\$50{,}000}{1 - 0.2}$ = $62,500. The effective interest rate will still be 11.25%.

c.

50,000	-50,000
- 4,375 (discount interest)	7,500
- 7,500 (compensating balance)	-42,500
38,125	

With a financial calculator, enter N = 1, PV = 38125, PMT = 0, and FV = -42500 to solve for I = 11.4754% ≈ 11.48%.

Note that, if Hawley actually needs $50,000 of funds, he will have to borrow $\frac{\$50,000}{1-0.0875-0.15}$ = $65,573.77. The effective interest rate will still be 11.48%.

d. Approximate annual rate = $\frac{(0.08)(\$50,000)}{(\$50,000/2)} = \frac{\$4,000}{\$25,000}$ = 16%.

Precise effective rate:

$$\$50,000 = \sum_{t=1}^{12} \frac{\$4,166.67}{(1+r_d)^t} + \frac{\$4,000}{(1+r_d)^{12}}$$

r_d, the monthly interest rate, is 1.1326%, found with a financial calculator. Input N = 12; PV = 50000; PMT = -4166.67; FV = -4000; and I = ?. The precise effective annual rate is $(1.011326)^{12}$ - 1.0 = 14.47%.

Alternative b has the lowest effective interest rate.

17-12 a. Simple interest: 12%.

b. 3-months: $(1 + 0.115/4)^4$ - 1 = 12.0055%, or use the interest conversion feature of your calculator as follows:
NOM% = 11.5; P/YR = 4; EFF% = ? EFF% = 12.01%.

c. Add-on: Interest = Funds needed(r_d).
Loan = Funds needed(1 + rd).
PMT = Loan/12.
Assume you borrowed \$100. Then, Loan = \$100(1.06) = \$106.
PMT = \$106/12 = \$8.8333.

$$\$100 = \sum_{t=1}^{12} \frac{\$8.8333}{(1 + r_d)^t}$$

Enter N = 12, PV = 100, PMT = -8.8333, FV = 0, and press I to get I = 0.908032% = rd. This is a monthly periodic rate, so the effective annual rate = $(1.00908032)^{12} - 1 = 0.1146 = 11.46\%$.

d. Trade credit: 1/99 = 1.01% on discount if pay in 15 days, otherwise pay 45 days later. So, get 60 - 15 = 45 days of credit at a cost of 1/99 = 1.01%. There are 360/45 = 8 periods, so the effective cost rate is:
$(1 + 1/99)^8 - 1 = (1.0101)^8 - 1 = 8.3723\%$.
Thus, the least expensive type of credit for Yonge is trade credit with an effective cost of 8.37%.

17-13 a. Return on equity may be computed as follows:

	Tight	Moderate	Relaxed
Current assets			
(% of sales × Sales)	$2,250,000	$2,500,000	$3,000,000
Fixed assets	3,000,000	3,000,000	3,000,000
Total assets	$5,250,000	$5,500,000	$6,000,000
Debt (60% of assets)	$ 3,150,000	$3,300,000	$3,600,000
Equity	2,100,000	2,200,000	2,400,000
Total liab. & equity	$ 5,250,000	$5,500,000	$6,000,000
EBIT (12% × $5 million)	$ 600,000	$ 600,000	$ 600,000
Interest (6%)	189,000	198,000	216,000
Earnings before taxes	411,000	402,000	384,000
Taxes (30%)	123,300	120,600	115,200
Net income	$ 287,700	$ 281,400	$ 268,800
Return on equity	13.70%	12.79%	11.20%

b. No, this assumption would probably not be valid in a real world situation. A firm's current asset policies, particularly with regard to accounts receivable, such as discounts, collection period, and collection policy, may have a significant effect on sales. The exact nature of this function may be difficult to quantify, however, and determining an "optimal" current asset level may not be possible in actuality.

c. As the answers to Part a indicate, the tighter policy leads to a higher expected return. However, as the current asset level is decreased, presumably some of this reduction comes from accounts receivable. This can be accomplished only through higher discounts, a shorter collection period, and/or tougher collection policies. As outlined above, this would in turn have some effect on sales, possibly lowering profits. More restrictive receivable policies might involve some additional costs (collection, and so forth) but would also probably reduce bad debt expenses. Lower current assets would also imply lower liquid assets; thus, the firm's ability to handle contingencies would be impaired. Higher risk of inadequate liquidity would increase the firm's risk of insolvency and thus increase its chance of failing to meet fixed charges. Also, lower inventories might mean lost sales and/or expensive production stoppages. Attempting to attach numerical values to these potential losses and probabilities would be extremely difficult.

17-14 a. I. *Collections and Purchases:*

	December	January	February
Sales	$160,000	$40,000	$60,000
Purchases	40,000	40,000	40,000
Payments	140,000*	40,000	40,000

*November purchases = $140,000.

II. *Cash Gain or Loss for Month:*

Receipts from sales	$160,000	$40,000	$60,000
Payments for:			
Purchases	140,000	40,000	40,000
Salaries	4,800	4,800	4,800
Rent	2,000	2,000	2,000
Taxes	12,000	-	-
Total payments	$158,800	$46,800	$46,800
Net cash gain (loss)	$ 1,200	$(6,800)	$13,200

III. *Cash Surplus or Loan Requirements:*

Cash at start of month	$ 400	$ 1,600	$(5,200)
Cumulative cash	1,600	(5,200)	8,000
Target cash balance	6,000	6,000	6,000
Cumulative surplus cash or total loans to maintain $6,000 target cash balance	$(4,400)	$(11,200)	$ 2,000

b. If the company began selling on credit on December 1, then it would have zero receipts during December, down from $160,000. Thus, it would have to borrow an additional $160,000, so its loans outstanding by December 31 would be $164,400. The loan requirements would build gradually during the month. We could trace the effects of the changed credit policy on out into January and February, but here it would probably be best to simply construct a new cash budget.

17-15 a. $\text{Average accounts payable} = \frac{\$3{,}650{,}000}{365 \text{ days}} \times 10 \text{ days} = \$10{,}000 \times 10 = \$100{,}000.$

b. There is no cost of trade credit at this point. The firm is using "free" trade credit.

c. $\text{Average payables (net of discount)} = \frac{\$3{,}650{,}000}{365} \times 30 = \$10{,}000 \times 30 = \$300{,}000.$

Nominal cost = (2/98)(365/20) = 37.24%,

or \$74,489.80/(\$300,000 - \$100,000) = 37.24%.

Effective cost = $(1 + 2/98)^{365/20} - 1 = 0.4459 = 44.59\%$.

d. Nominal rate = $\frac{2}{98} \times \frac{365}{40 - 10} = 24.83\%$.

Effective cost = $(1 + 2/98)^{365/30} - 1 = 0.2786 = 27.86\%$.

17-16 Trade Credit

Terms: 2/10, net 30. But the firm plans delaying payments 35 additional days, which is the equivalent of 2/10, net 65.

$$\text{Nominal cost} = \frac{\text{Discount percent}}{100 - \text{Discount percent}} \times \frac{365}{\text{Days credit is outstanding} - \text{Discount period}}$$

$$= \frac{2}{100 - 2} \times \frac{365}{65 - 10} = \frac{2}{98} \times \frac{365}{55} = 0.0204\,(6.6364) = 13.54\%\,.$$

Effective cost = $(1 + 2/98)^{365/55} - 1 = 14.35\%$.

17-17 a. Size of bank loan = (Purchases/Day)(Days late)

$$= \left(\frac{\text{Purchases}}{\begin{matrix}\text{Days payables}\\ \text{outstanding}\end{matrix}} \right) \left(\begin{matrix}\text{Days payables}\\ \text{outstanding}\end{matrix} - 30 \right)$$

= ($900,000/60)(60 - 30) = $15,000(30) = $450,000.

Alternatively, one could simply recognize that accounts payable must be cut to half of its existing level, because 30 days is half of 60 days.

b. Given the limited information, the decision must be based on the rule-of-thumb comparisons, such as the following:

1. Debt ratio = ($2,400,000 + $900,000)/$5,000,000 = 66%.
   Automated Dynamic's debt ratio is 66%, as compared to a typical debt ratio of 50%. The firm appears to be somewhat undercapitalized.

2. Current ratio = $2,700,000/$2,400,000 = 1.13.

   The current ratio is low, but current assets could cover current liabilities if all accounts receivable can be collected and if the inventory can be liquidated at its book value.

3. Quick ratio = $700,000/$2,400,000 = 0.29.

   The quick ratio indicates that current assets, excluding inventory, are only sufficient to cover 29% of current liabilities, which is very bad.

The company appears to be carrying excess inventory and financing extensively with debt. Bank borrowings are already high, and the liquidity situation is poor. On the basis of these observations, the loan should be denied, and the treasurer should be advised to seek permanent capital, especially equity capital.

17-18 a. Malone's current accounts payable balance represents 60 days purchases. Daily purchases can be calculated as $\frac{\$500}{60} = \$8.33$.
If Malone takes discounts then the accounts payable balance would include only 10 days purchases, so the A/P balance would be $8.33 × 10 = $83.33.

If Malone doesn't take discounts but pays in 30 days, its A/P balance would be $8.33 × 30 = $250.

b. Takes Discounts:
If Malone takes discounts its A/P balance would be $83.33. The cash it would need to be loaned is $500 - $83.33 = $416.67.

Since the loan is a discount loan with compensating balances, Malone would require more than a $416.67 loan.

Face amount of loan = $\frac{\$416.67}{1-0.15-0.20} = \frac{\$416.67}{0.65}$ = $641.03.

Doesn't Take Discounts:
If Malone doesn't take discounts, its A/P balance would be $250. The cash needed from the bank is $500 - $250 = $250.

Face amount of loan = $\frac{\$250}{1-0.15-0.20} = \frac{\$250}{0.65}$ = $384.62.

c. Nonfree Trade Credit:
Nominal annual cost:

$$\frac{\text{Discount \%}}{100 - \textit{Discount \%}} \times \frac{365}{\text{Days credit is outstanding} - \text{Discount period}} = \frac{1}{99} \times \frac{365}{20} = 18.43\%.$$

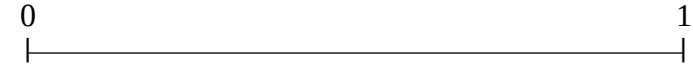
Effective cost: $\left(1+\frac{1}{99}\right)^{18.25} - 1 = (1.0101)^{18} - 1 = 1.2013 - 1 = 20.13\%.$

Bank Loan: 15% discount loan with 20% compensating balance.
Assume the firm doesn't take discounts, so it needs $250 and borrows $384.62. (The cost will be the same regardless of how much the firm borrows.)

384.62	-384.62
-57.69 Discount interest	+76.92
-76.92 Compensating balance	-307.70
250.00	

With a financial calculator, input the following data, N = 1, PV = 250, PMT = 0, FV = -307.70, and then solve for I = 23.08%.

Just to show you that it doesn't matter how much the firm borrows, assume the firm takes discounts and it reduces A/P to $83.33 so it needs $416.67 cash and borrows $641.03.



641.03	-641.03
-96.15 Discount interest	+128.21
-128.21 Compensating balance	-512.82
416.67	

With a financial calculator, input the following data, N = 1, PV = 416.67, PMT = 0, FV = -512.82, and then solve for I = 23.08%.

Because the cost of nonfree trade credit is less than the cost of the bank loan, Malone should forgo discounts and reduce its payables only to $250,000.

d. Pro Forma Balance Sheet (Thousands of Dollars):

Cash[a]	$ 126.9	Accounts payable	$ 250.0
Accounts receivable	450.0	Notes payable[b]	434.6
Inventory	750.0	Accruals	50.0
Prepaid interest[c]	57.7		
Total current assets	1,384.6	Total current liabilities	734.6
Fixed assets	750.0	Long-term debt	150.0
		Common equity	1,250.0
Total assets	$2,134.6	Total liabilities & equity	$2,134.6

[a] $384,615(0.2) = $76,923 = Compensating balance.
Cash = $50 + $76.923 = $126.9.
[b] Notes payable = $50 + $384.6 = $434.6.
[c] Prepaid interest = $384,615(0.15)=$57.7

e. To reduce the accounts payable by $250,000, which reflects the 1% discount, Malone must pay the full cost of the payables, which is $250,000/0.99 = $252,525.25. The lost discount is the difference between the full cost of the payables and the amount that is reported net of discount: Lost discount = $252,525.25 - $250,000.00 = $2,525.25. The after-tax cost of the lost discount is $2,525.25(1-0.40) = $1,515.15. Notice that this provides a tax shield in the amount of $2,525.25(0.40) = $1,010.10. The total amount of cash that Malone needs to pay down $250,000 of accounts payable is the gross amount minus the tax shield: $252,525.25 - $1,010.10 = $251,515.15.

$$\text{Face amount of loan} = \frac{\$251{,}515.15}{1-0.15-0.20} = \frac{\$251{,}515.15}{0.65} = \$386{,}946.38.$$

Pro Forma Balance Sheet (Thousands of Dollars):

Cash[a]	$ 127.4	Accounts payable	$ 250.0
Accounts receivable	450.0	Notes payable[b]	436.9
Inventory	750.0	Accruals	50.0
Prepaid interest[d]	58.0		
Total current assets	1,385.4	Total current liabilities	736.9
Fixed assets	750.0	Long-term debt	150.0
		Common equity[c]	1,248.5
Total assets	$2,135.4	Total liabilities & equity	$2,135.4

[a] $386,946.38(0.2) = $77,389.27 = Compensating balance.
Cash = $50 + $77.4 = $127.4.
[b] Notes payable = $50 + $386.9 = $436.9.
[c] Common equity = Previous common equity – after-tax lost discount
= $1,250 - $1.5 = $1,248.5
[d] Prepaid interest = $386,946(0.15) = $58.0

17-19 a.

	May	June	July	August	September	October	November	December	January
Collections and purchases worksheet									
Sales (gross)	**$180,000**	**$180,000**	**$360,000**	**$540,000**	**$720,000**	**$360,000**	**$360,000**	**$90,000**	**$180,000**
Collections									
During month of sale	**18,000**	**18,000**	**36,000**	**54,000**	**72,000**	**36,000**	**36,000**	**9,000**	
During 1st month after sale		**135,000**	**135,000**	**270,000**	**405,000**	**540,000**	**270,000**	**270,000**	
During 2nd month after sale			**27,000**	**27,000**	**54,000**	**81,000**	**108,000**	**54,000**	
Total collections			**$198,000**	**$351,000**	**$531,000**	**$657,000**	**$414,000**	**$333,000**	
Purchases									
Labor and raw materials	**$90,000**	**$90,000**	**$126,000**	**$882,000**	**$306,000**	**$234,000**	**$162,000**	**$90,000**	
Payments for labor and raw materials		**$90,000**	**$90,000**	**$126,000**	**$882,000**	**$306,000**	**$234,000**	**$162,000**	
Cash gain or loss for month									
Collections			**$198,000**	**$351,000**	**$531,000**	**$657,000**	**$414,000**	**$333,000**	
Payments for labor and raw materials			**90,000**	**126,000**	**882,000**	**306,000**	**234,000**	**162,000**	
General and administrative salaries			**27,000**	**27,000**	**27,000**	**27,000**	**27,000**	**27,000**	
Lease payments			**9,000**	**9,000**	**9,000**	**9,000**	**9,000**	**9,000**	
Miscellaneous expenses			**2,700**	**2,700**	**2,700**	**2,700**	**2,700**	**2,700**	
Income tax payments					**63,000**			**63,000**	
Design studio payment						**180,000**			
Total payments			**$128,700**	**$164,700**	**$983,700**	**$524,700**	**$272,700**	**$263,700**	
Net cash gain (loss) during month			**$69,300**	**$186,300**	**($452,700)**	**$132,300**	**$141,300**	**$69,300**	
Loan requirement or cash surplus									
Cash at start of month			**$132,000**	**$201,300**	**$387,600**	**($65,100)**	**$67,200**	**$208,500**	
Cumulative cash			**$201,300**	**$387,600**	**($65,100)**	**$67,200**	**$208,500**	**$277,800**	
Target cash balance			**$90,000**	**$90,000**	**$90,000**	**$90,000**	**$90,000**	**$90,000**	
Cumulative surplus cash or loans outstanding to maintain $90,000 target cash balance			**$111,300**	**$297,600**	**($155,100)**	**($22,800)**	**$118,500**	**$187,800**	

b. The cash budget indicates that Helen will have surplus funds available during July, August, November, and December. During September the company will need to borrow $155,100. The cash surplus that accrues during October will enable Helen to reduce the loan balance outstanding to $22,800 by the end of October.

c. In a situation such as this, where inflows and outflows are not synchronized during the month, it may not be possible to use a cash budget centered on the end of the month. The cash budget should be set up to show the cash positions of the firm on the 5th of each month. In this way the company could establish its maximum cash requirement and use these maximum figures to estimate its required line of credit.

The table below shows the status of the cash account on selected dates within the month of July. It shows how the inflows accumulate steadily throughout the month and how the requirement of paying all the outflows on the 5th of the month requires that the firm obtain external financing. By July 14, however, the firm reaches the point where the inflows have offset the outflows, and by July 30 we see that the monthly totals agree with the cash budget developed earlier in Part a.

	7/2/12	7/4/12	7/5/12	7/6/12	7/14/12	7/30/12
Opening balance	$132,000	132,000	132,000	$132,000	$132,000	$132,000
Cumulative inflows (1/30 × receipts × no. of days)	13,200	26,400	33,000	39,600	92,400	198,000
Total cash available	145,200	158,400	165,000	171,600	224,400	330,000
Outflow	0	0	128,700	128,700	128,700	128,700
Net cash position	145,200	158,400	36,300	42,900	95,700	201,300
Target cash balance	90,000	90,000	90,000	90,000	90,000	90,000
Cash above minimum needs (borrowing needs)	$ 55,200	$ 68,400	$(53,700)	$(47,100)	$ 5,700	$111,300

d. The months preceding peak sales would show a decreased current ratio and an increased debt ratio due to additional short-term bank loans. In the following months as receipts are collected from sales, the current ratio would increase and the debt ratio would decline. Abnormal changes in these ratios would affect the firm's ability to obtain bank credit.

17-20 a. 1. *Line of credit:*

Commitment fee = (0.005)($2,000,000)(11/12) = $ 9,167
Interest = (0.11)(1/12)($2,000,000) = 18,333
Total $27,500

2. *Trade discount:*

a. $\text{Nominal rate} = \left(\frac{2}{98}\right)\left(\frac{365}{30}\right) = 24.83 \approx 24.8\%.$

Total cost = 0.248($2,000,000)/12 = $41,333.

b. Effective cost = $(1 + 2/98)^{365/30} - 1 = 0.2786 = 27.86\%$.

Total cost = 0.2786($2,000,000)/12 = $46,433.

3. *30-day commercial paper:*

Interest = (0.095)($2,000,000)(1/12) = $15,833
Transaction fee = (0.005)($2,000,000) = 10,000
$25,833

4. *60-day commercial paper:*

Interest = (0.09)($2,000,000)(2/12) = $30,000
Transaction fee = (0.005)($2,000,000) = 10,000
$40,000

Marketable securities interest received
= (0.094)($2,000,000)(1/12) = -15,667

Transactions cost, marketable securities
= (0.004)($2,000,000) = +8,000
$32,333

The 30-day commercial paper has the lowest cost.

b. The lowest cost of financing is not necessarily the best. The use of 30-day commercial paper is the cheapest; however, sometimes the commercial paper market is tight and funds are not available. This market also is impersonal. A banking arrangement may provide financial counselling and a long-run relationship in which the bank performs almost as a "partner and counselor" to the firm. Note also that while the use of 60-day commercial paper is more expensive than the use of 30-day paper, it provides more flexibility in the event the money is needed for more than 30 days. However, the line of credit provides even more flexibility than the 60-day commercial paper and at a lower cost.

SOLUTION TO SPREADSHEET PROBLEM

17-21 The detailed solution for the spreadsheet problem is in the file ***Ch 17 Build a Model Solution.xlsx*** and is available on the textbook's website.

MINI CASE

Dan Barnes, financial manager of Ski Equipment Inc. (SKI), is excited, but apprehensive. The company's founder recently sold his 51% controlling block of stock to Kent Koren, who is a big fan of EVA (economic value added). EVA is found by taking the after-tax operating profit and then subtracting the dollar cost of all the capital the firm uses:

$$\text{EVA} = \text{NOPAT} - \text{Capital costs}$$
$$= \text{EBIT}(1 - T) - \text{WACC}(\text{Capital employed}).$$

If EVA is positive, then the firm is creating value. On the other hand, if EVA is negative, the firm is not covering its cost of capital, and shareholders' value is being eroded. Koren rewards managers handsomely if they create value, but those whose operations produce negative EVAs are soon looking for work. Koren frequently points out that if a company can generate its current level of sales with fewer assets, it would need less capital. That would, other things held constant, lower capital costs and increase its EVA.

Shortly after he took control of SKI, Kent Koren met with SKI's senior executives to tell them of his plans for the company. First, he presented some EVA data that convinced everyone that SKI had not been creating value in recent years. He then stated, in no uncertain terms, that this situation must change. He noted that SKI's designs of skis, boots, and clothing are acclaimed throughout the industry, but something is seriously amiss elsewhere in the company. Costs are too high, prices are too low, or the company employs too much capital, and he wants SKI's managers to correct the problem or else.

Barnes has long felt that SKI's working capital situation should be studied—the company may have the optimal amounts of cash, securities, receivables, and inventories, but it may also have too much or too little of these items. In the past, the production manager resisted Barnes' efforts to question his holdings of raw materials inventories, the marketing manager resisted questions about finished goods, the sales staff resisted questions about credit policy (which affects accounts receivable), and the treasurer did not want to talk about her cash and securities balances. Koren's speech made it clear that such resistance would no longer be tolerated.

Barnes also knows that decisions about working capital cannot be made in a vacuum. For example, if inventories could be lowered without adversely affecting operations, then less capital would be required, the dollar cost of capital would decline, and EVA would increase. However, lower raw materials inventories might lead to production slowdowns and higher costs, while lower finished goods inventories might lead to the loss of profitable sales. So, before inventories are changed, it will be necessary to study operating as well as financial effects. The situation is the same with regard to cash and receivables.

	SKI	INDUSTRY
Current	**1.75**	**2.25**
Quick	**0.83**	**1.20**
Debt/assets	**58.76%**	**50.00%**
Turnover of cash and securities	**16.67**	**22.22**
Days sales outstanding (365-day basis)	**45.63**	**32.00**
Inventory turnover	**4.82**	**7.00**
Fixed assets turnover	**11.35**	**12.00**
Total assets turnover	**2.08**	**3.00**
Profit margin on sales	**2.07%**	**3.50%**
Return on equity (ROE)	**10.45%**	**21.00%**
Payables deferral period	**30.00**	**33.00**

a. Barnes plans to use the preceding ratios as the starting point for discussions with SKI's operating executives. He wants everyone to think about the pros and cons of changing each type of current asset and how changes would interact to affect profits and EVA. Based on the data, does SKI seem to be following a relaxed, moderate, or restricted working capital policy?

Answer: A company with a relaxed working capital policy would carry relatively large amounts of current assets in relation to sales. It would be guarding against running out of stock or of running short of cash, or losing sales because of a restrictive credit policy. We can see that SKI has relatively low cash and inventory turnover ratios. For example, sales/inventories = 4.82 versus 7.0 for an average firm in its industry. Thus, SKI is carrying a lot of inventory per dollar of sales, which would meet the definition of a relaxed policy. Similarly, SKI's DSO is relatively high. Since DSO is calculated as receivables/sales per day, a high DSO indicates a lot of receivables per dollar of sales. Thus, SKI seems to have a relaxed working capital policy, and a lot of current assets. Its current ratio is weaker than the industry, so SKI must also have a lot of current liabilities.

b. **How can one distinguish between a relaxed but rational working capital policy and a situation in which a firm simply has a lot of current assets because it is inefficient? Does SKI's working capital policy seem appropriate?**

Answer: SKI may choose to hold large amounts of inventory to avoid the costs of "running short," and to cater to customers who expect to receive their equipment in a short period of time. SKI may also choose to hold high amounts of receivables to maintain good relationships with its customers. However, if SKI is holding large stocks of inventory and receivables to better serve customers, it should be able to offset the costs of carrying that working capital with high prices or higher sales, and its ROE should be no lower than that of firms with other working capital policies.

It is clear from the ratio data in the first table that SKI is not as profitable as the average firm in its industry. This suggests that it simply has excessive working capital, and that it should take steps to reduce its working capital.

c. **Calculate the firm's cash conversion cycle.**

Answer: A firm's cash conversion cycle is calculated as:

$$\begin{array}{cccc} \text{Inventory} & \text{Receivables} & \text{Payables} & \text{Cash} \\ \text{conversion} + & \text{collection} & - \text{ deferral} & = \text{conversion}. \\ \text{period} & \text{period} & \text{period} & \text{cycle} \end{array}$$

SKI's inventory turnover is given as 4.82 so we can calculate its inventory conversion period as:

$$\frac{365}{\text{Inventory turnover}} = \frac{365}{4.82} = 75.73 \approx 76 \text{ DAYS}.$$

SKI's receivables collection period is equal to its DSO. Its DSO is given as 45.63 days, or approximately 46 days.

We are given that its payables deferral period is 30 days, so now we have all the individual components to calculate SKI's cash conversion cycle.

$$76 \text{ days} + 46 \text{ days} - 30 \text{ days} = 92 \text{ days}.$$

Thus, SKI's cash conversion cycle is approximately 92 days.

d. What might SKI do to reduce its cash without harming operations?

Answer: To the extent that "cash and securities" consist of low-yielding securities, they could be sold off and the cash generated could be used to reduce debt, to buy back stock, or to invest in operating assets.

In an attempt to better understand SKI's cash position, Barnes developed a cash budget. Data for the first 2 months of the year are shown below. (Note that Barnes' preliminary cash budget does not account for interest income or interest expense.) He has the figures for the other months, but they are not shown.

SKI'S CASH BUDGET FOR JANUARY AND FEBRUARY

		November	December	January	February	March	April
I.	***Collections and purchases worksheet***						
(1)	Sales (gross)	$71,218	$68,212	$65,213	$52,475	$42,909	$30,524
	Collections:						
(2)	During month of sale (0.2)(0.98)(month's sales)			12,781.75	10,285.10		
(3)	During first month after sale 0.7(previous month's sales)			47,748.40	45,649.10		
(4)	During second month after sale 0.1(Sales 2 months ago)			7,121.80	6,821.20		
(5)	Total collections (lines 2 + 3 + 4)		$67,651.95	$62,755.40			
	Purchases:						
(6)	0.85(Forecasted sales 2 Months from now)		$44,603.75	$36,472.65	$25,945.40		
(7)	Payments (1-month lag)			44,603.75	36,472.65		
II.	***Cash gain or loss for month***						
(8)	Collections (from section I)			$67,651.95	$62,755.40		
(9)	Payments for purchases (from section I)			44,603.75	36,472.65		
(10)	Wages and salaries			6,690.56	5,470.90		
(11)	Rent			2,500.00	2,500.00		
(12)	Taxes						
(13)	Total payments			$53,794.31	$44,443.55		
(14)	Net cash gain (loss) during month (line 8 - line 13)			$13,857.64	$18,311.85		
III.	***Cash surplus or loan requirement***						
(15)	Cash at beginning of month if no borrowing is done			$ 3,000.00	$16,857.64		
(16)	Cumulative cash (cash at start, + gain Or - loss = line 14 + line 15)			16,857.64	35,169.49		
(17)	Target cash balance			1,500.00	1,500.00		
(18)	Cumulative surplus cash or loans outstanding to maintain $1,500 target cash balance (line 16 - line 17)			$15,357.64	$33,669.49		

e.	**Should depreciation expense be explicitly included in the cash budget? Why or why not?**

Answer: No, depreciation expense is a noncash charge and should not appear explicitly in the cash budget that focuses on the actual cash flowing into and out of a firm. However, a firm's depreciation expense does impact its tax liability, and hence depreciation affects SKI's quarterly tax payments.

f.	**In his preliminary cash budget, Barnes has assumed that all sales are collected and, thus, that SKI has no bad debts. Is this realistic? If not, how would bad debts be dealt with in a cash budgeting sense? (Hint: Bad debts will affect collections but not purchases.)**

Answer: It is not realistic to assume zero bad debts. When credit is granted, bad debts should be expected. Collections in each month would be lowered by the percentage of bad debts. Payments would be unchanged, so the result would be that loan balances would be larger and cash surplus balances would be smaller by the difference in the collection amounts.

g.	**Barnes' cash budget for the entire year, although not given here, is based heavily on his forecast for monthly sales. Sales are expected to be extremely low between May and September but then increase dramatically in the fall and winter. November is typically the firm's best month, when SKI ships equipment to retailers for the holiday season. Interestingly, Barnes' forecasted cash budget indicates that the company's cash holdings will exceed the targeted cash balance every month except for October and November, when shipments will be high but collections will not be coming in until later. Based on the ratios shown earlier, does it appear that SKI's target cash balance is appropriate? In addition to possibly lowering the target cash balance, what actions might SKI take to better improve its cash management policies, and how might that affect its EVA?**

Answer: The company's turnover of cash and its projected cash budget suggest that the company is holding too much cash. SKI could improve its EVA by either investing the cash in productive assets, or returning the cash to shareholders. If SKI uses the cash for profitable investments, its costs will remain the same, but its operating income will rise, thereby increasing EVA. On the other hand, if the company chooses to return the cash to its shareholders, for example, by increasing the dividend or repurchasing shares of common stock, the company's revenues would remain the same, but its overall cost of capital would fall, thereby increasing EVA.

h. What reasons might SKI have for maintaining a relatively high amount of cash?

Answer: If sales turn out to be considerably less than expected, the company could face a cash shortfall. A company may choose to hold large amounts of cash if it does not have much faith in its sales forecast or if it is very conservative. Unfortunately, given its current pressure to perform, SKI's management does not have the luxury to be extremely conservative.

i. Is there any reason to think that SKI may be holding too much inventory? If so, how would that affect EVA and ROE?

Answer: As pointed out in part a, SKI's inventory turnover (4.82) is considerably lower than the average firm's turnover (7.00). This indicates that the firm is carrying a lot of inventory per dollar of sales.

By holding more inventory per dollar of sales than is necessary, the firm is increasing its costs, which reduces its ROE. In addition, this additional working capital must be financed, so EVA is lowered too.

j. If the company reduces its inventory without adversely affecting sales, what effect should this have on the company's cash position (1) in the short run and (2) in the long run? Explain in terms of the cash budget and the balance sheet.

Answer: Reducing inventory purchases will increase the company's cash holdings in the short run, thus reducing the amount of financing or the target cash balance needed. In the long run, the company is likely to reduce its cash holdings in order to increase its EVA. SKI can use the "excess cash" to make investments in more productive assets such as plant and equipment. Alternatively, the firm can distribute the "excess cash" to its shareholders through higher dividends or repurchasing its shares.

In addition to improving the management of its current assets, SKI is also reviewing the ways in which it finances its current assets. With this concern in mind, Dan is also trying to answer the following questions.

k. Is it likely that SKI could make significantly greater use of accruals?

Answer: No, SKI could not make greater use of its accruals. Accruals arise because (1) workers are paid after they have actually provided their services, and (2) taxes are paid after the profits have been earned. Thus, accruals represent cash owed either to workers or to the Canada Revenue Agency (CRA). The cost of accruals is generally considered to be zero, since no explicit interest must be paid on these items.

The amount of accruals is generally limited by the amount of wages paid and the firm's profitability, as well as by industry conventions regarding when wage payments are made and CRA regulations regarding tax payments. A firm cannot ordinarily control its accruals. Firms use all the accruals they can, but they have little control over the levels of these accounts.

l. **Assume that SKI buys on terms of 1/10, net 30, but that it can get away with paying on the 40th day if it chooses not to take discounts. Also, assume that it purchases $506,985 of equipment per year, net of discounts. How much free trade credit can the company get, how much costly trade credit can it get, and what is the percentage cost of the costly credit? Should SKI take discounts?**

Answer: If SKI's net purchases are $506,985 annually, then, with a 1 percent discount, its gross purchases are $506,985/0.99 = $512,106. Net daily purchases from this supplier are $506,985/365 = $1,389.

If the discount is taken, then SKI must pay this supplier at the end of day 10 for purchases made on day 1, on day 11 for purchases made on day 2, and so on. Thus, in a steady state, SKI will on average have 10 days' worth of purchases in payables, so,

$$\text{Payables} = 10(\$1{,}389) = \$13{,}890.$$

If the discount is not taken, then SKI will wait 40 days before paying, so

$$\text{Payables} = 40(\$1{,}389) = \$55{,}560.$$

Therefore:

Trade credit if discounts are not taken:	$55,560 = total trade credit
Trade credit if discounts are taken:	-13,890 = free trade credit
Difference:	$41,670 = costly trade credit

To obtain $41,670 of costly trade credit, SKI must give up 0.01($512,106) = $5,121 in lost discounts annually. Since the forgone discounts pay for $41,670 of credit, the nominal annual interest rate is 12.29 percent:

$$\frac{\$5{,}121}{\$41{,}670} = 0.1229 = 12.29\%.$$

Here is a formula that can be used to find the nominal annual interest rate of costly trade credit:

$$\frac{\text{Nominal cost}}{\text{of trade credit}} = \frac{\text{Discount \%}}{1 - \text{Discount \%}} \times \frac{365 \text{ Days}}{\text{Days taken} - \text{discount period}}.$$

In this situation,

$$\frac{1}{99} \times \frac{365}{40 - 10} = 0.0101 \times 12.1667 = 0.1229 = 12.29\%.$$

Note (1) that the formula gives the same nominal annual interest rate as was calculated earlier, (2) that the first term is the periodic cost of the credit (SKI spends \$1 to get the use of \$99), and (3) that the second term is the number of "savings periods" per year (SKI delays payment for 40 - 10 = 30 days), and there are 365/30 = 12.1667 30-day periods in a year. Therefore, we could calculate the exact effective annual interest rate as: effective rate = $(1.0101)^{12.1667} - 1 = 13.01\%$.

If SKI can obtain financing from its bank (or from other sources) at an interest rate of less than 13.01 percent, it should borrow the funds and take discounts.

m.	**SKI tries to match the maturity of its assets and liabilities. Describe how SKI could adopt either a more aggressive or more conservative financing policy.**

Answer: There are three alternative current asset financing policies: aggressive, moderate, and relaxed. A moderate financing policy matches asset and liability maturities. (Of course exact maturity matching is not possible because of (1) the uncertainty of asset lives and (2) some common equity must be used and common equity has no maturity.) With this strategy, the firm minimizes its risk that it will be unable to pay off maturing obligations. An aggressive financing policy occurs when the firm finances all of its fixed assets with long-term capital, but part of its permanent current assets with short-term, nonspontaneous credit. There are degrees of aggressiveness; in fact, a firm could choose to finance all of its permanent current assets and part of its fixed assets with short-term credit; this would be a highly aggressive position, and one that would subject the firm to the dangers of rising interest rates as well as to loan renewal problems. A conservative financing policy occurs when the firm finances all of its permanent asset requirements and some of its seasonal demands with permanent capital. This position is a very safe one. Therefore, an aggressive financing policy uses the greatest amount of short-term debt, while the conservative policy uses the least. The maturity matching policy falls between these two policies.

n. What are the advantages and disadvantages of using short-term debt as a source of financing?

Answer: Although using short-term credit is generally riskier than using long-term credit, short-term credit does have some significant advantages. A short-term loan can be obtained much faster than long-term credit. Lenders insist on a more thorough financial examination before extending long-term credit. If a firm's needs for funds are seasonal or cyclical, it may not want to commit to long-term debt because: (1) flotation costs are generally high for long-term debt but trivial for short-term debt; (2) prepayment penalties with long-term debt can be expensive. Short-term debt provides flexibility; (3) long-term loan agreements contain provisions that constrain a firm's future actions. Short-term credit agreements are less onerous; (4) the yield curve is normally upward sloping, indicating that interest rates are generally lower on short-term than on long-term debt.

Even though short-term debt is often less expensive than long-term debt, short-term debt subjects the firm to more risk than long-term financing. The reasons for this are: (1) if a firm uses long-term debt, its interest costs will be relatively stable over time; however, if the firm uses short-term debt, its interest expense will fluctuate widely. (2) if a firm borrows heavily on a short-term basis, it may find itself unable to repay this debt, and it may be in such a weak financial position that the lender will not extend the loan, which could force the firm into bankruptcy.

o. Would it be feasible for SKI to finance with commercial paper?

Answer: It would not be feasible for SKI to finance with commercial paper. Commercial paper is unsecured, short-term debt issued by large, financially strong firms and sold primarily to other business firms, to insurance companies, to pension funds, to money market mutual funds, and to banks. Maturities are generally 270 days (9 months) or less. There is an active, liquid market for commercial paper, and, since there is relatively little default risk, commercial paper rates are generally less than the prime rate. Note, though, that issuers of commercial paper are required to have back-up lines of bank credit that can be used to pay off the paper if need be when it matures. These back-up credit lines have a cost, and this cost must be added to the interest rate on the paper to determine its effective cost. Since only large, well-known, financially strong companies can issue commercial paper, it would be impossible for SKI to tap this market.