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# CHAPTER 18

## SHORT-TERM FINANCE AND PLANNING

### Learning Objectives

- LO1** The operating and cash cycles and why they are important.
- LO2** The different types of short-term financial policy.
- LO3** The essentials of short-term financial planning.
- LO4** The sources and uses of cash on the balance sheet.
- LO5** The different types of short-term borrowing.

### Answers to Concepts Review and Critical Thinking Questions

1. **(LO1)** These are firms with relatively long inventory periods and/or relatively long receivables periods. Thus, such firms tend to keep inventory on hand, and they allow customers to purchase on credit and take a relatively long time to pay.
2. **(LO1)** These are firms that have a relatively long time between the time purchased inventory is paid for and the time that inventory is sold and payment received. Thus, these are firms that have relatively short payables periods and/or relatively long receivable cycles.
3. **(LO4)**
  - a. Use: The cash balance declined by \$200 to pay the dividend.
  - b. Source: The cash balance increased by \$500, assuming the goods bought on payables credit were sold for cash.
  - c. Use: The cash balance declined by \$900 to pay for the fixed assets.
  - d. Use: The cash balance declined by \$625 to pay for the higher level of inventory.
  - e. Use: The cash balance declined by \$1,200 to pay for the redemption of debt.
4. **(LO2)** Carrying costs will decrease because they are not holding goods in inventory. Shortage costs will probably increase depending on how close the suppliers are and how well they can estimate need. The operating cycle will decrease because the inventory period is decreased.
5. **(LO1)** Since the cash cycle equals the operating cycle minus the accounts payable period, it is not possible for the cash cycle to be longer than the operating cycle if the accounts payable period is positive. Moreover, it is unlikely that the accounts payable period would ever be negative since that implies the firm pays its bills before they are incurred.
6. **(LO1)** It lengthened its payables period, thereby shortening its cash cycle *but had no effect on the operating cycle*.
7. **(LO1)** Their receivables period increased, thereby increasing their operating and cash cycles.
8. **(LO1)** It is sometimes argued that large firms “take advantage of” smaller firms by threatening to take their business elsewhere. However, considering a move to another supplier to get better terms is the nature of competitive free enterprise. The suppliers in turn are welcome to stop supplying BlueSky and to provide their services to firms with faster payment cycles.

9. **(LO1)** They would like to! The payables period is a subject of much negotiation, and it is one aspect of the price a firm pays its suppliers. A firm will generally negotiate the best possible combination of payables period and price. Typically, suppliers provide strong financial incentives for rapid payment. This issue is discussed in detail in a later chapter on credit policy.
10. **(LO1)** BlueSky will need less financing because it is essentially borrowing more from its suppliers. Among other things, BlueSky will likely need less short-term borrowing from other sources, so it will save on interest expense.

### **Solutions to Questions and Problems**

*NOTE: All end of chapter problems were solved using a spreadsheet. Many problems require multiple steps. Due to space and readability constraints, when these intermediate steps are included in this solutions manual, rounding may appear to have occurred. However, the final answer for each problem is found without rounding during any step in the problem.*

#### **Basic**

1. **(LO4)**
  - a. No change. A dividend paid for by the sale of debt will not change cash since the cash raised from the debt offer goes immediately to shareholders.
  - b. No change. The real estate is paid for by the cash raised from the short term debt, so this will not change the cash balance.
  - c. No change. Inventory and accounts payable will increase, but neither will impact the cash account.
  - d. Decrease. The short-term bank loan is repaid with cash, which will reduce the cash balance.
  - e. Decrease. The payment of taxes is a cash transaction.
  - f. Decrease. The preferred stock will be repurchased with cash.
  - g. No change. Accounts receivable will increase, but cash will not increase until the sales are paid off.
  - h. Decrease. The interest is paid with cash, which will reduce the cash balance.
  - i. Increase. When payments for previous sales, or accounts receivable, are paid off, the cash balance increases since the payment must be made in cash.
  - j. Decrease. The accounts payable are reduced through cash payments to suppliers.
  - k. Decrease. Here the dividend payments are made with cash, which is generally the case. This is different from part *a* where debt was raised to make the dividend payment.
  - l. No change. The short-term note will not change the cash balance.
  - m. Decrease. The utility bills must be paid in cash.
  - n. Decrease. A cash payment will reduce cash.
  - o. Increase. If marketable securities are sold, the company will receive cash from the sale.

2. **(LO3)** The total liabilities and equity of the company are the net book worth, or market value of equity, plus current liabilities and long-term debt, so:

$$\text{Total liabilities and equity} = \$12,875 + 1,960 + 8,100$$

$$\text{Total liabilities and equity} = \$22,935$$

This is also equal to the total assets of the company. Since total assets are the sum of all assets, and cash is an asset, the cash account must be equal to total assets minus all other assets, so:

$$\text{Cash} = \$22,935 - 16,590 - 2,750 - 1,960$$

$$\text{Cash} = \$1,635$$

We have NWC other than cash, so the total NWC is:

$$\text{NWC} = \$2,750 + 1,635$$

$$\text{NWC} = \$4,385$$

We can find total current assets by using the NWC equation. NWC is equal to:

$$\text{NWC} = \text{CA} - \text{CL}$$

$$\$4,385 = \text{CA} - \$1,960$$

$$\text{CA} = \$6,345$$

3. **(LO1)**
- a. Increase. If receivables go up, the time to collect the receivables would increase, which increases the operating cycle.
  - b. Increase. If credit repayment times are increased, customers will take longer to pay their bills, which will lead to an increase in the operating cycle.
  - c. Decrease. If the inventory turnover increases, the inventory period decreases.
  - d. No change. The accounts payable period is part of the cash cycle, not the operating cycle.
  - e. Decrease. If the receivables turnover increases, the receivables period decreases.
  - f. No change. Payments to suppliers affects the accounts payable period, which is part of the cash cycle, not the operating cycle.
4. **(LO1)**
- a. Increase; Increase. If the terms of the cash discount are made less favorable to customers, the accounts receivable period will lengthen. This will increase both the cash cycle and the operating cycle.
  - b. Increase; No change. This will shorten the accounts payable period, which will increase the cash cycle. It will have no effect on the operating cycle since the accounts payable period is not part of the operating cycle.

- c. Decrease; Decrease. If more customers pay in cash, the accounts receivable period will decrease. This will decrease both the cash cycle and the operating cycle.
- d. Decrease; Decrease. Assume the accounts payable period does not change. Fewer raw materials purchased will reduce the inventory period, which will decrease both the cash cycle and the operating cycle.
- e. Decrease; No change. If more raw materials are purchased on credit, the accounts payable period will tend to increase, which would decrease the cash cycle. We should say that this may not be the case. The accounts payable period is a decision made by the company's management. The company could increase the accounts payable account and still make the payments in the same number of days. This would leave the accounts payable period unchanged, which would leave the cash cycle unchanged. The change in credit purchases made on credit will not affect the inventory period or the accounts payable period, so the operating cycle will not change.
- f. Increase; Increase. If more goods are produced for inventory, the inventory period will increase. This will increase both the cash cycle and operating cycle.

**5. (LO3)**

- a. A 45-day collection period implies all receivables outstanding from the previous quarter are collected in the current quarter, and:

$(90 - 45)/90 = 1/2$  of current sales are collected. So:

	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>
Beginning receivables	\$345.00	\$410.00	\$425.00	\$465.00
Sales	820.00	850.00	930.00	1,010.00
Cash collections	<u>(755.00)</u>	<u>(835.00)</u>	<u>(890.00)</u>	<u>(970.00)</u>
Ending receivables	<u>\$410.00</u>	<u>\$425.00</u>	<u>\$465.00</u>	<u>\$505.00</u>

- b. A 60-day collection period implies all receivables outstanding from previous quarter are collected in the current quarter, and:

$(90-60)/90 = 1/3$  of current sales are collected. So:

	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>
Beginning receivables	\$345.00	\$546.67	\$566.67	\$620.00
Sales	820.00	850.00	930.00	1,010.00
Cash collections	<u>(618.33)</u>	<u>(830.00)</u>	<u>(876.67)</u>	<u>(956.67)</u>
Ending receivables	<u>\$546.67</u>	<u>\$566.67</u>	<u>\$620.00</u>	<u>\$673.33</u>

- c. A 30-day collection period implies all receivables outstanding from previous quarter are collected in the current quarter, and:

$(90-30)/90 = 2/3$  of current sales are collected. So:

	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>
Beginning receivables	\$345.00	\$273.33	\$283.33	\$310.00
Sales	820.00	850.00	930.00	1,010.00
Cash collections	<u>(891.67)</u>	<u>(840.00)</u>	<u>(903.33)</u>	<u>(983.33)</u>
Ending receivables	<u><u>\$273.33</u></u>	<u><u>\$283.33</u></u>	<u><u>\$310.00</u></u>	<u><u>\$336.67</u></u>

6. (LO1) The operating cycle is the inventory period plus the receivables period. The inventory turnover and inventory period are:

Inventory turnover =  $\text{COGS}/\text{Average inventory}$   
 Inventory turnover =  $\$69,382/\{[\$10,583 + 12,142]/2\}$   
 Inventory turnover = 6.1062 times

Inventory period =  $365 \text{ days}/\text{Inventory turnover}$   
 Inventory period =  $365 \text{ days}/6.1062$   
 Inventory period = 59.77 days

And the receivables turnover and receivables period are:

Receivables turnover =  $\text{Credit sales}/\text{Average receivables}$   
 Receivables turnover =  $\$97,381/\{[\$5,130 + 5,340]/2\}$   
 Receivables turnover = 18.6019 times

Receivables period =  $365 \text{ days}/\text{Receivables turnover}$   
 Receivables period =  $365 \text{ days}/18.6019$   
 Receivables period = 19.62 days

So, the operating cycle is:

Operating cycle =  $59.77 \text{ days} + 19.62 \text{ days}$   
 Operating cycle = 79.39 days

The cash cycle is the operating cycle minus the payables period. The payables turnover and payables period are:

Payables turnover =  $\text{COGS}/\text{Average payables}$   
 Payables turnover =  $\$69,382/\{[\$7,205 + 7,630]/2\}$   
 Payables turnover = 9.3538 times

Payables period =  $365 \text{ days}/\text{Payables turnover}$   
 Payables period =  $365 \text{ days}/9.3538$   
 Payables period = 39.02 days

So, the cash cycle is:

Cash cycle = 79.39 days – 39.02 days

Cash cycle = 40.37 days

The firm is receiving cash on average 40.37 days after it pays its bills.

7. **(LO5)** If we factor immediately, we receive cash on an average of 32 days sooner. The number of periods in a year are:

Number of periods = 365/32

Number of periods = 11.40625

The EAR of this arrangement is:

EAR =  $(1 + \text{Periodic rate})^m - 1$

EAR =  $(1 + 1.35/98.65)^{11.40625} - 1$

EAR = .1677 or 16.77%

8. **(LO3)**

- a. The payables period is zero since the company pays immediately. The payment in each period is 30 percent of next period's sales, so:

	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>
Payment of accounts	\$261.00	\$249.00	\$279.00	\$272.55

- b. Since the payables period is 90 days, the payment in each period is 30 percent of the current period's sales, so:

	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>
Payment of accounts	\$237.00	\$261.00	\$249.00	\$279.00

- c. Since the payables period is 60 days, the payment in each period is 2/3 of last quarter's orders, plus 1/3 of this quarter's orders, or:

Quarterly payments = 2/3(.30) times current sales + 1/3(.30) next period sales.

	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>
Payment of accounts	\$245.00	\$257.00	\$259.00	\$276.85

9. **(LO3)** Since the payables period is 60 days, the payables in each period will be:

Payables each period = 2/3(0.75) of last quarter's orders + 1/3(0.75) of this quarter's orders

Payables each period = 2/3(0.75) times current sales + 1/3(0.75) next period sales

	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>
Payment of accounts	\$1,563.75	\$1,640.00	\$1,400.00	\$1,465.00
Wages, taxes, other expenses	394.00	463.00	386.00	348.00
Long-term financing expenses	90.00	90.00	90.00	90.00

Total	\$2,047.75	\$2,193.00	\$1,876.00	\$1,903.00
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**10. (LO3)**

- a. The November sales must have been the total uncollected sales minus the uncollected sales from December, divided by the collection rate two months after the sale, so:

$$\begin{aligned} \text{November sales} &= (\$86,000 - 59,000)/0.15 \\ \text{November sales} &= \$180,000 \end{aligned}$$

- b. The December sales are the uncollected sales from December divided by the collection rate of the previous months' sales, so:

$$\begin{aligned} \text{December sales} &= \$59,000/0.35 \\ \text{December sales} &= \$168,571.43 \end{aligned}$$

- c. The collections each month for this company are:

$$\text{Collections} = .15(\text{Sales from 2 months ago}) + .20(\text{Last month's sales}) + .65(\text{Current sales})$$

$$\begin{aligned} \text{January collections} &= .15(\$180,000) + .20(\$168,571.43) + .65(\$195,000) \\ \text{January collections} &= \$187,464.29 \end{aligned}$$

$$\begin{aligned} \text{February collections} &= .15(\$168,571.43) + .20(\$195,000) + .65(\$215,000) \\ \text{February collections} &= \$204,035.71 \end{aligned}$$

$$\begin{aligned} \text{March collections} &= .15(\$195,000) + .20(\$215,000) + .65(\$238,000) \\ \text{March collections} &= \$226,950 \end{aligned}$$

**11. (LO3)** The sales collections each month will be:

$$\text{Sales collections} = .35(\text{current month sales}) + .60(\text{previous month sales})$$

Given this collection, the cash budget will be:

	<u>April</u>	<u>May</u>	<u>June</u>
Beginning cash balance	\$135,000	\$90,020	\$70,205
Cash receipts			
Cash collections from credit sales	272,040	346,965	356,875
Total cash available	407,040	436,985	427,080
Cash disbursements			
Purchases	\$161,300	\$148,900	\$169,300
Wages, taxes, and expenses	54,340	70,300	75,170
Interest	12,580	12,580	12,580
Equipment purchases	88,800	135,000	0
Total cash disbursements	\$317,020	\$366,780	\$257,050
Ending cash balance	90,020	70,205	170,030

**12. (LO4)**

Item	<u>Source/Use</u>	<u>Amount</u>
Cash	Use	\$928
Accounts receivable	Use	-\$3,784
Inventories	Use	-\$3,230
Property, plant, and equipment	Use	-\$11,198
Accounts payable	Source	\$2,337
Accrued expenses	Use	-\$713
Long-term debt	Source	\$2,640
Common stock	Source	\$4,400
Accumulated retained earnings	Source	\$1,415

**Intermediate****13. (LO3)**

- a) If you borrow \$50,000,000 for one month, you will pay interest of:

$$\text{Interest} = \$50,000,000 \times 0.0047$$

$$\text{Interest} = \$235,000$$

However, with the compensating balancer you will only get the use of:

$$\text{Amount received} = \$50\text{M} - \$50\text{M} \times .04$$

$$\text{Amount actually receive} = \$48,000,000$$

This means the periodic rate actually is:

$$\text{Periodic rate} = \$235,000 / \$48,000,000$$

$$\text{Periodic rate} = 0.0048958 \text{ or } 0.48958\%$$

$$\text{So, the EAR is: } \text{EAR} = (1 + (235,000 / 48,000,000)^{12}) - 1$$

$$\text{EAR} = 0.060358 \text{ or } 6.0358\%$$

- b) To end up with \$15,000,000, you must borrow:

$$\text{Amount to borrow} = \$15,000,000 / (1 - .04) = \$15,625,000$$

The total interest you will pay on the loan is:

$$\text{Total interest paid} = \$15,625,000 (1.0048958)^6 - \$15,625,000 = \mathbf{\$464,635.76}$$

**14. (LO3)**

a.

The EAR of the revolving credit arrangement is:

$$\text{EAR} = 1.0105^4 - 1 = 0.042666143\% \text{ or } 4.27\%$$

b.

To calculate the EAR of the loan, we can divide the interest on the loan by the amount of the loan. The interest on the loan includes the opportunity cost of the compensating balance. The opportunity cost is the amount of the

compensating balance times the potential interest rate you could have earned. The compensating balance is only on the unused portion of the credit line, so:

$$\text{Opportunity cost} = 0.04(\$70,000,000 - \$45,000,000)(1.0105)^4 - 0.04(\$70,000,000 - \$45,000,000)$$

$$\text{Opportunity cost} = \$42,666.14$$

And the interest you will pay to the bank on the loan is:

$$\text{Interest cost} = \$45,000,000(1.019)^4 - \$45,000,000$$

$$\text{Interest cost} = \$3,518,710.48$$

So, the EAR of the loan in the amount of \$45 million is:

$$\text{EAR} = (\$3,518,710.48 + \$42,666.14) / \$45,000,000$$

$$\text{EAR} = 0.079141703 \text{ or } 7.91\%$$

**c.**

The compensating balance is only applied to the unused portion of the credit line, so the EAR of a loan on the full credit line is:

$$\text{EAR} = 1.019^4 - 1$$

$$\text{EAR} = 0.078193566 \text{ or } 7.8193566\%$$

**15. (LO3)**

a. A 45-day collection period means sales collections each quarter are:

$$\text{Collections} = 1/2 \text{ current sales} + 1/2 \text{ old sales}$$

A 36-day payables period means payables each quarter are:

$$\text{Payables} = 3/5 \text{ current orders} + 2/5 \text{ old orders}$$

So, the cash inflows and disbursements each quarter are:

	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>
Beginning receivables	\$68.00	\$80.00	87.50	95.00
Sales	160.00	175.00	190.00	215.00
Collection of accounts	148.00	167.50	182.50	202.50
Ending receivables	\$80.00	87.50	95.00	107.50
Payment of accounts	\$76.05	82.80	92.25	84.60
Wages, taxes, and expenses	40.00	43.75	47.50	53.75
Capital expenditures		75.00		
Interest & dividends	12.00	12.00	12.00	12.00
Total cash disbursements	\$128.05	213.55	151.75	150.35
Total cash collections	\$148.00	167.50	182.50	202.50
Total cash disbursements	128.05	213.55	151.75	150.35

Net cash inflow	\$19.95	(46.05)	30.75	52.15
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The company's cash budget will be:

Cottonwood INC. Cash Budget (in millions)				
	Q1	Q2	Q3	Q4
Beginning cash balance	\$49.00	68.95	22.90	53.65
Net cash inflow	19.95	-46.05	30.75	52.15
Ending cash balance	\$68.95	22.90	53.65	105.80
Minimum cash balance	-30.00	-30.00	-30.00	-30.00
Cumulative surplus (deficit)	\$38.95	(7.10)	23.65	75.80

With a \$30 million minimum cash balance, the short-term financial plan will be:

Cottonwood INC. Short-Term Financial Plan (in millions)				
	Q1	Q2	Q3	Q4
Beginning cash balance	\$30.00	\$30.00	\$30.00	\$30.00
Net cash inflow	19.95	-46.05	30.75	52.15
New short-term investments	-20.33	0	-24.64	-52.64
Income on short-term investments	0.38	0.79	0	0.49
Short-term investments sold	0	39.33	0	0
New short-term borrowing	0	5.93	0	0
Interest on short-term borrowing	0	0	-0.18	0
Short-term borrowing repaid	0	0	-5.93	0
Ending cash balance	\$30.00	\$30.00	\$30.00	\$30.00
Minimum cash balance	-30.00	-30.00	-30.00	-30.00
Cumulative surplus (deficit)	\$0	\$0	\$0	\$0
Beginning short-term investments	19.00	39.33	0	24.64
Ending short-term investments	39.33	0	24.64	77.28
Beginning short-term debt	\$0	\$0	5.93	\$0
Ending short-term debt	\$0	5.93	\$0	\$0

Below you will find the interest paid (or received) for each quarter:

Q1: excess funds at start of quarter of \$19 invested for 1 quarter earns  $.02(\$19) = \$0.38$  income

Q2: excess funds of \$39.33 invested for 1 quarter earns  $.02(\$39.335) = \$0.7866$  in income

Q3: excess funds of \$5.93 borrowed for 1 quarter pays  $.03(\$5.93) = \$0.17802$  interest

Q4: excess funds of \$24.64 invested for 1 quarter earns  $.02(\$24.64) = \$0.493$  in income

$$\text{Net cash cost} = \$0.38 + 0.79 - 0.178 + 0.493 = \$1.485$$

**16. (LO3)**

a. With a minimum cash balance of \$40 million, the short-term financial plan will be:

Cottonwood INC.  
Short-Term Financial Plan  
(in millions)

	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>
Beginning cash balance	\$40.00	\$40.00	\$40.00	\$40.00
Net cash inflow	19.95	-46.05	30.75	52.15
New short-term investments	-20.13	0	-13.92	-52.43
Income on short-term investments	0.18	0.58	0	0.28
Short-term investments sold	0	29.13	0	0
New short-term borrowing	0	16.34	0	0
Interest on short-term borrowing	0	0	-.49	0
Short-term borrowing repaid	0	0	-16.34	0
Ending cash balance	\$40.00	\$40.00	\$40.00	\$40.00
Minimum cash balance	-40.00	-40.00	-40.00	-40.00
Cumulative surplus (deficit)	\$0	\$0	\$0	\$0
Beginning short-term investments	\$9.00	29.13	\$0	13.92
Ending short-term investments	29.13	\$0	\$13.92	66.35
Beginning short-term debt	\$0	\$0	16.34	\$0
Ending short-term debt	\$0	16.34	\$0	\$0

Below you will find the interest paid (or received) for each quarter:

Q1: excess funds at start of quarter of \$9 invested for 1 quarter earns  $.02(\$9) = \$0.18$  income

Q2: excess funds of \$29.13 invested for 1 quarter earns  $.02(\$29.13) = \$0.58$  in income

Q3: shortage of funds of \$16.34 borrowed for 1 quarter costs  $.03(\$16.34) = \$0.49$  in interest

Q4: excess funds of \$13.92 invested for 1 quarter earns  $.02(\$13.92) = \$0.28$  in income

$$\text{Net cash cost} = \$0.18 + 0.58 - 0.49 + 0.28 = \$0.55$$

b. And with a minimum cash balance of \$10 million, the short-term financial plan will be:

Cottonwood INC.  
Short-Term Financial Plan  
(in millions)

	Q1	Q2	Q3	Q4
Beginning cash balance	\$20.00	\$20.00	\$20.00	\$20.00
Net cash inflow	19.95	-46.05	30.75	52.15
New short-term investments	<b>-\$20.53</b>	\$0.00	<b>-\$30.84</b>	<b>-\$52.86</b>
Income on short-term investments	\$0.58	\$0.99	\$0.09	\$0.71
Short-term investments sold	0	\$45.06	0	0
New short-term borrowing	0	0	0	0
Interest on short-term borrowing	0	0	0	0
Short-term borrowing repaid	0	0	0	0
Ending cash balance	\$20.00	\$20.00	\$20.00	\$20.00
Minimum cash balance	-20.00	-20.00	-20.00	-20.00
Cumulative surplus (deficit)	0	0	0	0
Beginning short-term investments	\$29.00	\$49.53	\$4.47	\$35.31
Ending short-term investments	\$49.53	\$4.47	\$35.31	\$88.17
Beginning short-term debt	0	0	0	0
Ending short-term debt	0	0	0	0

Below you will find the interest paid (or received) for each quarter:

Q1: excess funds at start of quarter of \$29 invested for 1 quarter earns  $.02(\$29) = \$0.58$  income

Q2: excess funds of \$49.53 invested for 1 quarter earns  $.02(\$49.53) = \$0.99$  in income

Q3: excess funds of \$4.47 invested for 1 quarter earns  $.02(\$4.47) = \$0.09$  in interest

Q4: excess funds of \$35.31 invested for 1 quarter earns  $.02(\$35.31) = \$0.71$  in income

Net cash cost =  $\$.58 + 0.99 + 0.09 + .71 = \$2.37$

Since cash has an opportunity cost, the firm can boost its profit if it keeps its minimum cash balance low and invests the cash instead. However, the tradeoff is that in the event of unforeseen circumstances, the firm may not be able to meet its short-run obligations if enough cash is not available.

**Challenge**

**17. (LO5)**

- a. For every dollar borrowed, you pay interest of:

$$\text{Interest} = \$1(.021) = \$0.021$$

You also must maintain a compensating balance of 4 percent of the funds borrowed, so for each dollar borrowed, you will only receive:

$$\text{Amount received} = \$1(1 - .04) = \$0.96$$

We can adjust the EAR equation we have been using to account for the compensating balance by dividing the EAR by one minus the compensating balance, so:

$$\begin{aligned}\text{EAR} &= [(1.021)^4 - 1]/(1 - .04) \\ \text{EAR} &= .0903 \text{ or } 9.03\%\end{aligned}$$

Another way to calculate the EAR is using the FVIF (or PVIF). For each dollar borrowed, we must repay:

$$\begin{aligned}\text{Amount owed} &= \$1(1.021)^4 \\ \text{Amount owed} &= \$1.0867\end{aligned}$$

At the end of the year the compensating balance will be returned, so your net cash flow at the end of the year will be:

$$\begin{aligned}\text{End of year cash flow} &= \$1.0867 - .04 \\ \text{End of year cash flow} &= \$1.0467\end{aligned}$$

The present value of the end of year cash flow is the amount you receive at the beginning of the year, so the EAR is:

$$\begin{aligned}\text{FV} &= \text{PV}(1 + R) \\ \$1.0467 &= \$0.96(1 + R) \\ R &= \$1.0467/\$0.96 - 1 \\ \text{EAR} &= .0903 \text{ or } 9.03\%\end{aligned}$$

- b. The EAR is the amount of interest paid on the loan divided by the amount received when the loan is originated. The amount of interest you will pay on the loan is the amount of the loan times the effective annual interest rate, so:

$$\begin{aligned}\text{Interest} &= \$130,000,000[(1.021)^4 - 1] \\ \text{Interest} &= \$11,268,821\end{aligned}$$

For whatever loan amount you take, you will only receive 96 percent of that amount since you must maintain a 4 percent compensating balance on the portion of the credit line used. The credit line also has a fee of .150 percent, so you will only get to use:

$$\begin{aligned} \text{Amount received} &= .96(\$130,000,000) - .0015 (\$400,000,000) \\ \text{Amount received} &= \$124,200,000 \end{aligned}$$

So, the EAR of the loan is:

$$\begin{aligned} \text{EAR} &= \$11,268,821/\$124,200,000 \\ \text{EAR} &= .0907 \text{ or } 9.07\% \end{aligned}$$

### 18. (LO5)

Assuming this is an annual interest rate, for every dollar borrowed, you pay interest of:

$$\text{Annual Interest} = \$1(.0775) = \$0.0775$$

You also must maintain a compensating balance of 5 percent of the funds borrowed, so for each dollar borrowed, you will only receive:

$$\text{Amount received} = \$1(1 - .05) = \$0.95$$

We can adjust the EAR equation we have been using to account for the compensating balance by dividing the EAR by one minus the compensating balance, so:

$$\begin{aligned} \text{EAR} &= 0.0775/(1 - .05) \\ \text{EAR} &= .0816 \text{ or } 8.16\% \end{aligned}$$

### 19. (LO2,3)

- a. Calgary Compressor's current assets are financed through a combination of current liabilities, long-term debt, and equity. On the other hand, Pnew Brunswick Pneumatic's current assets are not financed with long-term debt. Its current assets are only financed through current liabilities and equity.
- b. Calgary Compressor has the larger absolute investment in current assets (\$92,616 vs. 70,101). However, a better metric is to measure current assets as a percentage of total assets or sales. In this case, the two companies had the following percentages of total assets in current assets

<b>CALGARY COMPRESSOR</b>		
	<b>2014</b>	<b>2015</b>
Current assets:	\$85,404	\$92,616
Total Assets	\$167,991	\$174,794
Revenue		\$162,749
Current assets:		
As % of Total Assets	50.84%	52.99%
As % of Revenue		56.91%

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**PNEW BRUNSWICK PNEUMATIC**

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	<b>2014</b>	<b>2015</b>
Current assets:	\$78,434	\$70,101
Total Assets	\$93,343	\$85,147
Revenue		\$91,374

## Current assets:

As % of Total Assets    84.03%    82.33%

As % of Revenue                            76.72%

Pnew Brunswick Pneumatic has a much higher percentage of assets in current assets. In 2015, it was 82.33% vs. 52.99% for Calgary Compressor. In terms of as a percentage of sales, Pnew Brunswick Pneumatic's current assets was 76.72% vs. 56.91% in 2015.

- c. Carrying costs rise as a firm has higher current assets. In this case, Pnew Brunswick Pneumatic has a higher opportunity cost as its current assets are much higher than Calgary Compressor. This is due to the firm keeping a large percentage of assets in inventory and accounts receivable. Inventory and accounts receivable earn no interest and thus incur an opportunity cost.

In terms of shortage costs, Calgary Compressor is much more likely to have to face these costs due to its lower level of current assets. For example, its smaller inventory could result in higher order costs as the firm orders inventory more frequently or more lost sales or customer goodwill as stock outs occur.