

■ Solutions to Problems

P14-1. LG 1: Payment dates

Basic

- a. December 25
- b. December 30
- c. January 9
- d. January 29

P14-2. LG 1: Cost of giving up cash discount

Basic

- a. $(0.02 \div 0.98) \times (365 \div 20) = 37.24\%$
- b. $(0.01 \div 0.99) \times (365 \div 20) = 18.43\%$
- c. $(0.02 \div 0.98) \times (365 \div 35) = 21.28\%$
- d. $(0.03 \div 0.97) \times (365 \div 35) = 32.25\%$
- e. $(0.01 \div 0.99) \times (365 \div 50) = 7.37\%$
- f. $(0.03 \div 0.97) \times (365 \div 20) = 56.44\%$
- g. $(0.04 \div 0.96) \times (365 \div 170) = 8.95\%$

P14-3. LG 1: Credit terms

Basic

- a. 1/15 net 45 date of invoice
2/10 net 30 EOM
2/7 net 28 date of invoice
1/10 net 60 EOM
- b. 45 days
49 days
28 days
79 days

- c. Cost of giving up cash discount = $\frac{CD}{100\% - CD} \times \frac{365}{N}$
- Cost of giving up cash discount = $\frac{1\%}{100\% - 1\%} \times \frac{365}{30}$
- Cost of giving up cash discount = $0.0101 \times 12.17 = 0.1229 = 12.29\%$
- Cost of giving up cash discount = $\frac{2\%}{98\%} \times \frac{365}{(49 - 10)}$
- Cost of giving up cash discount = $0.0204 \times 9.359 = 0.1909 = 19.09\%$
- Cost of giving up cash discount = $\frac{2\%}{100\% - 2\%} \times \frac{365}{21}$
- Cost of giving up cash discount = $0.0204 \times 17.38 = 0.3646 = 36.46\%$
- Cost of giving up cash discount = $\frac{1\%}{100\% - 1\%} \times \frac{365}{(79 - 10)}$
- Cost of giving up cash discount = $0.0101 \times 5.2899 = 0.0534 = 5.34\%$
- d. For the first three purchases the firm would be better off to borrow the funds and take the discount. The annual cost of not taking the discount is less than the firm's 8% cost of capital in the last case.

P14-4. LG 1: Cash discount versus loan

Basic

$$\text{Cost of giving up cash discount} = (0.03 \div 0.97) \times (365 \div 35) = 32.25\%$$

Since the cost of giving up the discount is higher than the cost of borrowing for a short-term loan, Erica is correct; her boss is incorrect.

P14-5. LG 2: Personal finance: Borrow or pay cash for an asset

- a. Calculate the down payment on the loan

Loan principal	\$ 3,000
Down-payment required	<u>10%</u>
Cash down-payment on loan	\$ 300.00

- b. Calculate the monthly payment on the loan

PVA	\$2,700.00
Annual rate, r	4%
N	24
PVIFA	23.0283
Monthly payment	\$ 117.25

- c. Cash price of dining room set

Cash price of dining room set	\$ 3,000
Cash rebate	\$ 200
Cash purchase after rebate	\$ 2,800
Less: Cash down payment on loan	<u>(300)</u>
Net initial cash outlay under cash purchase option	\$ 2,500

d.	Earnings on savings	5.20%
	Years	2
	Net initial cash outlay	\$ 2,500
	Opportunity cost under the cash purchase option	\$ 260
e.	Opportunity cost	\$ 260
	Net initial cash outlay	\$ 2,500
	Cost of cash option	\$ 2,760
f.	Cost of the financing alternative ($24 \times \$117.25$)	\$ 2,814
	Cost of the cash option	\$ 2,760

Because it is less expensive, Bob and Carol should pay cash for the furniture. The lower cost of the cash alternative is largely the result of the \$300 cash rebate.

P14-6. LG 1, 2: Cash discount decisions

Intermediate

a. Supplier	Cost of Forgoing Discount	b. Decision
J	$(0.01 \div 0.99) \times (365 \div 20) = 18.43\%$	Borrow
K	$(0.02 \div 0.98) \times (365 \div 60) = 12.42\%$	Give up
L	$(0.01 \div 0.99) \times (365 \div 40) = 9.22\%$	Give up
M	$(0.03 \div 0.97) \times (365 \div 45) = 25.09\%$	Borrow

Prairie would have lower financing costs by giving up Ks and Ls discount since the cost of forgoing the discount is lower than the 16% cost of borrowing.

- c. Cost of giving up discount from Supplier M = $(0.03 \div 0.97) \times (365 \div 75) = 15.05\%$ In this case the firm should give up the discount and pay at the end of the extended period.

P14-7. LG 2: Changing payment cycle

Basic

$$\text{Annual savings} = (\$10,000,000) \times (0.13) = \$1,300,000$$

P14-8. LG 2: Spontaneous sources of funds, accruals

Intermediate

$$\text{Annual savings} = \$750,000 \times 0.11 = \$82,500$$

P14-9. LG 3: Cost of bank loan

Intermediate

a. Interest = $(\$10,000 \times 0.15) \times (90 \div 365) = \369.86

b. Effective 90 day rate = $\frac{\$369.86}{\$10,000} = 3.70\%$

c. Effective annual rate = $(1 + 0.037)^4 - 1 = 15.64\%$

P14-10 LG3: Personal finance: Unsecured sources of short-term loans

Challenge

- a. Fixed-rate loan

$$\text{Interest expense} = \text{loan amount} \times (\text{prime rate} + \text{percent over prime}) \times (\text{loan period} \div 365)$$

$$\$45,000 (0.075 + 0.025) (180 \div 365) = \$2,219.18$$

- b. Variable-rate loan

Time period:	First 60 days	Days 61 to 90	Days 91 to 180
Prime rate:	6.5%	6.5%	6.5%
Percent over prime:	1.5%	2.0%	3.0%
Applicable rate:	8.0%	8.5%	9.5%
Beginning amount owed:	\$45,000	\$45,591.78	\$45,910.30
Interest expense:	\$ 591.78	\$318.52	\$1,075.43
Amount owed at end of period:	\$45,591.78	\$45,910.30	\$46,985.73

The variable rate loan, which has an interest expense of \$1,985.73, is less costly.

P14-11. LG 3: Effective annual rate of interest

Basic

$$\text{Effective interest} = \frac{\$10,000 \times 0.10}{[\$10,000 \times (1 - 0.10 - 0.20)]} = 14.29\%$$

P14-12. LG 3: Compensating balances and effective annual rates

Intermediate

$$\begin{aligned} \text{a. Compensating balance requirement} &= \$800,000 \text{ borrowed} \times 15\% \\ &= \$120,000 \end{aligned}$$

$$\begin{aligned} \text{Amount of loan available for use} &= \$800,000 - \$120,000 \\ &= \$680,000 \end{aligned}$$

$$\begin{aligned} \text{Interest paid} &= \$800,000 \times 11\% \\ &= \$88,000 \end{aligned}$$

$$\text{Effective interest rate} = \frac{\$88,000}{\$680,000} = 12.94\%$$

$$\begin{aligned} \text{b. Additional balances required} &= \$120,000 - \$70,000 \\ &= \$50,000 \end{aligned}$$

$$\text{Effective interest rate} = \frac{\$88,000}{\$800,000 - \$50,000} = 11.73\%$$

$$\text{c. Effective interest rate} = 11\%$$

(None of the \$800,000 borrowed is required to satisfy the compensating balance requirement.)

- d. The lowest effective interest rate occurs in Situation (c), when Lincoln has \$150,000 on deposit. In Situations (a) and (b), the need to use a portion of the loan proceeds for compensating balances raises the borrowing cost.

P14-13. LG 3: Compensating balance vs. discount loan

Intermediate

$$\text{a. State Bank interest} = \frac{\$150,000 \times 0.09}{\$150,000 - (\$150,000 \times 0.10)} = \frac{\$13,500}{\$135,000} = 10.0\%$$

This calculation assumes that Weathers does not maintain any normal account balances at State Bank.

$$\text{Frost finance interest} = \frac{\$150,000 \times 0.09 \times 6/12}{\$150,000 - (\$150,000 \times 0.09 \times 6/12)} = \frac{\$6,750}{\$143,250} = 4.71\%$$

$$\text{Effective annual rate} = (1.0471)^2 - 1 = 0.0964 = 9.46\%$$

- b. If Weathers became a regular customer of State Bank and kept its normal deposits at the bank, then the additional deposit required for the compensating balance would be reduced and the cost would be lowered.

P14-14. LG 3: Integrative—comparison of loan terms

Challenge

- a. $(0.08 + 0.033) \div 0.80 = 14.125\%$
- b. Effective annual interest rate = $\frac{[\$2,000,000 \times (0.08 + 0.028) + (0.005 \times \$2,000,000)]}{(\$2,000,000 \times 0.80)} = 14.125\%$
- c. The revolving credit account seems better, since the cost of the two arrangements is the same; with a revolving loan arrangement, the loan is committed.

P14-15. LG 4: Cost of commercial paper

a. Effective 90-day rate = $\frac{\$1,000,000 - \$978,000}{\$978,000} = 2.25\%$

Effective annual rate = $(1 + 0.0225)^{365/90} - 1 = 9.44\%$

b. Effective 90-day rate = $\frac{[\$1,000,000 - \$978,000 + \$9,612]}{(\$978,000 - \$9,612)} = 3.26\%$

Effective annual rate = $(1 + 0.0326)^{365/90} - 1 = 13.89\%$

P14-16. LG 5: Accounts receivable as collateral

- a. Acceptable accounts receivable

Customer	Amount
D	\$ 8,000
E	50,000
F	12,000
H	46,000
J	22,000
K	62,000
Total collateral	\$200,000

- b. Adjustments: 5% returns/allowances, 80% advance percentage.
 Level of available funds = $[\$200,000 \times (1 - 0.05)] \times 0.80 = \$152,000$

P14-17. LG 5: Accounts receivable as collateral

Intermediate

a.

Customer	Amount
A	\$20,000
E	2,000
F	12,000
G	27,000
H	<u>19,000</u>
Total Collateral	\$80,000

b. $\$80,000 \times (1 - 0.1) = \$72,000$

c. $\$72,000 \times (0.75) = \$54,000$

P14-18. LG 3, 5: Accounts receivable as collateral, cost of borrowing

Challenge

a. $[\$134,000 - (\$134,000 \times 0.10)] \times 0.85 = \$102,510$

b. $(\$100,000 \times 0.02) + (\$100,000 \times 0.115) = \$2,000 + \$11,500 = \$13,500$

Interest cost = $\frac{\$13,500}{\$100,000} = 13.5\%$ for 12 months

$$(\$100,000 \times 0.02) + \left(\$100,000 \times \frac{0.115}{2} \right) = \$2,000 + \$5,750 = \$7,750$$

Interest cost = $\frac{\$7,750}{\$100,000} = 7.75\%$ for 6 months

Effective annual rate = $(1 + 0.0775)^2 - 1 = 16.1\%$

$$(\$100,000 \times 0.02) + \left(\$100,000 \times \frac{0.115}{4} \right) = \$2,000 + \$2,875 = \$4,875$$

Interest cost = $\frac{\$4,875}{\$100,000} = 4.88\%$ for 3 months

Effective annual rate = $(1 + 0.0488)^4 - 1 = 21.0\%$

P14-19. LG 5: Factoring

Intermediate

Holder Company Factored Accounts May 30					
Accounts	Amount	Date Due	Status on May 30	Amount Remitted	Date of Remittance
A	\$200,000	5/30	C 5/15	\$196,000	5/15
B	90,000	5/30	U	88,200	5/30
C	110,000	5/30	U	107,800	5/30
D	85,000	6/15	C 5/30	83,300	5/30
E	120,000	5/30	C 5/27	117,600	5/27
F	180,000	6/15	C 5/30	176,400	5/30
G	90,000	5/15	U	88,200	5/15
H	30,000	6/30	C 5/30	29,400	5/30

The factor purchases all acceptable accounts receivable on a nonrecourse basis, so remittance is made on uncollected as well as collected accounts.

P14-20. LG 1, 6: Inventory financing

Challenge

- a. City-Wide Bank: $[\$75,000 \times (0.12 \div 12)] + (0.0025 \times \$100,000) = \$1,000$
 Sun State Bank: $\$100,000 \times (0.13 \div 12) = \$1,083$
 Citizens' Bank and Trust: $[\$60,000 \times (0.15 \div 12)] + (0.005 \times \$60,000) = \$1,050$
- b. City-Wide Bank is the best alternative, since it has the lowest cost.
- c. Cost of giving up cash discount = $(0.02 \div 0.98) \times (365 \div 20) = 37.24\%$
 The effective cost of taking a loan = $(\$1,000 \div \$75,000) \times 12 = 16.00\%$
 Since the cost of giving up the discount (37.24%) is higher than borrowing at Citywide Bank (16%), the firm should borrow to take the discount.

P14-21. Ethics problem

The sales tax can be calculated based on the sales data, as follows:

$$\text{Sales tax} = [(\$73,000,000 - \$13,000,000) \div 1.05] \times 0.5 = \$2,857,143$$

An alternative method is to determine the taxable sales based on the sales tax reported.

$$\text{Taxable sales} = \$2,000,000 \div 0.05 = \$40,000,000$$

These calculations show a discrepancy in the financial statement provided by Rancco. The company has possibly underreported the amount of taxable income to the state and failed to pay the appropriate amount of sales tax. The other alternative is that Rancco has deliberately inflated the amount of revenues for the year in an attempt to improve the chances of getting the loan. You will want to have the company verify its calculation of sales tax due. Notice that to be able to make a valid comparison of sales taxes paid and revenues reported you must also determine the

correct amount of nontaxable revenue, which is usually not directly available from the company's financial statements.

■ Case

Selecting Kanton Company's Financing Strategy and Unsecured Short-Term Borrowing Arrangement

This case asks the student to evaluate the permanent and short-term funding requirements of Kanton Company, and to choose a financing strategy from among three alternatives: aggressive, conservative, and trade-off. The company's funding requirements vary considerably during the year, showing a seasonal pattern and peaking mid-year. Then the student must calculate the effective annual interest rates for two short-term borrowing alternatives and make a recommendation.

1. Strategy I—Aggressive

- a. Amount required: \$2,500,000 short-term and \$1,000,000 long-term
- b. Cost: $(10\% \times \$2,500,000) + (14\% \times \$1,000,000) = \$390,000$

Strategy 2—Conservative

- a. Amount required: \$7,000,000 long-term and \$0 short-term
- b. Cost: $(14\% \times \$7,000,000) = \$980,000$

Strategy 3—Tradeoff

- a. Calculation of short-term requirements

Month	(1) Total Funds Requirements	(2) Permanent Requirements	Seasonal Requirements
January	\$1,000,000	\$3,000,000	\$ 0
February	1,000,000	3,000,000	0
March	2,000,000	3,000,000	0
April	3,000,000	3,000,000	0
May	5,000,000	3,000,000	2,000,000
June	7,000,000	3,000,000	4,000,000
July	6,000,000	3,000,000	3,000,000
August	5,000,000	3,000,000	2,000,000
September	5,000,000	3,000,000	2,000,000
October	4,000,000	3,000,000	1,000,000
November	2,000,000	3,000,000	0
December	1,000,000	3,000,000	0

Monthly average: Permanent = \$3,000,000

Seasonal = \$1,166,667 (sum of seasonal requirements \div 12)

Seasonal = \$1,166,667 ($14,000,000 \div 12$)

- b. Cost: $(10\% \times \$1,166,667) + (14\% \times \$3,000,000) = \$536,667$

2. Net working capital = current assets – current liabilities

Aggressive = \$4,000,000 – \$2,500,000 = \$1,500,000

Conservative = \$4,000,000 – \$0 = \$4,000,000

Tradeoff = \$4,000,000 – \$1,166,667 = \$2,833,333

3. The three strategies differ in terms of profitability and risk. The aggressive strategy is the most profitable—it has the lowest cost, \$390,000—because it uses the largest amount of the less-expensive short-term financing. It also pays interest only on needed financing. The aggressive strategy is also the most risky, relying heavily on short-term financing, which may have more limited availability. Net working capital is lowest, also increasing risk.

Because the conservative strategy funds the highest amount in any month for the whole year with more-expensive long-term financing, it is the most expensive (\$980,000) and the least profitable. It is the lowest-risk strategy, however, reserving short-term financing for emergencies. The high level of working capital also reduces risk.

The tradeoff strategy falls between the two extremes in terms of both profitability and risk. The cost (\$536,667) is higher than the aggressive strategy because the permanent funds requirement of \$3,000,000 is financed with more costly long-term funds. In five months (January, February, March, November, and December), the company pays interest on unneeded funds. The risk is less than with the aggressive strategy; some short-term borrowing capacity is preserved for emergencies. Because a portion of short-term requirements is financed with long-term funds, the firm's ability to obtain short-term financing is good.

Mr. Mercado should consider implementing the tradeoff strategy. The wide swings in monthly funds requirements make the cost of the conservative strategy very high in comparison to the reduced risk. For the same reason, the aggressive strategy is quite risky, requiring the firm to raise short-term funds ranging from \$1,000,000 to \$6,000,000. If it should become difficult to arrange short-term financing, Kanton Company would be in trouble.

Note: Other recommendations are possible, depending on the student's risk preference. Of course, the student should present sound reasons for his or her choice of strategy.

4. a. Effective interest, line of credit:

Interest on borrowing: $\$600,000 \times (7\% + 2.5\%) = \$57,000$

$$\begin{aligned} \text{Effective interest} &= \frac{\text{Interest}}{\text{Amount available for use}} \\ &= \frac{\$57,000}{\$600,000 \times 0.80} = 11.88\% \end{aligned}$$

- b. Effective interest, revolving credit agreement:

Cost of borrowing:

Interest: $\$600,000 \times (7\% + 3.0\%)$	\$60,000
Commitment Fee: $\$400,000 \times 0.5\%$	<u>2,000</u>
Total	\$62,000

$$\begin{aligned} \text{Effective interest} &= \frac{\text{Interest and commitment fee}}{\text{Amount available for use}} \\ &= \frac{\$62,000}{\$600,000 \times 0.80} = 12.92\% \end{aligned}$$

5. The line of credit arrangement seems better, since its annual cost of 11.88% is less than the 12.92% cost of the revolving loan arrangement. Kanton will save about 1% in terms of annual interest cost (11.88% versus 12.92%) by using the line of credit. The only negative is that if Third National lacks loanable funds, Kanton may not be able to borrow the needed funds. Under the revolving credit agreement, funds availability would be guaranteed.

■ Spreadsheet Exercise

The answer to Chapter 14's comparison of borrowing from First American or First Citizen spreadsheet problem is located in the Instructor's Resource Center at www.prenhall.com/irc.

■ A Note on Web Exercises

A series of chapter-relevant assignments requiring Internet access can be found at the book's Companion Website at <http://www.prenhall.com/gitman>. In the course of completing the assignments students access information about a firm, its industry, and the macro economy, and conduct analyses consistent with those found in each respective chapter.

