

## **Chapter 2**

### **FINANCIAL BACKGROUND: A REVIEW OF ACCOUNTING, FINANCIAL STATEMENTS, AND TAXES**

#### **FOCUS**

Most students have been exposed to accounting and taxes in prerequisite courses, but many don't recall the material well enough to tackle finance effectively. Chapter 2 provides a concise review of what they need to know in one convenient place. The material is presented in relatively non-numerical form although some computation is unavoidable.

#### **PEDAGOGY**

You may not want to spend much class time lecturing on accounting and tax material. An hour is generally enough to hit the highlights. Assigning the chapter as background reading followed by a quiz gets students warmed up and focused on financial concepts in preparation for the things to come.

#### **TEACHING OBJECTIVES**

1. To reacquaint students with basic accounting concepts and procedures which they may have forgotten.
2. To develop an understanding of federal tax fundamentals, and the ability to calculate simple taxes.

#### **OUTLINE**

- I. ACCOUNTING SYSTEMS AND FINANCIAL STATEMENTS
  - A. The Nature of Financial Statements  
How accounting ideas such as "income" are different from everyday use of similar terms.
  - B. The Accounting System  
A brief treatment of basic ideas including the double entry concept, accounting periods, closing the books, and stocks and flows.
- II. THE INCOME STATEMENT  
A line by line treatment of income, cost, and expense items along with subtotals such as Gross Margin and EBIT.
- III. THE BALANCE SHEET
  - A. Presentation  
Format, the balance sheet identity, liquidity.
  - B. Assets  
A brief description of the treatment of each asset item along with the risks it presents. E.g., overstatement of receivables.
  - C. Liabilities  
An intuitive description of the nature of current liabilities, especially accruals.
  - D. Equity  
The three equity accounts are explained along with the relationship between income, dividends, new stock sales and equity.
- IV. THE TAX ENVIRONMENT
  - A. Taxing Authorities and Tax Bases  
Who can tax us, based on what.

- B. Income Taxes - The Total Effective Income Tax Rate  
State tax is deductible from federal tax.
  - C. Progressive Tax Systems, Marginal and Average Rates  
Definitions, the current progressive system, the importance of the marginal rate for investment decisions.
  - D. Ordinary Income and Capital Gains/Losses  
The nature of capital gains and losses, why the way they're taxed is important to investment, and the current status.
- V. INCOME TAX CALCULATIONS
- A. Personal Taxes  
Basic rules of exempt income, deductions and personal exemptions. Taxpayer classes and the tax tables. Examples: Choosing between corporate and municipal bonds.
  - B. Corporate Taxes  
Defining taxable income, the corporate rate structure, the system favors debt financing, dividend exemptions between corporations, carry backs/forwards.

## QUESTIONS

1. Why does a financial professional working outside accounting need a knowledge of accounting principles and methods?

**ANSWER** Financial records are kept within accounting systems and results are formulated in accounting reports. Therefore, to understand transactions and the results of operations, one has to have at least a fundamental understanding of accounting principles.

2. Discuss the purpose of an accounting system and financial statements in terms of the way the system represents a business.

**ANSWER** Accounting is designed to provide a "picture" of operations in numerical terms. It does that with devices like depreciation which matches the cost of an asset with its service life regardless of the cash flows associated with its acquisition. The portrayal is conceptual in that it attempts to give a broader picture of the condition of a business than the immediate availability of funds.

3. Why is EBIT an important line item in the income statement? What does EBIT show us?

**ANSWER** Earnings before interest and taxes (EBIT) is the lowest line on the income statement that isn't affected by the firm's method of financing (the relative amounts of debt and equity used). It is important because it allows an evaluation of physical business operations separate from the influence of financing decisions. It is therefore often called operating income.

4. What is meant by liquidity in financial statements?

**ANSWER** In financial statements liquidity implies the ease with which assets can be converted into cash without substantial loss. With respect to liabilities it is related to the immediacy with which they require cash.

5. What are the common misstatements of balance sheet figures and why do they present a problem?

**ANSWER** Receivables are often overstated in that they contain uncollectible accounts. Inventories are overstated when items are carried at values that exceed what they're actually worth. Less frequently,

payables omit legitimate liabilities of the company. Such misstatements represent a firm as being worth more than it actually is. That deceives investors and others interested in dealing with the company.

6. Do the definitions of current assets and current liabilities suggest a quick way of looking at the firm's ability to meet its financial obligations (pay its bills) over the near term? (*Hint: Think in terms of ratios.*)

**ANSWER** Current assets represent things that are expected to become cash within a year (inflows), while current liabilities require cash within a year (outflows). Being able to pay the bills means the inflows have to exceed the outflows in the short run. This suggests forming the ratio of current assets to current liabilities (called the current ratio). If that ratio exceeds 1.0, the firm should be able to pay its bills in the next year.

7. How are capital and working capital different?

**ANSWER** Capital refers to the money used to start businesses and acquire long-lived assets. Working capital refers to the money used to support day to day operations. We can therefore think of the two as differing with respect to time. Capital is long term and working capital is short term.

8. What is leverage and how does it work? What is the main concern about using it?

**ANSWER** Leverage refers to using borrowed (someone else's) money to support a business rather than the owner's own equity. Leverage can enhance financial results if the business earns more with the borrowed money than the interest cost of borrowing it. In that case leverage multiplies good financial results into better ones. The concern about using borrowed money is that interest has to be paid whether results are good or not. When a business earns less using borrowed money than the cost of borrowing it, leverage multiplies poor results into very poor results.

9. Define the term tax base and discuss common bases. What government units tax on each? What are these taxes commonly called?

**ANSWER** A tax base is the item or activity on which a tax is levied. The common bases are income, wealth, and consumption. Income taxes simply require the payment of a percentage of income to the government in every period, usually a year. Income is taxed by the federal government, most states, and a few cities (e.g. New York City). A wealth tax charges the owner of property a percentage of its value each year. The most common wealth tax is levied on real estate by cities and counties. A consumption tax charges users a percentage of the cost of products they consume. The most common consumption tax is a sales tax usually levied by states, counties, and cities. The federal government's consumption taxes are called excise taxes.

10. What is the total effective tax rate?

**ANSWER** The total effective tax rate is the combination of state and federal income tax rates. It is less than the sum of the two rates, because state tax is deductible from income for federal tax purposes.

11. What is taxable income for an individual? How does it differ from taxable income for a corporation?

**ANSWER** Taxable income for an individual is income less exempt or excluded items, less deductions and less personal exemptions. Taxable income for a corporation is revenue less excluded items less business costs and expenses. Personal exemptions don't exist for corporations.

12. What tax rate is important for investment decisions? Why?

**ANSWER** The marginal tax rate is the rate on the next (or last) dollar of income. It is important for investment decisions, because investments are generally made with "extra" income available after necessary expenses have been taken care of. Thus investment income is generally taxed at the taxpayer's marginal rate.

13. Why is the tax treatment of capital gains an important financial issue?

**ANSWER** Income on investments is usually received at least in part in the form of capital gains. Therefore, if the tax system treats capital gains favorably, investing becomes relatively more attractive. Since investing is the essence of finance, capital gains taxation plays a pivotal role in financial matters.

14. Is the corporate tax schedule progressive? Why or why not?

**ANSWER** Yes and no! Lower rates are charged on lower incomes so the system is progressive in that most basic sense. However, the benefits of the early lower rates are taken back through rate surcharges as income increases. That creates a rate structure that increases and then decreases which is contrary to the normal notion of a progressive system.

15. What are the tax implications of financing with debt versus equity? If financing with debt is better, why doesn't everyone finance almost entirely with debt?

**ANSWER** Financing with debt is cheaper than with equity because of the tax deductibility of interest. However, debt adds risk to businesses, so lenders tend to limit the amounts of capital they're willing to supply to companies. Those limits make it virtually impossible to finance entirely with debt.

16. Why are dividends paid from one corporation to another partially tax exempt?

**ANSWER** Fully taxing dividends paid by one corporation to another results in triple (and more) taxation of earnings which is more severe than the government's intent.

17. Explain the reasoning behind tax loss carry backs and carry forwards.

**ANSWER** If business losses could not offset profits in previous or subsequent periods, the tax system viewed over a period of years would tax companies with temporary losses at rates in excess of one hundred percent of profits. This clearly doesn't make sense, so the inter-year allocation of losses is allowed.

## PROBLEMS

### Writing Off a Large Uncollectable Receivable - Example 2-1, Page 32

1. Canaday Ltd. has the following receivables balances (\$M)

Gross Accounts Receivable	\$175
Bad Debt Reserve	<u>(3)</u>
Net Accounts Receivable	\$172

Two years ago a customer was approved for an unusually large credit sale of \$7M over the objections of the credit and collections department. Shortly after the sale the customer's business began to deteriorate due to an unexpected recession. To date it has paid only \$2M against the order despite the fact that it has consumed all of the material purchased. The collections department has worked diligently to collect the remaining \$5M without success. The customer filed for bankruptcy this morning with essentially no assets to pay a large number of creditors. Evaluate the financial statement impact of the bankruptcy on Canaday. Assume Canaday's product cost is 40% of revenue and the bad debt reserve of \$3M will be fully reestablished.

#### Solution:

Gross receivables must be reduced by \$5M. Using the entire reserve has the following immediate effect on the balance sheet:

Gross Accounts Receivable	\$170
Bad Debt Reserve	<u>0</u>
Net Accounts Receivable	\$170

This year's income statement earnings before tax are reduced by another (\$5M – 3M =) \$2M in bad debt expense. If the reserve is to be reinstated fairly quickly, another \$3M profit reduction will be needed.

The pretax profit on the uncollected portion of the sale two years ago was

$$\$5M \times .6 = \$3M$$

The pretax loss due to the write off this year will be the full \$5M.

### Selling a Fixed Asset - Example 2-2, Page 36

2. The Johnson Company bought a truck costing \$24,000 two and a half years ago. The truck's estimated life was four years at the time of purchase. It was accounted for using straight line depreciation with zero salvage value. The truck was sold yesterday for \$19,000. What taxable gain must be reported on the sale of the truck?

**SOLUTION:** Yearly depreciation on the truck is

$$\$24,000 / 4 = \$6,000$$

and depreciation for 2.5 years is

$$\$6,000 \times 2.5 = \$15,000$$

Therefore the truck's Net Book Value at the time of sale is

$$\$24,000 - \$15,000 = \$9,000$$

This is the accounting cost of the sale, The taxable gain on the sale is:

Sales price	\$19,000
Cost	<u>9,000</u>
Gain	\$10,000

3. If the Johnson Company of Problem 2 is subject to a marginal tax rate of 34%, what is the cash flow associated with the sale of the used truck?

**SOLUTION:**

Johnson will pay tax on the \$10,000 profit on the sale at 34%.

$$\$10,000 \times .34 = \$3,400.$$

Cash flow is the sale proceeds of \$19,000 less the tax paid.

$$\$19,000 - \$3,400 = \$15,600.$$

Note: The truck's cost in the profit calculation in Problem 2 is its net book value on Johnson's books. Although that figure is subtracted from the price received for the truck to calculate accounting profit, no cash was expended at the time of sale associated with that cost. Hence cash flow is just revenue minus tax.

4. Heald and Swenson Inc purchased a drill press for \$850,000 one year and nine months ago. The asset has a six year life and has been depreciated according to the following accelerated schedule.

Year	1	2	3	4	5	6
% of cost	55%	20%	10%	5%	5%	5%

The press was just sold for \$475,000. The firm's marginal tax rate is 35%. Calculate Heald and Swenson's taxable profit and cash flow on the sale. Assume depreciation is spread evenly within each year.

**SOLUTION:** First bring depreciation up to date as of the time of sale. Fifty five percent of the asset's cost will have been recognized as depreciation in the first year. In the second year

$$9/12 \times 20\% = 15\%$$

will have been taken. This leaves a net book value of  $(100 - 55 - 15) = 30\%$  of original cost at the time of the sale.

$$\text{NBV} = \$850,000 \times .30 = \$255,000$$

This is the asset's cost for accounting and tax purposes, and

Sales price	\$475,000
Cost	<u>(\$255,000)</u>
Gain	\$220,000

Tax on the gain at 35% will be

$$\$220,000 \times .35 = \$77,000,$$

and cash flow is sale proceeds less tax.

$$\text{Cash flow} = \$475,000 - \$77,000 = \$398,000.$$

**Problems 5 through 13 are numerical exercises intended to develop familiarity with financial statements without actually going through debit and credit accounting entries. They don't follow specific examples in the text, but most provide guidance in the form of hints or instructions.**

5. Fred Gowen opened Gowen Retail Sales as a sole proprietorship and recorded the following transactions during his first month in business:

- (1) Purchased \$50,000 of fixed assets, putting 10% down and borrowing the remainder.
- (2) Sold 1,000 units of product at an average price of \$45 each. Half of the sales were on credit, none of which had been collected as of the end of the month.
- (3) Recorded cost of goods sold of \$21,000 related to the above sales
- (4) Purchased \$30,000 worth of inventory and paid cash.

- (5) Incurred other expenses (including the interest from the loan) of \$5,000, all of which were paid in cash.
- (6) Fred's tax rate is 40%. (Taxes will be paid in a subsequent period.)
- What will the business report as net income for its first month of business? (*Hint: Write out an income statement and enter revenue, cost, and expense, then calculate tax and net income.*)
  - List the flows of cash in and out of the business during the month. Show inflows as positives and outflows as negatives (using parentheses). Sum to arrive at a "Net Cash Flow" figure.
  - Should Fred pay more attention to net income or cash flow? Why?

**SOLUTION:**a. Net Income

Sales	\$45,000	(1000 units @ \$45)
Cost of Goods Sold	<u>21,000</u>	
Gross Margin	24,000	
Other Expense	<u>5,000</u>	(Includes Interest Expense)
EBT	19,000	
Taxes	<u>7,600</u>	(\$19,000 x 40%)
Net Income	11,400	

b. Cash Flows

Purchase of Assets	(\$50,000)	
Proceeds from Loan	45,000	(90% of the asset purchase price)
Cash from Sales	22,500	(One half of the sales)
Purchase of Inventory	( 30,000)	
Other Expenses	<u>( 5,000)</u>	
Net Cash Flow	(\$17,500)	

- c. Fred has to pay attention to both net income and cash flow. Net Income is important because it is an indication of the long term profitability of the business. It matches the revenues and expenses for the period and will help him understand whether he can sell his products at a profit in the long run. However, cash flow is equally important, because if a business can't generate positive cash flows, it is destined to fail. It is not uncommon for a business to have negative cash flows early in its existence, even if it's showing a positive net income. That's one reason for doing a statement of cash flows like the one we'll study in Chapter 3.

6. McFadden Corp. reports the following balances on their December 31, 20X2 Balance Sheet:

	<u>(\$000)</u>	
Accounts Payable	60	
Accounts Receivable	120	
Accumulated Depreciation	350	
Fixed Assets (Net)	900	
Inventory	150	
Long Term Debt	400	
Paid in Excess	160	
Retained Earnings	380	
Total Assets	1,240	
Total Liabilities	500	(long term debt + current liabilities)

All of the remaining accounts are listed below. Calculate the balance in each.

Accruals  
 Cash  
 Common Stock  
 Fixed Assets (Gross)  
 Total Current Assets  
 Total Current Liabilities  
 Total Equity

**SOLUTION:**

<u>Assets (\$000)</u>		<u>Liabilities &amp; Equity (\$000)</u>	
Cash	\$ 70	Account Payable	\$ 60
Accounts Receivable	120	Accruals	<u>40</u>
Inventory	<u>150</u>	Total Current Liabilities	100
Total Current Assets	340		
		Long Term Debt	400
Fixed Assets (Gross)	1,250		
Accumulated Depreciation	<u>(350)</u>	Common Stock	200
Fixed Assets (Net)	900	Paid In Excess	160
		Retained Earnings	<u>380</u>
Total Assets	\$1,240	Total Equity	740
		Total Liabilities & Equity	\$1,240

7. Consider the Current Asset accounts (Cash, Accounts Receivable and Inventory) individually and as a group. What impact will the following transactions have on each account and current assets in total (Increase, Decrease, No Change)? (*Hint: Each transaction has two sides that are equal in amount but opposite in sign. Consider whether the sides offset within current assets or one side is recorded somewhere else.*)
- The purchase of a fixed asset for cash
  - The purchase of a fixed asset on credit
  - The purchase of inventory for cash
  - The purchase of inventory on credit
  - Customer payment of an account receivable
  - Writing off a customer's bad debt (assume bad debt reserve > write off)
  - The sale of a fixed asset for cash
  - The sale of inventory (at a profit) for cash
  - The sale of inventory (at a loss) for cash
  - The sale of inventory (at a profit) on credit

**SOLUTION:**

	Cash	Accounts Receivable	Inventory	Total Current Assets
a.	Decrease	NC	NC	Decrease
b.	NC	NC	NC	NC
c.	Decrease	NC	Increase	NC
d.	NC	NC	Increase	Increase
e.	Increase	Decrease	NC	NC
f.	NC	NC	NC	NC
g.	Increase	NC	NC	Increase
h.	Increase	NC	Decrease	Increase



i.	Increase	NC	Decrease	Decrease
j.	NC	Increase	Decrease	Increase

8. On January 1, 20X2, Miller Corp. purchased a milling machine for \$400,000. It will be depreciated on a straight line basis over 20 years. On January 1, 20X3, Miller purchased a heavy duty lathe for \$250,000 which will be depreciated on a straight line basis over 40 years.
- Compute Miller's depreciation expense for 20X2, 20X3 and 20X4.
  - Prepare the Fixed Asset portion of the balance sheet (for these two fixed assets) as of the end of 20X2, 20X3 and 20X4. (*Hint: Subtract accumulated depreciation in each year from total original cost. See page XX*)

**SOLUTION:**

## a. Depreciation Expense

Depreciation on the milling machine:  $\$400,000/20 \text{ years} = \$20,000/\text{year}$   
 Depreciation on the lathe  $\$250,000/40 \text{ years} = \$6,250/\text{year}$

	<u>X3</u>	<u>X4</u>	<u>X5</u>
MM	20,000	20,000	20,000
Lathe		<u>6,250</u>	<u>6,250</u>
Depreciation	20,000	26,250	26,250
Accum Depr	20,000	46,250	72,500

b.	Fixed Assets (Gross)	\$400,000	\$650,000	\$650,000
	Accumulated Depreciation	<u>20,000</u>	<u>46,250</u>	<u>72,500</u>
	Fixed Assets (Net)	\$380,000	\$603,750	\$577,500

9. Becher Industries has three suppliers for its raw materials for manufacturing. The firm purchases \$180 million per year from Johnson Corp. and normally takes 30 days to pay these bills. Belcher also purchases \$150 million per year from Jensen, Inc. and normally pays Jensen in 45 days. Belcher's third supplier, Docking Distributors, offers 2/10, n. 30 terms. Becher takes advantage of the discount on the \$90 million per year that it typically purchases from Docking. Calculate Becher's expected Accounts Payable balance. (Use a 360-day year for your calculations. For example calculate Johnson's account as  $\$180\text{M} \times 30/360$ .)

**SOLUTION:**

These problems assume that purchases are made evenly across the year. Therefore, at any point in time, Becher will have 30/360ths of its annual purchases from Johnson in its accounts receivable balance; 45/360ths of its annual purchases from Jensen in its accounts receivable balance and 10/360ths (excluding any adjustment for treatment of the discount) of its annual purchases from Docking in its account receivable balance. Therefore, we would expect the balance to be:

$\$180,000,000 \times 30/360 =$	\$15,000,000
$\$150,000,000 \times 45/360 =$	\$18,750,000
$\$90,000,000 \times 10/360 =$	<u>\$2,500,000</u>
Total Accounts Receivable	\$36,250,000

10. Belvedere Inc. has an annual payroll of \$52 million. The firm pays employees every two weeks on Friday afternoon. Last month, the books were closed on the Tuesday after payday. How much is the payroll accrual at the end of the month? (See page XX.)

**SOLUTION:** Two days of the pay period belong in the month just closed, so the accrual is  $2/5$  of one week's payroll:

$$2/5 \times \$1,000,000 = \$400,000.$$

11. Sanderson Metals Inc. accrues four liability items: payroll, employee vacation that has been earned but not used, property taxes, and inventory that arrives at its factory dock before an invoice is received from the vendor.

**Payroll:** Sanderson pays its employees every other Friday for work performed through that day. The annual payroll is \$47 million.

**Property tax:** The firm pays the local government \$3.6 million per year in property taxes on its factory and office buildings. The tax is paid in arrears\* on June 30 at the end of the county's fiscal year\*\*. The firm accrues a liability each month to reflect the fact that it owes the county property tax through that date.

**Vacation:** Sanderson's employees get three weeks (15 work days) of vacation each year, which is earned at a rate of  $(15 \div 12 =) 1.25$  days per month worked. No vacation can be carried over year end, but an employee can take the current year's vacation before it is actually earned. There are 250 work days each year. The vacation accrual reflects that pay for vacation days earned but not used is a liability of the company.

**Inventory:** The accounting department uses vendor (supplier) invoices combined with receiving documents to enter new inventory on the company's books. However, inventory often arrives a few days before the associated invoice is received. The approximate value of material in this received but unbilled status is accrued to reflect that the company is in possession of the goods and has a liability to pay for them.

Sanderson is currently closing the books on April 20X8. The last day of the month was seven days after a payday. Through the end of April employees had taken \$587,000 of paid vacation time. Five railroad carloads of steel arrived in the last week of April but invoices for only three of those shipments have been received. An average carload shipment costs \$107,000. All prior receipts have been invoiced. Calculate Sanderson's April month end accruals balance.

(Hint: Some accruals, like payroll and inventory, clear a few days after month end. Others, like property tax, build up steadily until cleared at the end of a period like the county's fiscal year. Still others, like vacation, are increased steadily and are decreased when some activity occurs, such as people going on vacation.)

\*A property tax bill paid in arrears is due at the end of the period during which the liability is incurred. The liability for the bill, however, comes from owning the property as time passes. Hence, as each month of the tax year goes by, the company's property tax liability increases by  $1/12$  of the annual bill until it is paid at the end of the fiscal year.

\*\*A fiscal year is an organization's year for accounting purposes. Many companies and most government units use fiscal years that don't coincide with calendar years. Sanderson's books are kept on a calendar year.

**SOLUTION:** a.

**Payroll:** 7 days is 1.4 weeks

$$(1.4 / 52) \times \$47,000,000 = \$1,265,385$$

**Property tax:**

Monthly accrual  $(\$3,600,000 / 12) = \$300,000$

$$\text{April balance: } \$300,000 \times 4 = \$1,200,000$$

**Vacation accrual:**

Vacation accrual per month:

$$(1.25 / 250) \times \$47,000,000 = \$235,000$$

April accrual year to date	\$235,000 x 4 = \$940,000	
Less vacation taken	(587,000)	
April balance		\$ 353,000

## Inventory:

2 truckloads @ \$107,000 = \$ 214,000

April accrual balance \$3,032,385

## 12. In January, 20X3, Elliott Industries recorded the following transactions:

- (1) Paid bills from 20X2 totaling \$120,000 and collected \$150,000 for sales that were made in 20X2.
- (2) Purchased inventory on credit totaling \$500,000, 30% of which remain unpaid at the end of January
- (3) Sold \$400,000 of inventory on credit for \$600,000. 20% of those sales remained uncollected at the end of the month.
- (4) Accruals increased by \$10,000 during the month.
- (5) Additional cash payments were made for expenses incurred during the month of totaling \$80,000.

Compute the change in Elliott's working capital for the month of January, 20X3. (*Hint: Each transaction has offsetting entries(sides) that sum to zero. If all of the entries are to current accounts, there is no impact on working capital. But if one side is somewhere else, working capital will change.*)

**SOLUTION:**

- (1) These transactions will have no net impact on working capital. Paying bills from a previous period will reduce cash and accounts payable by an equal amount. Collecting accounts receivable will cause cash to increase and accounts receivable to decrease by the same amount.
- (2) This transaction will have no net impact on net working capital. Inventory will increase by \$500,000, cash will decrease by \$350,000 (70% of the purchases) and accounts payable will increase by \$150,000 (30% of the purchases)
- (3) This transaction will increase net working capital by \$200,000. Inventory will decrease by \$400,000, cash will increase by \$480,000 (80% of sales) and accounts receivable will increase by \$120,000 (20% of sales).
- (4) This will cause net working capital to decrease by \$10,000
- (5) Since these expenses were incurred and paid during the month, there will be no net impact on accounts payable. Therefore, the only effect on net working capital will be a \$80,000 decrease in cash.

Total Impact	(3)	\$200,000 increase
	(4)	\$ 10,000 decrease
	(5)	<u>\$ 80,000 decrease</u>
		\$110,000 increase is the total change in net working capital

13. The Glavits Company opened for business on Monday, June 1, with inventory of \$5,000 and cash in the bank of \$7,000. These were its only assets. All start-up financing was provided from the owner's personal funds, and there were no other liabilities. The firm has a line of credit at the bank that enables it to borrow up to \$20,000 by writing overdraft checks on its account.

Glavits' terms of sale are net 30, but the new firm must pay its suppliers in 10 days. Employees are the company's only expense. They're paid a total of \$1,000 per week each Friday afternoon for the week just ending.

On June 3, the company made a sale of \$9,000 out of inventory with a cost of \$3,000. On June 10 it received \$2,000 of new inventory. There were no other sales or inventory receipts. The company bought a delivery truck paying with a \$10,000 check on June 30. The books were closed for the month on Tuesday June 30.

Construct Glavits' income statement and balance sheet for June using the worksheet shown. Ignore taxes for this problem. First enter the beginning balance sheet. Next enter one number two times in each column to reflect the transaction indicated at the top of the column. Note that sometimes the numbers will be additions and sometimes they will be subtractions. Finally add across the page to get the statements for June.

<u>Worksheet Rows</u>	<u>Worksheet Columns</u>
1. BALANCE SHEET	1. Opening Balance Sheet
2. Assets	2. Record Sales
3. Cash	3. Record Cost of Sale
4. Accts. Receivable	4. Receive Inventory
5. Inventory	5. Pay for Inventory
6. Fixed Assets (net)	6. Buy Truck
7. Total Assets	7. Pay Employees-1st 4 weeks
8. <i>Skip</i>	8. Pay Employees-Last 2 days
9. Liabilities	9. Reclassify cash overdraft as loan
10. Accts. Payable	10. Record Net Income as Income and Equity
11. Accruals	11. <i>Skip</i>
12. Debt	12. June Statements
13. Equity	
14. Total Liab. & Equities	
15. <i>Skip</i>	
16. INCOME STATEMENT	
17. Sales	
18. Cost	
19. Expense	
20. Net Income	

### SOLUTION:

	(1) Opening Balance Sheet	(2)  Sales	(3)  COGS	(4)  Receive Inventory
BALANCE SHEET				
Assets				
Cash	\$7,000			
Accounts Receivable		\$9,000		
Inventory	\$5,000		(\$3,000)	\$2,000
Fixed Assets (net)				
Total Assets	\$12,000			
Liabilities				
Accounts Payable				\$2,000
Accruals				
Debt				
Equity	\$12,000			

Total Liability & Equity	\$12,000			
INCOME STATEMENT				
Sales		\$9,000		
Cost			\$3,000	
Expense				
Net Income				
	(5)	(6)	(7)	(8)
	Pay for Inventory	Buy Truck	Pay Employees 4 weeks	Pay Employees Last 2 days
BALANCE SHEET				
Assets				
Cash	(\$2,000)	(\$6,000)	(\$4,000)	
Accounts Receivable				
Inventory				
Fixed Assets (net)		\$6,000		
Total Assets				
Liabilities				
Accounts Payable	(\$2,000)			
Accruals				\$400
Debt				
Equity				
Total Liability and Equity				
INCOME STATEMENT				
Sales				
Cost				
Expense			\$4,000	\$400
Net Income				
	(9)	(10)	(11)	
	Reclassify Overdraft as Loan	Record Profit as Net Income & Equity	June Statements	
BALANCE SHEET				
Assets				
Cash	\$5,000		-0-	
Accounts Receivable			\$9,000	
Inventory			\$4,000	
Fixed Assets (net)			\$6,000	
Total Assets			\$19,000	
Liabilities				

Accounts Payable			-0-
Accruals			\$400
Debt	\$5,000		\$5,000
Equity		\$1,600	\$13,600
Total Liability & Equity			\$19,000
INCOME STATEMENT			
Sales			\$9,000
Cost			\$3,000
Expense			\$4,400
Net Income		\$1,600	\$1,600

### Leverage – Example 2-3, Page 39

14. Jacob Cornwall has a business in which he's invested \$250,000 of his own money, which is the firm's only capital. (There are no other equity investors and no debt.) In a recent year the firm had net income of \$20,000 for a return on equity of 8% (\$20,000/\$250,000). What will the firm's return on equity be next year if net income from business operations remains the same but it borrows \$150,000 returning the same amount to Jake from the equity account if

- The after tax interest rate is 6%.
- The after tax interest rate is 10%.
- Comment on the difference between the results of a and b.

#### SOLUTION:

a., b.

	<u>All Equity</u>	<u>Leveraged</u>	
		<u>6%</u>	<u>10%</u>
Earnings	\$ 20,000	\$ 20,000	\$20,000
Interest (after tax)	—	\$ 9,000	15,000
Net Income	\$ 20,000	\$ 11,000	\$ 5,000
Debt	—	\$150,000	\$150,000
Equity	\$250,000	100,000	100,000
Total capital	\$250,000	\$250,000	\$250,000
Return*	8%	11%	5%
*Net Income/Equity =	\$20/\$250	\$11/\$100	\$5/\$100

c. Leverage works both ways. It improves ROE if the firm's underlying return on capital is higher than the rate it pays for borrowed money. This is the case when the interest rate is 6%. But if debt costs more than the company earns with the borrowed money, as in part b., leverage makes ROE worse.

15. Gatwick Ltd. has after tax profits (net income) of \$500,000 and no debt. The owners have a \$6 million investment in the business. If they borrow \$2 million at 10% and use it to retire stock, how will the return on their investment (equity) change if earnings before interest and taxes remains the same? Assume a flat 40% tax rate and that the loan reduces equity dollar for dollar. A business owner's return on investment or equity is  $ROI=ROE=Net\ Income/Equity$ .

**SOLUTION:** Gatwick's original return on invested equity is its after-tax earnings divided by the equity:

$$\$500,000 / \$6,000,000 = 8.3\%$$

Borrowing \$2M to retire stock will change the invested equity to \$4M. At the same time, the new debt will generate interest of (10% of \$2M) \$200,000 which will reduce profit. However the after-tax profit reduction is less than that amount because of the taxes saved due to the interest paid. The tax saving is

$$\$200,000 \times .40 = \$80,000$$

so the profit reduction due to paying interest is

$$\$200,000 - \$80,000 = \$120,000,$$

and the new profit level will be

$$\$500,000 - \$120,000 = \$380,000.$$

Then the new return on invested equity will be

$$\$380,000 / \$4,000,000 = 9.5\%.$$

Notice that borrowing has **levered** up the return on equity.

**See the illustration of the equity accounts on page XX for problem 16-19.**

16. Declan Ross wants to sell his business. The firm has no debt and earns an 8% return (ROE) on equity of \$150,000. The business can borrow at an after tax rate of 5%. A consultant has advised that the business will be worth more if its financial statements show a higher return on equity (ROE = net income / equity). Unfortunately an increase in profitability isn't feasible. The consultant also says that leverage can sometimes be used to improve ROE, and that since the firm earns a higher return (8%) than the after tax loan rate (5%), borrowing money to reduce equity will increase ROE. How much will Declan have to borrow to raise his firm's ROE to 12%? (*Hint: First calculate net income using the definition of ROE. Then assume Declan borrows \$50,000 reducing equity by the same amount. Recalculate net income and ROE. Repeat with different debt amounts until ROE is close to 12%.*)

**SOLUTION:**

First find the firm's current net income

$$\text{ROE} = \text{Net Income} / \text{Equity}$$

$$.08 = \text{Net Income} / \$150,000$$

$$\text{Net Income} = \$12,000$$

A debt of D will reduce equity by D and reduce net income by .05D. Begin by evaluating the effect of borrowing \$50,000.

$$\text{Equity} = \$150,000 - \$50,000 = \$100,000$$

$$\begin{aligned} \text{Net Income} &= \$12,000 - .05D = \$12,000 - .05(\$50,000) = \$12,000 - \$2,500 \\ &= \$9,500 \end{aligned}$$

$$\text{Then ROE} = \$9,500 / \$100,000 = .095 = 9.5\%$$

So borrowing \$50,000 has raised ROE but not enough.

We try other values of D searching for a 12% return until we arrive at approximately \$86,000 at which

$$\text{Equity} = \$150,000 - \$86,000 = \$64,000 \text{ and}$$

$$\text{Net Income} = \$12,000 - .05(\$86,000) = \$7,700$$

$$\text{So ROE} = \$7,700 / \$64,000 = .1203 = 12.0\%$$

Hence Declan must borrow approximately \$86,000.

An alternate algebraic solution is as follows:

$$(1) \quad \text{Net Income} = \$12,000 - .05D$$

$$(2) \quad \text{ROE} = \text{Net Income} / (\$150,000 - D)$$

Substitute (1) into (2) and set ROE = 12%

$$.12 = (\$12,000 - .05D) / (\$150,000 - D)$$

Then solve for D to get \$85,714 from which

$$\text{Equity} = \$150,000 - \$85,714 = \$64,286. \text{ Then}$$

$$\text{Net Income} = \$12,000 - .05D = \$12,000 - .05(\$85,714) = \$7,714.3, \text{ and}$$

$$\text{ROE} = \$7,7143 / \$64286 = 12.00\%$$

**See the illustration of the equity accounts and their beginning/ending relationships on page 41 for problems 17 – 19.**

17. During the last year Alpha Co had Net Income of \$150, paid \$20 in dividends, and sold new stock for \$40. Beginning equity for the year was \$700. Calculate ending equity.

**Solution:**

$$\begin{aligned}\text{Ending Equity} &= \text{Beginning Equity} + \text{Net Income} - \text{Dividends} + \text{New Stock} \\ &= \$700 + \$150 - \$20 + \$40 = \$870\end{aligned}$$

18. Mints Entertainment, Inc. had Net Income of \$170,000 and paid dividends of \$0.25 per share on its 100,000 shares of outstanding stock this year. At the end of the year its balance sheet showed retained earnings of \$250,000. What was Mints' retained earnings balance at the end of last year?

**Solution**

This year's ending Retained Earnings	=	\$250,000
Less this year's Net Income		(170,000)
Plus this year's dividends (100,000 x \$.25=)		<u>+ 25,000</u>
Last year's ending Retained Earnings	=	\$105,000

19. Preston Road Inc. was organized was organized last year when its founders contributed \$9 million and issued 3 million shares of \$1.25 par value stock. The company earned \$750,000 in its first year and paid dividends of \$325,000. Construct the equity section of Preston Road's balance sheet as of the end of that year.

**SOLUTION:**

**Initially**

Common stock (3M shrs @ \$1.25 par)	\$3,750,000
Paid in Excess (\$9M - \$3.75M)	<u>5,250,000</u>
Total Equity	\$9,000,000

Note: paid in excess can also be calculated as share price (\$9M/3Mshrs = \$3.00) minus par times the number of shares issued.

$$(\$3.00 - \$1.25) \times 3\text{M} = \$1.75 \times 3\text{M} = \$5,250,000$$

**At The End Of The First Year**

Add retained earnings of \$750,000 – \$325,000 = \$425,000  
Then:

Common stock (3M shrs @ \$1.25 par)	\$3,750,000
Paid in Excess	5,250,000
Retained Earnings	<u>425,000</u>
Total Equity	\$9,425,000

20. The Digital Systems Company was organized two years ago to take advantage of an internet opportunity. Investors paid \$12 a share for 2 million shares with a \$4 par value. In the next two years the company had earnings of \$2 million and \$3 million respectively. It paid dividends of \$1.2 million and \$1.3 million respectively in those years. At the end of the first year Digital sold another 500,000 shares of stock at \$14 per share. Construct the equity section of Digital's balance sheet initially and at the end of its first and second years in business.



**SOLUTION:****Initially**

Common stock (2M shrs @ \$4 par)	\$ 8,000,000
Paid in Excess (2M shrs @ \$8)	<u>16,000,000</u>
Total Equity	\$24,000,000

**At The End Of The First Year**

Add to common stock	.5M shrs × \$4 par = \$2M
Add to Paid in Excess	.5M shrs × \$10 = \$5M
Add retained earnings of	\$2M – \$1.2M = \$0.8M

Common stock (2.5M shrs @ \$4 par)	\$10,000,000
Paid in Excess	21,000,000
Retained Earnings	<u>800,000</u>
Total Equity	\$31,800,000

**At The End Of The Second Year**

Add retained earnings of	\$3M – \$1.3M = \$1.7M
--------------------------	------------------------

Common stock (2.5M shrs @ \$4 par)	\$10,000,000
Paid in Excess	21,000,000
Retained Earnings	<u>2,500,000</u>
Total Equity	\$33,500,000

**TAXES**

21. The Coolidge family has taxable income of \$165,000. They live in a state in which income over \$100,000 is taxed at 11%. What is their total effective (marginal) tax rate? (*Hint:* Use Equation 2.1 on page 43 and Table 2-4 on page 47.)

**SOLUTION:**

Write Equation (2-1) and substitute from the problem noticing that the Coolidge's marginal tax rate is 28% from Table 2-4.

$$\begin{aligned}
 \text{TETR} &= T_f + T_s (1 - T_f) \\
 &= .28 + .11 (1 - .28) \\
 &= 35.9\%
 \end{aligned}$$

22. Use the following tax brackets for taxable income:

<u>Bracket</u>	<u>Tax Rate</u>
\$0 - \$10,000	15%
\$10,000 - \$50,000	25%
\$50,000 - \$250,000	30%
over \$250,000	35%

Compute the average tax rate for the following taxable income amounts (see page **XX**):

- (a) \$20,000
- (b) \$125,000
- (c) \$350,000

(d) \$1,000,000

**SOLUTION:**

- a.  $(\$10,000 \times .15) + (\$10,000 \times .25) = \$4,000$ ;  $\$4,000/\$20,000 = 20.0\%$
- b.  $(\$10,000 \times .15) + (\$40,000 \times .25) + (\$75,000 \times .30) = \$34,000$ ;  $\$34,000/\$125,000 = 27.2\%$
- c.  $(\$10,000 \times .15) + (\$40,000 \times .25) + (\$200,000 \times .30) + (\$100,000 \times .35) = \$106,500$ ;  
 $\$106,500/\$350,000 = 30.4\%$
- d.  $(\$10,000 \times .15) + (\$40,000 \times .25) + (\$200,000 \times .30) + (\$750,000 \times .35) = \$334,000$ ;  
 $\$334,000/\$1,000,000 = 33.4\%$

23. Joan Petros reported taxable income in 20X2 of \$150,000 which included the following transactions:
- (1) In June, 20X2, Joan sold 100 shares of stock for \$40 per share. She had purchased them three months earlier for \$35 per share.
  - (2) In October, 20X2, Joan sold 200 shares of stock for \$79 per share. She had purchased them three years earlier for \$61 per share.
- Joan had no dividend income in 20X2.  
 If long-term capital gains are taxed at 15%, and all ordinary income is taxed at 25%, what is Joan's tax liability for 20X2?

**SOLUTION:**

The shares sold in (1). generate a short-term capital gain which is taxable as ordinary income. Therefore, the only transaction for which Joan received favorable treatment is (2), which is a long-term capital gain taxed at 15%.

Tax on Gain from (2). :  $(\$79 - \$61) \times 200 = \$3,600 \times .15 = \$540$

Tax on ordinary income:  $(\$150,000 - \$3,600) \times .25 = \$36,600$

Total Tax Liability:  $\$36,600 + \$540 = \$37,140$

## Calculating Personal Taxes – Example 2-4, Page 48

24. The Lindscomb family had the following income in 2015:

Salaries:	Mark	\$63,500
	Ashley	57,900
Interest on investments:		
	IBM bonds	\$ 4,750
	New York City bond	1,400
	Savings account	2,600

The family made home mortgage payments that included interest of \$16,480, and paid real estate (property) tax of \$4,320 on the home. They also paid state income tax of \$5,860 and donated \$1,250 to well-known charities. The Lindscombs have three dependent children.

- a. Calculate the family's federally taxable income.
- b. What is their tax liability assuming they file jointly as a married couple
- c. What are their average and marginal tax rates?

**SOLUTION:**

- a. First calculate income excluding interest on the exempt New York City bond.

Salaries	\$121,400
Interest	<u>7,350</u>
	\$128,750

Next calculate itemized deductions:

Mortgage Interest	\$16,480
Local Tax:     Property	4,320
State Income	5,860
Charitable contributions	<u>1,250</u>
Total Itemized Deductions	\$27,910

Then calculate personal and dependency exemptions for five people:

$$\$4,000 \times 5 = \$20,000$$

Taxable income is then income excluding exempt items less deductions and exemptions:

Income	\$128,750
Deductions	(27,910)
Exemptions	<u>(20,000)</u>
Taxable Income	\$ 80,840

- b. Apply the tax schedule for married couples filing jointly from table 2.4 noticing that the family is in the third or 25% bracket:

$$\begin{array}{rcl}
 \$18,450 \times .10 & = & \$ 1,845 \\
 (\$74,900 - \$18,450) \times .15 & = & \$56,450 \times .15 = 8,468 \\
 (\$80,840 - \$74,900) \times .25 & = & \$5,940 \times .25 = \underline{1,485} \\
 \text{Tax liability} & & \$11,798
 \end{array}$$

- c. Average tax rate = tax liability / taxable income  
 $= \$11,798 / \$80,840$   
 $= 14.6\%$   
 Marginal tax rate = bracket rate = 25%

25. The Benjamin family had wage earnings of \$185,000 in 2015. They received interest of \$4,500 on corporate bonds and \$1,500 on bonds issued by the state. Their dividend income was \$500, and they had a \$1,000 long term capital gain on the sale of securities.

They paid real estate taxes of \$1,450, state income tax of \$3,000, and donated \$550 to their church. They paid interest of \$8,000 on their home mortgage. They have one dependent child. What was their tax liability for 2015?

#### SOLUTION:

Ordinary Income	
Wages	\$185,000
Interest (exclude state bond)	<u>4,500</u>
Total	\$189,500

Deductions	Home mortgage interest	\$ 8,000
	Real estate tax	1,450
	State income tax	3,000
	Donations	<u>550</u>
	Total	\$13,000

Exemptions	3 x \$4,000 =	\$12,000
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Ordinary taxable income	\$164,500
-------------------------	-----------

Tax on ordinary income	
.10 x \$18,450 =	\$ 1,845

$$\begin{aligned}
 .15 \times (\$74,900 - \$18,450) &= .15 \times \$56,450 = \$ 8,468 \\
 .25 \times (\$151,200 - \$74,900) &= .25 \times \$76,300 = \$19,075 \\
 .28 \times (\$164,500 - \$151,200) &= .28 \times \$13,300 = \underline{\$ 3,724} \\
 \text{Total} &= \$31,267
 \end{aligned}$$

Capital gains tax @ 15%

$$.15 \times \$1,000 = \$ 150$$

Tax on dividends @ 15%

$$.15 \times \$500 = \$ 75$$

$$\text{Total Tax Liability} \quad \$31,267 + \$150 + \$75 = \$31,492$$

26. Joan and Harry Leahy both had income in 2015. Harry made \$72,500 in wages. Joan has an incorporated small business that paid her a salary of \$50,000. In addition, the business had profits of \$15,000, which were paid to the Leahys as dividends. They received \$5,600 in interest on savings and \$350 in interest on a loan made to Harry's brother Lou. Lou also repaid \$2,000 of principal on that loan during the year. The couple had interest income from two bonds, \$2,200 on a 20-year IBM issue, and \$2,700 on a State of Michigan revenue bond.

They sold some Biotech stock for \$14,000 that had been purchased five years before for \$4,000. Two years ago they invested \$50,000 in some rural land on the advice of a real estate agent. They sold the property in 2015 for \$46,000.

The Leahys paid \$12,500 in mortgage payments of which \$9,000 was interest and the rest reduced principal. They paid real estate taxes of \$2,750 and state income tax of \$6,800 during the year. They contributed \$1,500 to their church and \$3,000 to the support of Joan's elderly mother. They have two young children. (Joan's mother is not a dependent.)

- Calculate the Leahys' taxable income.
- What is their tax liability for 2015?
- What is their average tax rate?
- What is their marginal tax rate? Can there be more than one marginal rate? Explain.

### SOLUTION:

First enumerate the items of income omitting the exempt interest from the Michigan (municipal) bond

a.	Wages:	Harry	\$ 72,500
		Joan	<u>50,000</u>
			\$122,500
	Business profits (dividend)		\$ 15,000

#### Interest:

Savings	\$5,600	
Brother Lou	350	
IBM	<u>2,200</u>	<u>\$ 8,150</u>

(Notice that interest on the Michigan bond is not included.)

#### Capital gain/(loss):

Biotech	\$10,000	
Real Estate	<u>(4,000)</u>	<u>\$ 6,000</u>
Income		\$151,650

Next list deductions from income noticing that principal repayment on the mortgage is not deductible. Likewise the payment to Joan's mother isn't deductible.

Mortgage interest	\$9,000
-------------------	---------

Real Estate tax	2,750
State Income tax	6,800
Charitable contributions	<u>1,500</u>
	\$20,050

Finally calculate exemptions at \$3,800 for each person in the household.

$$\$4,000 \times 4 = \$16,000$$

Then taxable income is income less deductions and exemptions.

$$\$151,650 - \$20,050 - \$16,000 = \$115,600$$

b. To calculate the tax liability we have to recognize that \$6,000 of the Leahy's taxable income is from long-term capital gains, which are subject to a maximum tax rate of 15 percent. Similarly the \$15,000 dividend is taxable at only 15%.

Their ordinary taxable income excluding capital gains and dividends is

$$\$115,600 - \$6,000 - \$15,000 = \$94,600$$

Applying Table 2-4 gives the tax liability on this income of

$\$18,450 \times .10 =$	\$ 1,845
$(\$74,900 - \$18,450) \times .15 =$	\$ 8,468
$(\$94,600 - \$74,900) \times .25 =$	<u>\$ 4,925</u>
	\$15,238

The tax on the capital gain is

$$\$6,000 \times .15 = \$900$$

and the tax on the dividend is

$$\$15,000 \times .15 = \$2,250$$

Hence, the total tax liability is

$$\$15,238 + \$900 + \$2,250 = \$18,388$$

c. The average tax rate is just the tax liability divided by taxable income:

Including capital gains and dividends =	$\$18,388 / \$115,600 = 15.9\%$
Not including capital gains and dividends =	$\$15,238 / \$94,600 = 16.1\%$

d. Notice that there are actually two marginal rates, one for ordinary income (25%) and one for long-term capital gains and dividends (15%). Hence the correct marginal rate for financial decisions would depend on the type of investment income under consideration.

## Comparing Taxable and Tax Exempt Returns – Example 2-5, Page 50

27. Harry Swartz wants to invest in a bond and has narrowed his choices down to two issues. The first is offered by Microsoft Corp. and pays an interest rate of 8%. The second option is offered by the city of Springfield, Massachusetts, and offers a return of 6%. Harry feels that the risk levels inherent in the two bonds are similar. The both mature in ten years. Harry is single, has taxable income of \$125,000 in 201 and lives in a state that has no personal income tax. Which bond should Harry choose?

**Solution:** First consult the 2015 tax schedule for single individuals in Table 2.4 and observe that Harry is in the 28% federal tax bracket. The bracket rate is also his marginal tax rate which is relevant for investment decisions.

The Microsoft bond pays 8%, but Harry will keep only 5.76% after taxes calculated as follows  

$$8\% \times (1 - .28) = 8\% \times .72 = 5.76\%$$

Which is less than the Springfield bond's tax exempt return of 6%. Hence Harry is better off with the municipal bond.

28. Dick Downen is considering three investment opportunities:

- (1) A 4.5% City of Chicago bond that is tax exempt at both the state and federal level.
- (2) A 4.75% State of Illinois bond that is tax exempt at the federal level but taxable at the state level.
- (3) A 6.7% McDonald's bond that is taxable at both the state and federal level. (*Hint: Use the TETR.*)

If the Illinois state tax rate is 6% and Dick's marginal federal tax rate is 30%, which investment yields the highest after-tax return?

**SOLUTION:**

- (1) Since there is no tax on the City of Chicago bond, the after-tax return is 4.5%
- (2) The State of Illinois bond, taxable only at the federal level, has an after-tax return of  

$$6.35\% \times (1 - .3) = 4.445\%.$$
- (3) For the McDonald's bond first calculate the total effective tax rate (TETR)  

$$\begin{aligned} \text{TETR} &= T_f + T_s (1 - T_f) \\ \text{TETR} &= .30 + .06(1 - .30) \\ &= .30 + .042 = .342 \end{aligned}$$

Then:  
 Bond yield after tax =  $6.7 (1 - .342) = 6.7 (.658)$   

$$= 4.4086\%$$

Hence, the return on the City of Chicago bond is highest by a very slim margin.

**Corporate Income Taxes – Example 2-6, Page 53**

29. Calculate the corporate tax on earnings before tax (EBT) of the following amounts

- a. \$37,000
- b. \$57,000
- c. \$88,500
- d. \$110,000
- e. \$5,375,000
- f. \$14,000,000
- g. \$17,350,000
- h. \$23,500,000

**SOLUTION:**

- a.  $\$37,000 \times .15 = \$5,550$
- b.  $\$50,000 \times .15 = \$7,500$   
 $7,000 \times .25 = \underline{1,750}$   
 $\$9,250$

- c.  $\begin{array}{r} \$50,000 \times .15 = \$7,500 \\ 25,000 \times .25 = 6,250 \\ 13,500 \times .34 = \underline{4,590} \\ \$18,340 \end{array}$
- d.  $\begin{array}{r} \$50,000 \times .15 = \$7,500 \\ 25,000 \times .25 = 6,250 \\ 25,000 \times .34 = 8,500 \\ 10,000 \times .39 = \underline{3,900} \\ \$26,150 \end{array}$
- e.  $\$5,375,000 \times .34 = \$1,827,500$  (See Example 2.6b)
- f.  $\begin{array}{r} \$10,000,000 \times .34 = \$3,400,000 \\ 4,000,000 \times .35 = \underline{1,400,000} \\ \$4,800,000 \end{array}$
- g.  $\begin{array}{r} \$10,000,000 \times .34 = \$3,400,000 \\ 5,000,000 \times .35 = 1,750,000 \\ 2,350,000 \times .38 = \underline{893,000} \\ \$6,043,000 \end{array}$
- h.  $\$23,500,000 \times .35 = \$8,225,000$  (See Example 2.6d)

30. Ed Fletcher is planning to start a business that requires an investment of \$500,000. He has that much money, but can also borrow virtually the whole amount from a rich relative. (This is very unusual.) Ed feels that after the business is started, it will be important to retain as much money in the company as possible to fund growth. Nevertheless, he plans to pay the investor, either himself or his relative, a \$50,000 return (10% of the amount invested) each year. That's about as much as could be earned elsewhere. Considering cash retention only, should Ed borrow or invest his own money? That is, which option will result in keeping more money in the company available to grow the business? How much more? The company's total effective tax rate will be 40%. (*Hint: See Taxes and Financing, page XX.*)

**SOLUTION:**

Ed should borrow because an interest payment to his relative will be tax deductible while a dividend payment to himself will not. Hence the firm will retain tax savings of

$$\$50,000 \times .40 = \$20,000$$

each year by using debt as opposed to equity financing.

31. Microchip Inc had the following profits and losses in the years indicated

2013	\$5,000,000
2014	\$ 350,000
2015	(\$3,450,000)

How much federal tax will it eventually pay for 2013. The corporate rate schedule is the same for all three years.

**SOLUTION:**

The entire 2015 loss can be carried back to 2013. Then

$$2013 \text{ EBT} = \$5,000,000 - \$3,450,000 = \$1,550,000$$

And from the tax table the tax is  
 $\$1,550,000 \times .34 = \$527,000$

It's worth noting that there isn't a choice as to the years in which the loss can be applied. A firm in Microchip's situation must apply the loss as far back as the law allows and then work its way forward until the loss is exhausted.

32. Inky Inc. reported the following financial information in 2015.

Operating income (EBIT)	\$650,000
Interest	\$430,000
Dividends from Printers Inc. not included in operating income (Inky owns 3% of Printers)	\$20,000
Dividends paid to Inky's stockholders	\$50,000

- What is Inky's tax liability? (Use the corporate tax schedule on page XX.)
- What is Inky's marginal tax rate?
- What is Inky's average tax rate?
- Explain why only one of the rates in b and c is relevant for financial decisions?

**SOLUTION:**

- First calculate Inky's EBT (taxable income):

Operating Income (excl Printers dividend)	\$ 650,000
30% of Printers dividend	<u>6,000</u>
EBIT	\$ 656,000
Interest	<u>(430,000)</u>
EBT	\$ 226,000

Then calculate Inky's tax liability using the corporate schedule:

$\$50,000 \times .15 =$	\$ 7500
$\$25,000 \times .25 =$	\$ 6250
$\$25,000 \times .34 =$	\$ 8,500
$\$126,000 \times .38 =$	<u>\$47,880</u>
Tax liability =	\$71,130

Note: Dividends to Inky's stockholders don't enter the calculations because they're paid from after tax income.

- The marginal tax rate is the rate paid on the next dollar of taxable income which is generally the bracket rate, 38% in Inky's case.
- The average tax rate = Tax liability/EBT =  $\$71,130/\$226,000 = 31.0\%$
- The marginal tax rate is relevant in financial decisions involving **incremental** income because such income is generally taxed at that rate.

33. The Snyder Company had the following income and expense items:

Sales	\$180,870,000
Cost	\$110,450,000
Expenses	\$65,560,000

In addition, it received both interest and dividends from the Bevins Corp., of which it owns 30%. The interest received from Bevins was \$2,430,000 and the dividends were \$4,700,000. Calculate Snyder's tax liability.



**SOLUTION:**

Snyder's taxable income is revenue less costs and expenses *plus* the interest and dividends from Bevins. However the dividends are 80% exempt because of Snyder's 30% ownership of Bevins. Hence only 20% are included in the calculation.

Sales	\$180,870,000
Cost	110,450,000
Expense	<u>65,560,000</u>
	\$ 4,860,000
Plus:	
Interest	2,430,000
Dividends	
(\$4.7M × 20%)	<u>940,000</u>
Taxable income	\$8,230,000

Applying Table 2-5 gives the tax liability.

$\$50,000 \times .15$	= \$	7,500
$(\$75,000 - \$50,000) \times .25$	= \$	6,250
$(\$100,000 - \$75,000) \times .34$	= \$	8,500
$(\$335,000 - \$100,000) \times .39$	= \$	91,650
$(\$8,230,000 - \$335,000) \times .34$	= <u>\$2,684,300</u>	
		\$ 2,798,200

**COMPUTER PROBLEMS**

34. Rachel and Harry are planning to get married. Both have successful careers and expect to earn the following this year.

	<u>Rachel</u>	<u>Harry</u>
Salary	\$155,380	\$146,200
Interest Income (taxable)	6,750	45,325
Capital gain/(loss)	<u>5,798</u>	<u>-</u>
Total Income	\$167,928	\$191,525
Itemized deductions	\$ 28,763	\$ 15,271

a. Use the **PERSTAX** program to calculate their total tax bill as single individuals and determine whether getting married will cost or save them money and how much. Assume that getting married during a year subjects the entire year's income to the married filing jointly rate schedule. Assume there are no state taxes.

b. Duncan and Angela are also considering getting married, but have considerably lower incomes.

	<u>Duncan</u>	<u>Angela</u>
Salary	\$56,450	\$37,829
Itemized deductions	\$ 6,048	\$ 3,224

What will it cost or save them to get married?

**SOLUTION:**

a.		<u>Rachel</u>	<u>Harry</u>	<u>Together</u>	<u>Married</u>
	Tax	\$30,910	\$42,102	\$73,012	\$78,457
	Tax cost to marry				\$5,445

b.		<u>Duncan</u>	<u>Angela</u>	<u>Together</u>	<u>Married</u>
	Tax	\$7,876	\$4,226	\$12,102	\$11,802
	Tax saving to marry				300

35. You've been hired by the nation of Utopia to computerize its approach to calculating taxes. Utopia's progressive tax system contains only two brackets, which are applicable to all households. These are as follows:

	<u>Income</u>	<u>Rate</u>
	Under \$30,000	20%
	Over \$30,000	30%

The treatment of personal exemptions and itemized deductions is similar to the U.S. system, but the exemption amount is permanently fixed at \$2,550 per person. There is no special consideration given to capital gains and losses or dividends. Write a spreadsheet program to compute taxes for a typical Utopian household. Test your program with the following cases.

Income	\$28,950	\$96,250
# people	1	5
Deductions	\$2,800	\$14,457

Verify that your program works by calculating the Utopian taxes manually. (*Hint*: use a single conditional instruction (IF statement) to identify which bracket the taxpayer is in *and* make the tax calculation.)

**SOLUTION:**

Income	\$28,950	\$96,250
Less:		
Exemptions	\$ 2,550	\$12,750
Deductions	\$ 2,800	\$14,457
Taxable Income	\$23,600	\$69,043
Tax at 20%	\$4,720	\$6,000
Tax at 30%	-	<u>\$11,713</u>
Total tax	\$4,720	\$17,713