

## EEA13 SUPPLEMENT FOR TAX CUTS AND JOBS ACT

The Tax Cuts and Jobs Act, approved in December 2017, made significant changes in personal and corporate tax policy. Some changes are permanent, and some will begin phasing out after 5 years. This supplement was developed to help you understand some of the changes in depreciation and tax requirements that have occurred. There are three sections:

- Depreciation (supplement to Chapter 11)
- Corporate Income Taxes (supplement to Chapter 12)
- Personal Income Taxes (supplement to Appendix 12A)

### DEPRECIATION

This section introduces major changes to depreciation rules as they relate to taxes. The rules for the accounting of assets have not changed.

#### Bonus Depreciation

The Tax Cuts and Jobs Act includes a 100% bonus depreciation (Special Depreciation Allowance). This is available for qualified new and used items purchased after September 2017. Many types of tangible property having a depreciable life of 20 years or less may be depreciated 100% during the first year of use. Qualifying expenditures reduce taxable income and therefore reduce taxes for the year the item is put into use. 100% bonus depreciation effectively expenses tangible property.

Bonus depreciation is scheduled to be in effect through 2022 for most items, when it will begin a 5-year phase-out.

#### EXAMPLE S-1

Consider the following (in \$1000):

|                                 |       |
|---------------------------------|-------|
| Cost of the asset, $B$          | \$900 |
| Depreciable life, in years, $n$ | 5     |
| Salvage value, $S$              | \$70  |

Determine the depreciation schedule with 100% bonus depreciation.

#### SOLUTION

|                         |       |
|-------------------------|-------|
| Depreciation, year 1    | \$900 |
| Depreciation, years 2–5 | 0     |

The asset is 100% depreciated in its first year of use. Any salvage value that occurs after year 1 is taxed as recaptured depreciation or regular income.

#### Section 179

The **Section 179 deduction** encourages capital investment by small businesses. This deduction allows complete expensing of up to \$1 million of capital expenditures in the year of purchase. Businesses must reduce this deduction by one dollar for every dollar of capital spent in that year that exceeds \$2.5 million. Total depreciation under bonus, regular, and 179 depreciation is always limited to an item's capital cost.

## **CORPORATE INCOME TAXES**

### **Corporate Tax Rates**

The Tax Cuts and Jobs Act simplified and reduced federal corporate income tax rates from eight tax brackets, with tax rates ranging from 15% to 39%, to one tax rate of 21% beginning in 2018.

### **EXAMPLE S-2**

A firm expanded one of its manufacturing operations inside an existing building. New processing and packaging equipment was purchased for \$800,000. Operations began June 1, 2018. Sales revenue for the year was \$1.25 million. Operating expenses for that year, not including the capital expenditures, were \$360,000.

- (a) What is the first-year depreciation charge?
- (b) What is the first-year taxable income?
- (c) What are the federal income taxes for the year?

### **SOLUTION TO PART a**

The new processing and packaging equipment qualifies for bonus depreciation.

$$\text{First-year depreciation} = \$800,000$$

### **SOLUTION TO PART b**

$$\begin{aligned} \text{Taxable income} &= \text{Gross income} - \text{operating expenses} - \text{depreciation} \\ &= \$1,250,000 - 360,000 - 800,000 = \$90,000 \end{aligned}$$

### **SOLUTION TO PART c**

$$\text{Federal income tax} = \$90,000 \times 0.21 = \$18,900$$

### **Combined Federal and State Income Taxes**

Most companies pay state income taxes in addition to federal income taxes. With the decrease in federal tax rates, state taxes are of increased importance. It is convenient to have a single combined tax rate that can be used for planning purposes. The combined incremental tax rate will not be the sum of two tax rates, but rather

$$\text{Combined incremental tax rate} = \text{State tax rate} + (\text{Federal tax rate})(1 - \text{State tax rate})$$

### **EXAMPLE S-3**

A company in Kentucky has taxable income of \$160,000. The Commonwealth of Kentucky taxes corporate income with a series of marginal rates. Taxable income up to \$50,000 is taxed at 4%, income over \$50,000 up to \$100,000 is taxed at 5%, and income over \$100,000 is taxed at 6%.

How much income tax is owed?

### **SOLUTION**

$$\text{Tax} = 0.04 \times 50,000 + 0.05 \times (100,000 - 50,000) + 0.06 \times (160,000 - 100,000) = \$8100$$

**EXAMPLE S-4**

A small design firm is located in Pennsylvania where the state tax rate is 9.99%. Income taxes need to be considered as the firm bids for new projects. What is the firm's combined federal and state income tax rate on new income?

**SOLUTION**

Combined incremental tax rate =  $0.0999 + 0.21(1 - 0.0999) = 0.2889 = 28.89\%$ .

**Economic Analysis Taking Income Taxes into Account**

Firms manage their business, including their projects, based on after-tax profit. If a firm has a strategic target of growing by 15% per year, it needs to achieve this level of return on an after-tax basis. In order to determine after-tax results, we need to determine *after-tax cash flows*. The main elements of an *after-tax analysis* are as follows:

- Before-tax cash flow
- Depreciation
- Taxable income (Before-tax cash flow – Depreciation)
- Income taxes (Taxable income × Incremental tax rate)
- After-tax cash flow (Before-tax cash flow – Income taxes)

An **after-tax cash flow table** is illustrated in Example S-5.

**EXAMPLE S-5**

A profitable company buys \$25,000 of equipment that qualifies for bonus depreciation. The equipment is expected to save \$8000 per year over its 5-year life, when it will be sold for \$6000.

- (a) What is the before-tax present worth? Use a MARR of 15%.  
 (b) What is the after-tax present worth? The after-tax MARR is usually lower, but the same 15% is used so that the impact of taxes can be clearly seen.

**SOLUTION TO PART a**

The first step is to compute the before-tax cash flows.

| Year | Before-Tax<br>Cash Flow                                       |
|------|---|
| 0    | -\$25,000   |
| 1    | 8,000   |
| 2    | 8,000   |
| 3    | 8,000   |
| 4    | 8,000   |
| 5    | $\left\{ \begin{array}{l} 8,000 \\ 6,000 \end{array} \right.$ |

Solve for the before-tax present worth:

$$\begin{aligned} PW &= -25,000 + 8000(P/A, 15\%, 5) + 6000(P/F, 15\%, 5) \\ &= -25,000 + 8000(3.352) + 6000(.4972) = \$4799 \end{aligned}$$

**5-BUTTON SOLUTION**

First, identify the present value of the benefits, then subtract the investment.

|   | A        | B   | C   | D     | E       | F    | G         | H      |
|---|----------|-----|-----|-------|---------|------|-----------|--------|
| 1 | Problem  | $i$ | $n$ | $PMT$ | $PV$    | $FV$ | Solve for | Answer |
| 2 | Exp. S-4 | 15% | 5   | 8000  |         | 6000 | PV        | 29,800 |
| 3 |          |     |     |       | -25,000 |      | PV        | \$4800 |

**SOLUTION TO PART b**

For an after-tax present worth, set up an after-tax cash flow table (Table S-1). The first element is the before-tax cash flow. Then we need the depreciation schedule for the equipment:

Bonus depreciation = \$25,000 in Year 1

Taxable income is the before-tax cash flow *minus* depreciation. The federal income tax rate is 21%, so taxes are 21% of taxable income. The salvage value is taxed as income because the investment was fully depreciated. Finally, the after-tax cash flow equals the before-tax cash flow *minus* income taxes. These data are used to compute Table S-1.

**TABLE S-1 After-Tax Cash Flow Table for Example S-5\***

| Year | (a)<br>Before-Tax<br>Cash Flow | (b)<br>Bonus<br>Depreciation | (c)<br>Taxable<br>Income<br>(a) - (b) | (d)<br>21%<br>Income Taxes<br>-0.21(c) | (e)<br>After-Tax<br>Cash Flow<br>(a) + (d) † |
|------|--------------------------------|------------------------------|---------------------------------------|--|--|
| 0    | -\$25,000                      |                              |                                       |  | -\$25,000                                    |
| 1    | 8,000                          | \$25,000                     | -\$17,000                             | \$3570                                 | 11,570                                       |
| 2    | 8,000                          | 0                            | 8,000                                 | -1680                                  | 6,320  |
| 3    | 8,000                          | 0                            | 8,000                                 | -1680                                  | 6,320  |
| 4    | 8,000                          | 0                            | 8,000                                 | -1680                                  | 6,320  |
| 5    | { 8,000<br>6,000               | 0                            | { 8,000<br>6,000                      | { -1680<br>-1260                       | { 6,320<br>4,740                             |

\*Sign convention for income taxes: a minus ( - ) represents a disbursement of money to pay income taxes; a plus ( + ) represents the receipt of money by a decrease in the tax liability.

†The after-tax cash flow is the before-tax cash flow minus income taxes. Based on the income tax sign convention, this is accomplished by *adding* columns (a) and (d).

**SPREADSHEET SOLUTION**

We now use the after-tax cash flows to find the after-tax present worth. MARR = 15%.

|   | A    | B            |
|---|------|--------------|
| 1 | Year | AT Cash Flow |
| 2 | 0    | -\$25,000    |
| 3 | 1    | 11,570       |
| 4 | 2    | 6,320        |
| 5 | 3    | 6,320        |
| 6 | 4    | 6,320        |
| 7 | 5    | 11,060       |
| 8 | PW   | \$3,107      |

The after-tax present worth of the project is \$3107.

**PERSONAL INCOME TAXES**

The Tax Cut and Jobs Act eliminated personal exemptions. By increasing the standard deduction and limiting itemized deductions it simplified tax calculations for many taxpayers.

**Taxable income**

= adjusted gross income – itemized deductions or standard deduction (S-1)

**The standard deduction** for 2018 returns is \$12,000 for single taxpayers, and \$24,000 if married and filing jointly. Important **itemized deductions** include:

- Medical and dental expenses exceeding 7.5% of AGI
- State/local income taxes, real estate, and property taxes (limit of \$10,000)
- Home mortgage interest (limit of \$750,000 in debt)
- Charitable contributions (limit of 60% of AGI)

Tables S–2 and S–3 show the tax rates for single and married filing jointly.

**TABLE S–2 2018 Tax Rate Schedule, Filing Status is Single**

| Taxable income         | Tax rate   |
|------------------------|--|
| \$0 to \$9525          | 10%  |
| \$9526 to \$38,700     | \$952.50 plus 12% of the amount over \$9525        |
| \$38,701 to \$82,500   | \$4453.50 plus 22% of the amount over \$38,700     |
| \$82,501 to \$157,500  | \$14,089.50 plus 24% of the amount over \$82,500   |
| \$157,501 to \$200,000 | \$32,089.50 plus 32% of the amount over \$157,500  |
| \$200,001 to \$500,000 | \$45,689.50 plus 35% of the amount over \$200,000  |
| \$500,001 or more      | \$150,689.50 plus 37% of the amount over \$500,000 |

**TABLE S–3 2018 Tax Rate Schedule, Filing Status is Married Filing Jointly**

| Taxable income         | Tax rate   |
|------------------------|--|
| \$0 to \$19,050        | 10%  |
| \$19,051 to \$77,400   | \$1905.00 plus 12% of the amount over \$19,050     |
| \$77,401 to \$165,000  | \$8907.00 plus 22% of the amount over \$77,400     |
| \$165,001 to \$315,000 | \$28,179.00 plus 24% of the amount over \$165,000  |
| \$315,001 to \$400,000 | \$64,179.00 plus 32% of the amount over \$315,000  |
| \$400,001 to \$600,000 | \$91,379.00 plus 35% of the amount over \$400,000  |
| \$600,001 or more      | \$161,379.00 plus 37% of the amount over \$600,000 |

\*Note: Tables are also available for unmarried individual with dependent relatives (“head of household”) and married taxpayers filing separately.

### EXAMPLE S–6

A young engineer earned \$85,000 in wages and other income in the last tax year. She is unmarried and from company records knows that \$13,000 has been withheld for taxes. If she had \$8,000 in charitable donations last year, calculate if she will receive a refund or owe taxes.

### SOLUTION

$$\begin{aligned} \text{Taxable Income} &= \text{Adjusted Gross Income} - \text{Standard or Itemized Deductions} \\ &= 85,000 - 12,000 \text{ (standard deduction was greater)} \\ &= \$73,000 \end{aligned}$$

$$\text{Federal Income Tax} = 4453.50 + (.22)(73,000 - 38,700) = \$11,999.50$$

Since her company withheld \$13,000 in taxes, she will be receiving a refund of \$1000.50 (= 13,000 – 11,999.50) from the federal government this year.

## PROBLEMS

### Depreciation

- S-1 A metal fabrication company is buying a CNC machine for \$600,000. After 20 years of use, the machine should have a salvage value of \$35,000.
- Under bonus depreciation, what depreciation can be claimed in year 1?
  - Under bonus depreciation, what depreciation can be claimed in year 2?
- S-2 A manual press costs \$16,000, and it will be scrapped after 10 years. Compute the depreciation and book value for the first two years using bonus depreciation.
- S-3 Using bonus depreciation, determine the depreciation schedule for \$375,000 worth of equipment that was purchased by a small design firm in 2018. The firm had no other capital expenditures.
- S-4 A small, profitable construction contractor purchased equipment costing a total of \$1,600,000 in 2018. Using Section 179 expensing first, and then bonus depreciation, determine the depreciation schedule for the equipment.

### Corporate Income Taxes

- S-5 A small manufacturing company had sales of \$470,000, expenses of \$310,000, and depreciation costs of \$110,000. What is the taxable income, federal tax, and ATCF in year 1? Use a federal tax rate of 21%.
- S-6 Calculate the state and federal taxes for a company whose taxable income was \$170,000. The state where the company operates taxes profits at a rate of 8% on the first \$50,000 and 10% on profits above \$50,000. The federal tax rate is 21%.
- Determine the state and federal taxes owed.
  - Determine the effective marginal tax rate for the company.
- S-7 Country Squire Company had sales revenue of \$900,000 and expenses of \$470,000. In addition, recaptured depreciation was \$24,000 and depreciation expenses were \$220,000. The company also sold some equipment for additional income of \$800,000. The federal tax rate is 21% and the state tax rate is 6%. Determine:
- Taxable income
  - State tax due
  - Federal tax due
  - Marginal total tax rate
- S-8 Some shop equipment totaling \$36,000 was purchased to take advantage of bonus depreciation. The salvage value is estimated to be \$5000 after 10 years. What are the cash flows that result from these transactions in year 0, year 1, and year 10?
- S-9 Aggregate Mining Co. purchased equipment that generates \$270,000 per year in revenue.

|                          |                    |
|--------------------------|--------------------|
| First cost               | \$560,000          |
| Operating & Maintenance  | \$150,000 per year |
| Salvage value            | \$50,000           |
| Life                     | 10 years           |
| Marginal tax rate, total | 25%                |
| After-tax MARR           | 15%                |

- (a) Find the after-tax cash flow in year 1 using bonus depreciation.
- (b) Find the after-tax present worth for the equipment, including recaptured depreciation.
- (c) Find the after-tax IRR.
- (d) Is this a worthwhile investment on an after-tax basis?

S-10 Cloverleaf R&D purchased a \$1.5 million simulator that is expected to be kept for 5 years. The simulator qualifies for bonus depreciation. The firm’s combined federal and state marginal tax rate is 28%. The expected salvage value is \$0.2 million.

- (a) What is the after-tax cash flow in year 5?
- (b) What is the equipment’s after-tax EAC over its life if the after-tax MARR is 15%?

S-11 A brass and a stainless steel pump are being compared. Which is the cheaper after-tax alternative if the combined (federal and state) tax rate is 28%? Both pumps qualify for bonus depreciation. The after-tax MARR is 12%. Use EAC to determine your answer.

| Pump type       | First cost | Annual O&M costs | Life (years) | Salvage value |
|-----------------|------------|------------------|--------------|---------------|
| Brass           | \$9,500    | \$150            | 10           | \$875         |
| Stainless steel | 12,000     | 90               | 20           | 3000          |

S-12 New equipment is expected to increase production and generate profits. There are 2 alternatives being considered, and both qualify for bonus depreciation. The company pays a combined 28% marginal tax rate and has an after-tax MARR of 15%. Which alternative should be chosen if you use present worth analysis? Does your answer change if you use IRR?

|                        | Alternative A | Alternative B |
|------------------------|---------------|---------------|
| Cost                   | \$15,000      | \$40,000      |
| Profits per year       | 10,000        | 20,000        |
| Expected salvage value | 6,000         | 8,000         |
| Useful life (years)    | 5             | 5             |

**Personal Income Taxes**

S-13 Calculate the taxable income and federal taxes paid for each of the following:

- (a) Single filer; AGI = \$65,000; itemized deductions = \$2500
- (b) Single filer; AGI = \$110,000; itemized deductions = \$15,000
- (c) Married filing jointly; AGI = \$150,000; itemized deductions = \$8000
- (d) Two people are married, but they filing as two single people; AGI(1) = \$80,000, AGI(2) = \$70,000; itemized deduction(1) = \$5000, itemized deductions(2) = \$3000; compare the combined answers here to the answer in part (c); now find the new tax brackets for “married filing separately” and do the same comparison.

S-14 Professor M. Grace has federal taxable income of \$90,000 and she falls into the 5.0% state incremental income tax bracket. She recently received an offer to consult in her area of technical expertise. What is the after-tax amount on a stipend of \$8000 for this work? Her filing status is single, and she is able to itemize deductions, including her state income tax.

S-15 A royalty check arrived for \$500, boosting the annual income of you and your spouse to \$84,500. You are married, filing jointly, with itemized deductions of \$12,800. Your state taxes income at a marginal rate of 6.5%. How much of your check will you be able to spend?

- S-16 Ms. Ima N. Jinere is looking over the federal tax return that her accountant has produced for her review. Consider the analysis below and either confirm the accountant's report, or quantify the effect of any errors. Her filing status is single.

| <u>Given Data:</u>                | <u>Accountant Calculations:</u>          |
|-----------------------------------|--|
| Adjusted Gross Income = \$100,000 | Taxable Income = 100,000 – 12,000**      |
| Itemized Deductions:              | = \$88,000                               |
| Medical expenses = \$12,000       | Taxes = 14,059.50 + .24(88,000 – 82,500) |
| Property taxes = \$2,000          | = \$15,379.50                            |
| Mortgage interest* = \$7,500      | Due IRS = 15,379.50 – 14,000             |
| Charitable gifts = \$3,500        | = \$1379.50                              |
| Federal Taxes Withheld = \$14,000 | **standard deduction                     |
| *on \$400,000 home mortgage debt  |  |

- S-17 Two married engineers filing jointly, and using the standard deduction, do not want to pay more than \$80,000 in federal taxes this year. The combined income on their regular salaries and investment income is \$380,000. What is the maximum that they can earn on a new venture and meet their goal?