

HALF-YEAR TIME CONVENTIONS FOR MACRS DEPRECIATION CALCULATIONS

- All assets placed in service during the year are treated as if use began in the middle of the year -- 1/2- year depreciation is allowed**
- If asset is disposed of before the full recovery period is used, only half of the normal depreciation deduction can be taken for that year**

MACRS (GDS) PROPERTY CLASSES AND CLASS LIFE

**GDS Property Class and
Depreciation Method**

Class Life

**3-year, 200% DB with
switchover to SL**

4 years or less

**5-year, 200% DB with
switchover to SL**

**More than 4 years
to less than 10 years**

**7-year, 200% DB with
switchover to SL**

**10 years to less than
16**

**10-year, 200% DB with
switchover to SL**

**16 years to less than
20**

**15-year, 150% DB with
switchover to SL**

**20 years to less than
25**

**20-year, 150% DB with
switchover to SL**

25 years or more

27.5 year, SL

N / A

39-year, SL

N / A

**MACRS DEPRECIATION
GDS OR ADS ?**

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Same as recovery
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Obtain recovery rates

**Compute depreciation amount;
Asset's cost basis
SL = $\frac{\text{-----}}{\text{Recovery period}}$**

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**Compute depreciation amount;
Asset's cost basis
 $SL = \frac{\text{Asset's cost basis}}{\text{Recovery period}}$**

Compute depreciation deduction in year k (d_k) by multiplying cost basis by recovery period.

Compute depreciation deduction in year k (d_k)

DEPLETION

- **Used to indicate the decrease in the value of the resource base when natural resources are being consumed in producing products or services.**
- **Term most commonly used in connection with mining properties, oil and gas wells, timberlands, etc...**
- **Amounts charged as depletion cannot be used to replace sold resources**

PAYMENTS TO RESOURCE OWNERS

Annual payments to resource owners consist of two parts:

- 1. Earned profit**
- 2. Portion of owner's capital returned, marked as depletion**

TWO WAYS TO COMPUTE DEPLETION ALLOWANCE

1. Cost method

Applies to all types of property and is more widely used method

Depletion unit is determined by dividing adjusted cost basis by the number of units to be mined or harvested

Depletion allowance for tax year is the product of the number of units sold times the depletion unit

TWO WAYS TO COMPUTE DEPLETION ALLOWANCE

2. The Percentage Method

Based on percentage of year's gross income, provided amount charged does not exceed 50% of net income (before deduction of depletion allowance)

Can be used for most types of metal mines, geothermal deposits and coal mines

Can not be used for timber and, in most cases, is not applicable to oil and gas

When percentage method applies, depletion allowance must be calculated by cost and percentage method -- the larger of the two applies

TYPES OF TAXES

- 1. Income taxes - assessed as a function of gross revenues minus allowable deductions**
 - levied at federal, most state, and some municipal governments
- 2. Property taxes - assessed as a function of owned property value;**
 - independent of income or profit of firm
 - levied at municipal, county, and / or state level
- 3. Sales taxes - assessed on purchases of goods and services**
 - independent of gross income or profits
 - relevant to engineering studies as added cost
- 4. Excise taxes - assessed on sale of certain nonessential goods and services**
 - independent of business income and profit
 - cost ultimately to consumer, despite original target

BEFORE-TAX MARR

(Before Tax MARR) [(1- effective income tax rate)] \approx After Tax
MARR

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- If the asset is nondepreciable and there are no gains or losses on disposal, tax credits, or other types of deductions involved this approximation in the equation above is exact
- Otherwise, some degree of error is introduced, since the factors cited affect amount and timing of income tax payments

CALCULATING TAXABLE INCOME

- NET INCOME BEFORE TAXES (NIBT) -

- **Calculate Gross Income**

Gross Profits (revenues from sales - cost of goods sold)

+ income from dividends, interest, rent, royalties, and gains (losses) from sale or exchange of capital assets

- **Deduct all ordinary and necessary operating expenses to conduct business**

Include interest but exclude capital investments

- **Deduct depreciation**

taxable income = gross income - all expenses - depreciation

NET INCOME AFTER TAXES (NIAT)

- **The income after taxes have been deducted from the taxable income or Net Income Before Taxes**

Net Income After Taxes = NIBT - income taxes

EFFECTIVE (MARGINAL) CORPORATE INCOME TAX RATE

- **As personal income tax rates are based on income brackets, so, too, is corporate income tax**
- **Depending on the bracket a firm's income falls within, the marginal federal rate can vary from 15% to a maximum of 39% (for incomes between \$100,000 and \$335,000)**
- **Incomes above \$18,333,333 are taxed at a flat rate of 35%**
 - **TRA 86 responsible for lowering maximum rate from 46% to 35%**
 - **Also created alternative minimum tax (AMT)**

GAIN (LOSS) ON DISPOSAL OF A DEPRECIABLE TANGIBLE ASSET

$$[\text{GAIN (LOSS) ON DISPOSAL}]_N = MV_N - BV_N$$

- If gain, referred to as depreciation recapture
- Tax for gain (loss) is usually the same as ordinary income gain (loss) -- effective income tax rate, t
- For capital asset sold or exchanged, gain (loss) referred to as capital gain (loss)
- capital assets are stocks, bonds, gold, silver, other metals, and real property

BEFORE-TAX ECONOMIC ANALYSIS

$$\text{NIBT} = (R_k - E_k - d_k)$$

$$T_k = - t (R_k - E_k - d_k)$$

R_k = revenues (and savings from the project: cash inflow from project during period 'k')

E_k = cash outflows during year k for deductible expenses and interest

d_k = sum of all noncash, or book costs during year 'k', such as depreciation and depletion

t = effective income tax rate on ordinary income (federal, state and other); assumed to remain constant during the study period

T_k = income taxes paid during year 'k'

ECONOMIC VALUE ADDED (EVA)

An economic measure for estimating wealth creation potential of capital investments:

$EVA = (\text{Net Operating Profit After Taxes})_k - \text{Cost of Capital Used to Produce Profit})_k$

$$EVA = NOPAT_k - \tau \cdot BV_{k-1}$$

Where $k =$ index for year in question ($1 \leq k \leq N$)

$\tau =$ after-tax MARR based on firm's cost of capital

$BV_{k-1} =$ Beginning of year book value

$N =$ the study (analysis) period in years

ECONOMIC VALUE ADDED (EVA)

- $\text{NOPAT}_k = (1 - t) (R_k - E_k - d_k)$

- $\text{EVA}_k = (1 - t) (R_k - E_k - d_k) - \tau \cdot \text{BV}_{k-1}$

When $k > 0$, $\text{ATCF}_k = (1 - t) (R_k - E_k - d_k) + d_k$

When $k = 0$, $\text{ATCF}_0 = \text{BV}_0$

- $\text{ATCF}_k = \text{EVA}_k + \tau \cdot \text{BV}_k + d_k$

d_k is the sum of all noncash, or book costs during the year k , such as depreciation or depletion