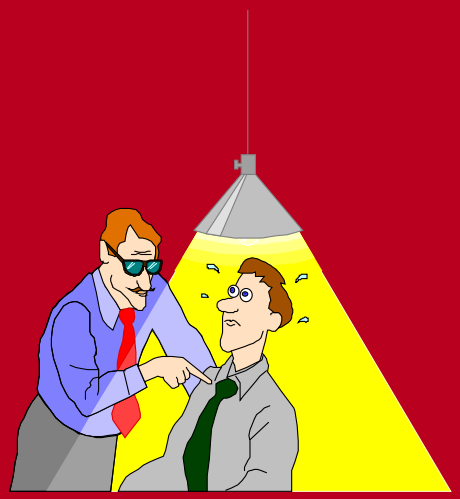
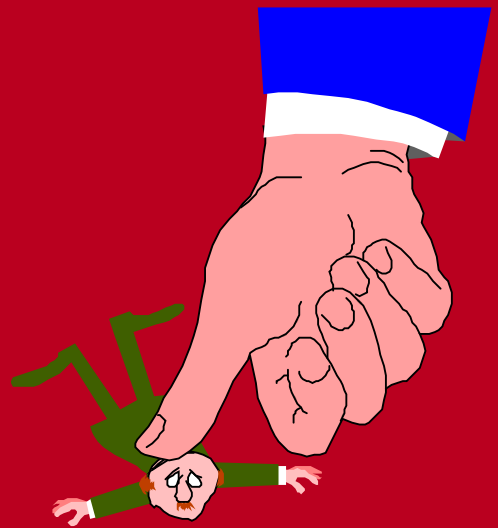
DEPRECIATION AND INCOME TAXES





DEPRECIATION

- Decrease in value of physical properties with passage of time and use
- Accounting concept establishing annual deduction against before-tax income
  - to reflect effect of time and use on asset's value in firm's financial statements
  - to match yearly fraction of value used by asset in production of income over asset's economic life

PROPERTY IS DEPRECIABLE IF IT MUST :

- be used in business or held to produce income
- have a determinable useful life which is longer than one year
- wear out, decay, get used up, become obsolete, or lose value from natural causes
- not be inventory, stock in trade, or investment property

DEPRECIABLE PROPERTY

- **TANGIBLE - can be seen or touched**

  <u>personal property</u> - includes assets such as machinery, vehicles, equipment, furniture, etc...

  <u>real property</u> - anything erected on, growing on, or attached to land

  (Since land does not have a determinable life itself, it is not depreciable)

- **INTANGIBLE - personal property, such as copyright, patent or franchise**

WHEN DEPRECIATION STARTS AND STOPS

- Depreciation starts when property is placed in service for use in business or for production of income
- Property is considered in service when ready and available for specific use, even if not actually used yet
- Depreciation stops when cost of placing it in service is removed or it is retired from service

DEPRECIATION METHODS

Time Implemented	Method
Before 1981	(SL) Straight-Line (DB) Declining Balance (SYD) Sum-of-the-years-digits
> 1980 > 1987	(ACRS) Accelerated Cost Recovery System Implemented by (ERTA) Economic RecoveryTax Act of 1981
>1986	(MACRS) Modified Accelerated Cost Recovery System Brought about by (TRA 86) TaxReform Act of 1986

DEPRECIATION CONCEPTS

- **Adjusted cost basis -- allowable adjustment (increase or decrease) to original cost basis, used to calculate depreciation and depletion deductions**
- **Basis, or cost basis -- also called unadjusted cost -- initial cost of acquiring an asset, plus sales tax, transportation, and normal costs of making asset serviceable**

DEPRECIATION CONCEPTS

- **Book Value (BV)** -- Worth of depreciable property as shown on accounting records

  -- Original cost basis of property, including adjustments, less allowable depletion or depreciation deductions

  -- Represents amount of capital remaining invested in property and must be recovered in future through accounting

$$(\text{Book Value})_k = \text{adjusted cost basis} - \sum_{j=1}^{k} (\text{depreciation deduction})_j$$

DEPRECIATION CONCEPTS

- **Market Value (MV) -- Amount paid by willing buyer to willing seller for property where no advantage and no compulsion to transact**

  -- apporximates present value of what will be received through ownership of property, including time-value of money (or profit)

DEPRECIATION CONCEPTS

- Recovery Period -- Number of years over which basis of property is recovered through accounting process.

  -- Normally the useful life for classical methods

  -- Property class for General Depreciation System (GDS) under MACRS

  -- Class Life for Alternative Depreciation System (ADS)

- Recovery Rate -- Percentage for each year of MACRS recovery period used to calculate an annual depreciation deduction.

DEPRECIATION CONCEPTS

- Salvage Value (SV) -- Estimated value of property at the end of useful life.

  -- expected selling price of property when asset can no longer be used productively

  -- net salvage value used when expenses incurred in disposing of property; cash outflows must be deducted from cash inflows for final net salvage value

  -- with classical methods of depreciation, estimated salvage value is established and used

  -- with MACRS, the salvage value of depreciable property is defined to be zero

DEPRECIATION CONCEPTS

- **Useful Life -- Expected (estimated) period of time property will be used in trade or business or to produce income; sometimes referred to as depreciable life.**

DEPRECIATION CONCEPTS

The following terms are used in the classical (historical) depreciation method equations:

N = depreciable life of the asset in years

B = cost basis, including allowable adjustments

d_k = annual depreciation deduction in year k ($1 \leq k \leq N$)

d_{k^*} = cummulative depreciation through year k

BV_k = book value at the end of year k

BV_N = book value at the end of the depreciable (useful) life

SV_N = salvage value at the end of year N

R = the ratio of depreciation in any one year to the BV at the beginning of the year

STRAIGHT-LINE (SL) METHOD

- Simplest depreciation method
- Assumes constant amount is depreciated each year over depreciable (useful) life

$$d_k = (B - SV_N) / N$$

$$d_{k^*} = k d_k \text{ for } 1 \leq k \leq N$$

$$BV_k = B - d_{k^*}$$

- This method requires an estimate of the final SV (also the final book value at the end of year N)

DECLINING BALANCE (DB) METHOD

- Sometimes called constant percentage method or Matheson formula
- Assumed annual cost of depreciation is fixed percentage of BV at beginning of year
- R is constant

  R = 2 / N when 200% declining balance used

  R = 1.5 / N when 150% declining balance used

$$d_1 = B(R)$$

$$d_k = B(1 - R)^{k-1}(R)$$

$$d_{k^*} = B[1 - (1 - R)^k]$$

$$BV_k = B(1 - R)^k$$

$$BV_N = B(1 - R)^N$$

- Because declining balance method never reaches BV = 0, it's permissible to switch from this to straight-line method so asset's SV_N will be zero or other desired value

UNITS-OF-PRODUCTION METHOD

- **Not based on the idea that decrease in value of property is a function of time**
- **Decrease in value is mostly a function of use**
- **Method results in cost basis (minus final SV) being allocated equally over the estimated number of units produced during useful life of asset.**

Depreciation per unit of production =

(B - SV_N) / (Estimated lifetime production in units)

ACCELERATED COST RECOVERY SYSTEM (ACRS)

- Recognizes an asset as belonging to one of four (tangible) property classes
- IRS prescribes the specific series of depreciation per property class
- Rates are based on 150% Declining Balance depreciation, switching to Straight-Line

MODIFIED ACCELERATED COST RECOVERY SYSTEM (MACRS)

- The principal method for computing depreciation deductions for property in engineering projects.
- Applies to most tangible depreciable property placed in service after December 31, 1986
- SV_N is defined to be 0 ; useful life estimates are not used directly in calculating depreciation amounts
- Consists of two systems for computing depreciation deductions:

1. The General Depreciation System (GDS)
2. The Alternative Depreciation System (ADS)

   Provides longer recovery period and uses only straight-line method of depreciation

   Assets depreciated under ADS include property placed in any tax-exempt use and property used predominantly outside the U.S.

INFORMATION NEEDED TO CALCULATE MACRS DEPRECIATION

1. The cost basis
2. The date the property was placed in service
3. The property class and recovery period
4. The MACRS depreciation used (GDS or ADS)
5. The time convention that applies (half year)

GENERAL DEPRECIATION SYSTEM (GDS) BASIC INFORMATION

1. Tangible depreciable property assigned to one of six personal property classes (3, 5, 7, 10, 15 and 20-year) - Corresponds to GDS recovery period; personal depreciable property not corresponding to these periods is considered 7-yr property class.
2. Real property assigned to two real property classes -- nonresidential real property and residential rental property.
3. GDS recovery period is 39 years for nonresidential real property (31.5 years if in service before May 13, 1993) and 27.5 years for residential rental property.

ALTERNATIVE DEPRECIATION SYSTEM (ADS) BASIC INFORMATION

1. ADS recovery period for tangible personal property is normally the same as the class life of the property, with some exceptions (i.e., asset class 00.12 and 00.22)
2. Any tangible personal property that does not fit into one of the asset classes is depreciated using a 12-year ADS recovery period
3. ADS recovery period for nonresidential real property is 40 years

CALCULATING DEPRECIATION DEDUCTIONS UNDER MACRS

Depreciation Method	Personal Property Class	Approach
GDS	3-, 5-, 7-, 10-year	200% DB method with switch to SL when deduction greater
GDS	15- & 20-year	150% DB method with switch to SL when deduction greater
GDS	residential & real rental	SL over fixed GDS recovery periods
ADS	personal & real	SL method over fixed ADS recovery periods