DEPRECIATON

- Depreciation

  - A decrease in value of an asset each year
  - A non-cash cost (no money changing hands) that affects income taxes
  - An annual deduction against before-tax income
  - A business expense the government allows to offset the loss in value of business assets
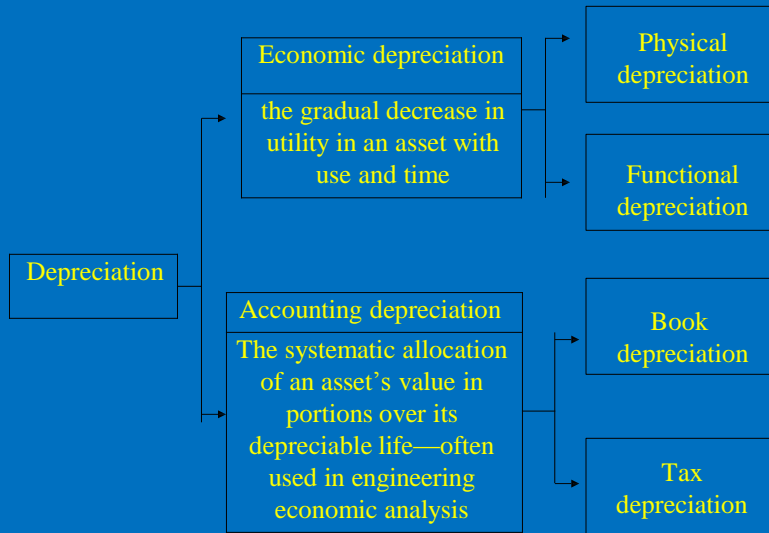- Usually you pay for the asset "up front", but depreciate it over time (e.g., a new truck)
- Depreciation deductions reduce the taxable income of businesses and thus reduce the amount of tax paid
- Government allows some choice among depreciation methods
  - Firm wants to use the method that will minimize its taxable income
  - To do so, it must understand how the depreciation methods work

Depreciation

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                    ┌─────────────────────────┐      ┌──────────────────┐
                    │  Economic depreciation  │ ───▶ │     Physical     │
                    ├─────────────────────────┤      │   depreciation   │
                    │   the gradual decrease  │      └──────────────────┘
              ┌────▶│    in utility in an     │
              │     │   asset with use and    │      ┌──────────────────┐
              │     │          time           │ ───▶ │    Functional    │
              │     └─────────────────────────┘      │   depreciation   │
┌──────────────┐                                     └──────────────────┘
│ Depreciation │
└──────────────┘    ┌─────────────────────────┐      ┌──────────────────┐
              │     │ Accounting depreciation │ ───▶ │       Book       │
              │     ├─────────────────────────┤      │   depreciation   │
              │     │  The systematic         │      └──────────────────┘
              └────▶│  allocation of an       │
                    │  asset's value in       │      ┌──────────────────┐
                    │  portions over its      │ ───▶ │       Tax        │
                    │  depreciable life—often │      │   depreciation   │
                    │  used in engineering    │      └──────────────────┘
                    │  economic analysis      │
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Depreciation

- Important reasons for depreciation include
  - deterioration (wear on parts that affect its functionality)
  - obsolescence (product becomes outdated)
- Economic depreciation can mean
  - a decrease in *market value* or *value to the owner*
- Accounting depreciation is defined as the systematic allocation of the cost of an asset over its depreciable life
  - This period may differ from the useful life
- Accountant definition is used for determining taxable income. It is this definition that is most important to us
- NOTE: While many things depreciate, some things, including land, do not. The value of land can change, but it is not because of depreciation

Depreciation Methods

Book Depreciation Methods (Only options before 1981):

- Used for reporting net income to investors/stockholders
- Required an estimate of the asset's useful life and salvage value
- Straight Line (SL)
- Sum-Of-Years Digits (SOYD)
- Declining Balance (DB)
- Units-of-Production (UOP)

Tax Depreciation Methods (Available after 1981):

- Often used for calculating income taxes paid to the IRS
- Modified Accelerated Cost Recovery System (MACRS)
  - First method was ACRS (1981 – 1986)
  - Salvage values assumed to be zero; estimates no longer required
  - Property class lives were created to categorize assets
  - Recovery periods accelerated, capital costs deducted more quickly

Straight Line Depreciation

Example

An asset has a cost of $I = \$900$, a useful life of $N = 5$ years, and an EOL salvage value of $S = \$70$. Compute depreciation as follows:

- Annual depreciation charge $= D_n = (I - S)/N = 830/5 = \$166$
- The book value of the asset decreases by $166 each year!
- Straight line depreciation is the simplest and best known

Year	Initial Book Value	Depreciation	EOY Book Value
0			$900
1	Cost = $900	$166	734
2	$734	$166	568
3	568	$166	402
4	402	$166	236
5	236	$166	Salvage Value = 70
Total		$830	

Sum-Of-Years Digits (SOYD) Depreciation

<u>Example</u>

An asset has a cost of I = $900, a useful life of N = 5 years, and an EOL salvage value of S = $70. Compute depreciation as follows:

Year	Life, FOY	Multiplier	I - S	Depreciation	EOY Book Value
0					$900
1	5	5/15	$870	$277	623
2	4	4/15	870	221	402
3	3	3/15	870	166	236
4	2	2/15	870	111	125
5	1	1/15	870	55	70
Total		1		$830	

- For N years, $1 + 2 + \ldots + N = N(N+1)/2$
- The multiplier for year n is thus

$$(N+1-n)/[N(N+1)/2] = 2(N+1-n)/[N(N+1)]$$