Lectures 22/23: Expected Present Discounted Values

- **EPDV**
- **Bond Prices**
- **Stock Prices**

EPDV

- Figure 14-3
- $1/(1+i(t))$: **present discounted value** of one dollar received next year
- An asset that expects to pay: $d(t)$, $d^e(t+1)$, …. has a EPDV of:

$$\mathbf{V = d(t) + d^e(t+1)/(1+i(t)) + d^e(t+2)/((1+i(t))(1+i^e(t+1)) + \ldots.}$$

Using Present Values

- Two general principles:
  - V rises with an increase in $d^e(t+s)$
  - V falls with an increase in $i^e(t+s)$

$$\mathbf{V = d(t) + d^e(t+1)/(1+i(t)) + d^e(t+2)/((1+i(t))(1+i^e(t+1)) + \ldots.}$$

Examples

$V = d(t) + d^e(t+1)/(1+i(t)) + d^e(t+2)/((1+i(t))(1+i^e(t+1))+\ldots$

If **$i^e(t+s) = i$ and $d^e(t+s) = d$**

$V = d\ [\ 1 + 1/(1+i) + 1/(1+i)^2 + \ldots + 1/(1+i)^{n-1}]$

$V = d\ [1-1/(1+i)^n] / [1-1/(1+i)]$

Example: Lottery prize of \$1m paid in 20 installments of \$50k; if i=6% =>

V = \$50,000 * 0.688/0.067 = \$608,000

Note: If $i=0 => V = \Sigma\ d = n*d$ = \$1m

Examples

$V = d\,[1-1/(1+i)^n] \,/\, [1-1/(1+i)]$

Example: A consol n->infinity, payments start next year

$V = d/(1+i)\,[\,1/\,(i/(1+i))] \;= d/i$

If d = \$10 and i=0.05 => C = \$200