What is a stock -- equity?

- A share of ownership in a business.
- Suppose a business earns a dependable profit of \( \Pi \) every year.
- How much would you pay to own that share of stock.

Present discounted value (PDV)

- PDV of $121 in 2 years = $100.
  - $100 \times (1.1)^2 = $121
  - $121 / (1.1)^2 = $100

- General formula: PDV of $Y$ in $t$ years at interest rate $i$

\[
PDV = \frac{Y}{(1+i)^t}
\]

back to our firm . . . .

- earns \( \pi \) every year forever, starting next year

\[PDV = \frac{\pi}{1+i} + \frac{\pi}{(1+i)^2} + \frac{\pi}{(1+i)^3} + \ldots\]

- multiply both sides by \(1+i\)

\[(1+i)PDV = \pi + \frac{\pi}{1+i} + \frac{\pi}{(1+i)^2} + \ldots\]

- subtract (1) from (2)

\[iPDV = \pi \quad \text{or} \quad PDV = \frac{\pi}{i}\]

Bonds

- means for corporations and governments to borrow
- a promise to pay a fixed amount in future -- at maturity
- if the interest rate on a 10 year bond is 10%, a $5000 bond will pay $500 each year, and $5000 at maturity
- risk due to interest rate fluctuations, inflation, and default possibility
- corporate bonds riskier than government bonds
- U.S. Federal Government debt = T-bills
• Stocks
  – literally ownership of a fraction of a firm
  – two benefits
    • dividends (versus retained earnings)
    • capital gains
  – risk
    • October 19, 1987 NYSE prices fell 22%
    • 1929-1933 NYSE prices fell 90%
    • January 2000 – October 2002 DJIA fell 36%
      – (from 11723 on 1/14/00 to 7501 on 10/8/02)
  – DJIA = 30 stocks
    • Amex, Coke, Kodak, GE, GM, IBM, Disney, McDonalds...
  – mutual funds
  – efficient market hypothesis

• Price-earnings ratio
  – P-E ratio = (price per share) / (earnings per share)
  – price = PDV = (earnings per share)/i
  – thus...
    • P-E = (earnings / i) /earnings = 1/i
    • when market interest rates fall, P-E rises.