Choice of Discount Rate

- The Principle
- Consequences
- Practice
- Application to Government
- Inflation
- Is Critical!

Choice of DR: Principle

- DR should reflect rate at which money can increase in productive investments = productivity of capital
- An empirical definition - not theory
- Test: what is rate at which current investments are producing, at margin?

Ex: You have loans: $200 at store 18%
    $5000 for tuition 9%
Could save at 6%

DR for $100? $1,000? $10,000?
Consequences of Principle

- DR peculiar to situation of decision-making unit
  - depends on opportunities
- DR not a precise measure
  - except in classroom examples, exact return difficult to obtain precisely; ± 1 or 2% quite acceptable
- DR ≥ interest rate paid
  - repaying debt always one possible investment, so DR at least equals interest
  - actually you borrow because:
    value of money > interest
- Since DR = minimum acceptable profitability,
  NPV > 0 indicates a good project (may not be best)

DR Used in Practice

- A nice round number, generally
  - recognition of imprecision in measurement
- Where rate must be defended legally, as to regulatory groups - by formula
  - not subjective
  - illusory precision
- Research has shown that available profitability, with no inflation = 10 to 15%/yr worldwide
- US Government, as of 1997, uses a several DR rates
  - 4% -- Budget Dir. (Govt. Perform. Results Act), 1997
  - 7% -- Office of Management and Budget, 1999
Distribution of Discount Rates for a sample of US companies

Source: Poterba and Summers, Sloan Management Review, Fall 1995

Distribution of Discount Rates for a sample of US Manufacturers

Source: Poterba and Summers, Sloan Management Review, Fall 1995
Application to Government

- Where does Government Money come from?
  - Taxes: One of Government’s possible investments, or uses of money, is to reduce taxes

- Recall, DR to be used for economic investments.
  - Many government actions not measured in money (e.g.: defense, justice, ...)

- DR not particularly appropriate to decide if schools should be built at all; is appropriate for choice of design

Discount Rate and Inflation

- Issue is Comparability
  - the idea is to place all B, C on current basis of value

- Two factors
  - Productivity, p%/yr.
  - Change in purchasing power, i%/yr.
    (Inflation, Deflation)

- Procedure depends on whether B, C stated in constant or changing purchasing power
  - If constant: \( r = p \)
  - If varying: \( r = p + i \)
Examples: Which r?

1) Build Bridge, Tolls $1/car
   \[ r = p + i \]  Tolls unlikely to adjust with inflation

2) Build Hospital, Fee $500/bed/day
   \[ r = p \]  Rates do (in US) adjust with inflation, therefore you get $ equal to current $

3) Buy New Furnace, Save 2000gallons fuel per year
   \[ r = p \]  So long as fuel costs vary with inflation

Choice of DR Critical

- DR indicates if any investment is minimally acceptable
- Ranking of investments changes with DR which are:
  - less capital intensive
  - faster returns
    ex. Toyota vs. Mercedes
- Choice of DR very political
  - low rates favored by
    - project enthusiasts
    - proponents of government projects