Discount Rates

\[ PV(B_n) = B_n \cdot \frac{1}{(1+r)^n} \]

What is correct discount rate \((r)\) to use to evaluate investment decisions?
- individual
- corporation
- government (society)

Considerations
1) inflation, real vs. nominal $  
   \( = \Delta \) in prices  
   Q: which prices? \(ightarrow\) different ways of measuring of inflation  
   consumer price index  
   producer price index  
   \( \rightarrow \) be consistent, use real $ when possible
2) cost of capital  
   a. risk free – U.S. government bonds  
   b. risk premium  
   c. uncertainty in projections \( r_{RP} \)  
   \( r = r_{RF} + r_{RP} \)  
   - \( r_{RF} \) is same for government, private  
   - \( r_{RP} \) is greater for private because government can be source of risk  
   represents uncertainty about future projections

Private discount rate > Social discount rate  
\( \rightarrow \) faster exploitation of natural resources

Net Present Value  
\[ \text{Net Present Value} = \sum_{i=1}^{n} \frac{B_i - C_i}{(1+r)^i} \]

Payback (period) – how long until $ back?  
not a real measure of profitability

IRR  
- discount rate that results in present value = 0  
- example: $3000 inv. yields $1000/year...  
- timing of flows \( \sqrt{\} \)  
- assumes all cash can be invested at same rate?

NPV  
- choose discount rate (“cut-off rate”)
Role of **financing** ("other people's money" or OPM, "leverage")
- compare projects with equal (or no) leverage

<table>
<thead>
<tr>
<th>Example</th>
<th>@ 10% discount rate</th>
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<tbody>
<tr>
<td>$100m now</td>
<td>-100.0</td>
</tr>
<tr>
<td>2: (next yr) $50m payment</td>
<td>+45.5</td>
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<tr>
<td>3: $100m -&gt; yard</td>
<td>-82.6</td>
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<tr>
<td>4: $200m payment</td>
<td>+150.0</td>
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<td>+12.9 @ 10%</td>
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