Chapter 1: Utility and Risk Aversion

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Examples of Finance Questions

1) A company can invest K to generate a cash flow of $\tilde{x}$ in one year. Under what circumstances should it make the investment?

2) Under what circumstances can we expect stock A to earn a higher return than stock B?

Utility and Certainty Equivalents

- Expected utility $\mathrm{E}[u(\tilde{w})]$
  - Utility function u is unique up to monotone affine transform: $f(w) = a + bu(w)$ for $b > 0$.
- Risk aversion: $\mathrm{E}[\tilde{\varepsilon}] = 0 \Rightarrow \mathrm{E}[u(w + \tilde{\varepsilon})] < \mathrm{E}[u(w)]$.
  - Equivalent to concavity (Jensen's inequality)
  - Equivalent to decreasing marginal utility: $u'' \leq 0$.
  - Invariant under monotone affine transformations.
- Certainty equivalent: a constant x is the certainty equivalent of a random $\tilde{w}$ if $u(x) = \mathrm{E}[u(\tilde{w})]$.
  - Risk aversion implies $x < \mathrm{E}[\tilde{w}]$.
  - Certainty equivalents are invariant under monotone affine transformations.

To Be Continued