Econ 4310 Notes

Michael Lee

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- **Def.** Randomized experiment (RCT) - You randomly assign subjects to n groups with a control groups
- This is necessary to help separate correlation from causation
- Helpful because on average, the groups are the same. Thus, we can isolate the differentiating variable(s)
- **Experimental Language**
  - **Def.** Treatment Group - Group exposed to the experimental condition
  - **Def.** Control group - Baseline group
  - **Def.** Sample - Group who makes up participants
  - **Def.** Independent variable - Manipulated factor
  - **Def.** Dependent variable - The measure of interest
  - **Def.** Between-participant design - Each participant experiences only one condition
  - **Def.** Within-participant design - Each participant experiences multiple conditions
  - **Def.** Factorial design - Multiple factors are manipulated at once, often in all combinations
  - **Def.** Internal validity - The degree to which the causal effect is valid inside the study
  - **Def.** External validity - How generalizable the results are beyond the Sample
  - **Def.** Confound - Uncontrollable factor(s) that may influence results
  - **Def.** Incentive compatibility - Ensuring participants' best choice aligns with truthful or intended behavior
- People might not be able to do RCT because economic systems are complex, there are cost/access problems, and ethical concerns

2 What is Rational?

- **Def.** Rationality - Maximizing one's own self-interest (utility)
- Budget constraint and preferences $\rightarrow$ optimal choice
- **Def.** Utility - represents a subject's preferences. When comparing the utility of options, comparisons are binary (not bundled), ordinal, and not comparable across subjects
  - Utility can be anything (profit, social benefits, reproductive rights, combination of things, etc.)
- **Def.** Preference Axioms
  - Let X be a set of bundles

1. **Reflexive** - $\forall x \in X$, $x \gtrsim x$ (i.e. each bundle is at least as preferred as itself)
2. **Complete** - $\forall x, y \in X$, $x \gtrsim y$ or $y \gtrsim x$ (or both $(x \sim y)$) (i.e. every bundle can be compared to every other bundle)
3. **Transitive** - $\forall x, y, z \in X$, $x \gtrsim y$ and $y \gtrsim z \Rightarrow x \gtrsim z$

- **Def.** Complete preference relation - X is reflexive, complete, and transitive $\iff$ X is rationalizable
  - The following statements are equivalent:

$$(xRy) = (x \gtrsim y) = (R = \{(x, y)\})$$

- **Thm.** For finite X, a binary relation, R, on X has a utility representation $\iff$ it is a complete preference relation
- Utility Function Assumptions
    1. Continuous - There are no big jumps in changes
    2. Monotonic - More is better
    3. Convex - As the amount of smth increases, the marginal utlity gain decreases