

Sample Questions for the Additional Topics Module

ECON 340: Economic Research Methods

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You can expect open-ended or multiple-choice questions derived from the following topics on the final exam.

Randomized Controlled Trials

1. What is a Randomized Controlled Trial (RCT)?
2. Why is evidence from RCTs superior to evidence from observational data?
3. How does randomization in RCTs contribute to the validity of the study?
4. Can you provide examples of situations where a RCT would be infeasible or unethical?

Quasi-experimental Methods

1. Can you provide a brief explanation of a commonly used method in economics to evaluate policies when RCTs are not feasible or ethical?
2. Consider a scenario where a government policy provides additional educational funding to schools if their pass rate in standardized exams is above 75%. Those falling below this threshold don't receive the funds. Given this clear cutoff point, how would you design a study to evaluate the impact of this funding on school performance?
3. Explain how a Regression Discontinuity (RD) design can be used to assess the impact of a policy intervention.
4. Considering we have both pre- and post-implementation data for all US states, what would be the most effective approach to evaluate the impact of a policy that has been implemented in some states but not in others?
5. Describe how the Difference-in-Differences (DID) approach is utilized to evaluate the effects of a policy change.

6. Let Y_0^T denote the average pre-treatment outcome for the treated group and Y_0^C for the control group. Similarly, let Y_1^T and Y_1^C represent the average post-treatment outcomes for the treated and control groups, respectively. Write the formula for the Difference-in-Differences (DiD) estimator based on these variables.
7. What is the key assumption underlying the Difference-in-Differences (DiD) methodology when evaluating the effects of a policy change?
8. Discuss the parallel trends assumption that is critical to the Difference-in-Differences methodology. Why is it important to ensure that the treatment and control groups exhibit parallel trends in outcomes before the policy intervention?

Big Data & Machine Learning

1. How does Machine Learning differ from traditional Econometrics?
2. Explain the relationship between Machine Learning and Artificial Intelligence.