ECN 102, Spring 2020

Week 4 Section

Multiple Choice Questions

In general it is easiest to establish cause and effect with

(a) experimental data

(b) observational data

(c) neither are adequate for establishing cause and effect

(d) both are just as useful for establishing cause and effect

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(a) experimental data

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Answer: a. When an experiment is run, all other factors can be *controlled for*, which allows us to isolate causal effects. With observational data, there are too many other *confounding factors* that are not being controlled for.

Multiple Choice Questions

Desirable properties of an estimator are

(a) consistency

(b) large variance

(c) both of the above

(d) none of the above

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Answer: a. If an estimator has high variance, then it's going to be way off much of the time. Why would you want to use an estimator that's way off much of the time? You wouldn't.

Note that $\overline{X}$ has the lowest variance among unbiased estimators of μ as long as the underlying distribution is Normal, Bernoulli, binomial or Poisson.

Multiple Choice Questions

An estimator is the best estimator among consistent estimators if

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(b) it has the smallest variance

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Answer: b. If an estimator has the smallest variance, that means it's going to be closest to the true parameter, on average.

Multiple Choice Questions

For the t-statistic based on the sample mean $\overline{X}$ to be exactly $T(n-1)$ distributed in small samples, it needs to be assumed that

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Answer: c. If all X_i are normally distributed, then

$$\frac{\overline{X}-\mu}{S/\sqrt{n}} \sim T(n-1)$$

is an exact distribution for any n, big or small.

Multiple Choice Questions

A type 1 error of a statistical test of H_0 against H_a occurs if we

(a) reject H_0 given that H_0 is true

(b) reject H_0 given that H_a is true

(c) do not reject H_0 given that H_0 is true

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Answer: a. A type 1 error (or false positive) occurs when you reject a null hypothesis, even though the null hypothesis is true. The significance or size α is the probability of committing a type 1 error.

Multiple Choice Questions

If the median is greater than the mean, then the data is

(a) left-skewed

(b) right-skewed

(c) symmetric

(d) leptokurtic

(e) platykurtic

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Answer: a. Consider the sample $(-1, 0, 1)$. It has mean zero and median zero. Its left-tail and right-tail are exactly the same, so it is symmetric.

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Answer: a. Consider the sample $(-1, 0, 1)$. It has mean zero and median zero. Its left-tail and right-tail are exactly the same, so it is symmetric.

Now consider $(-97, 0, 1)$. This is left-skewed because the left tail is enormous. Its median is zero, but its mean is $(-97 + 0 + 1)/3 = -32$. The median is greater than the mean, and it is left-skewed.