

NAME (Please Print): _____

Statistics 320 (2014Spring)

Quiz 3: Key

False 1. (1 point) Propensity score methods are only applicable to causal comparisons.

- (a) True (b) False

2. (1 point) State, in plain language, what does the assumption of unconfoundedness means?

Unconfoundedness means that if the units have the same covariates values, the treatment is randomized; or there is no unmeasured confounders; or there is no selection into the treatment based on the potential outcomes.

3. (2 points) Give the names of two different models that are suitable for multilevel data.

Fixed effects model and random effects model.

4. (2 points) State, in plain language or by mathematical formula, the two fundamental properties of propensity score.

1. Balancing Property: $W \perp X|e(X)$. That is, if the units are balanced in the propensity score between the two groups, the distribution of all covariates are also balanced between the groups.

2. Unconfoundedness Property: If $(Y(0), Y(1)) \perp W|X$, then $(Y(0), Y(1)) \perp W|e(X)$. That is, if the treatment assignment are unconfounded conditional on the covariates, then it is also unconfounded conditional on the propensity score.

5. (2 point) Give a real example of study/data with multilevel structure (excluding the one talked in class).

Depends

6. (2 points) Give at least one reason why using a propensity score method is usually more preferable than direct regression method for causal inference.

1. Propensity score approach forces analysts to check the underlying assumptions on designs, such as overlap or balance; 2. it avoids directly modeling the outcome; 3. it avoids modeling a large number of variables. All these features make it less sensitive to model misspecifications.