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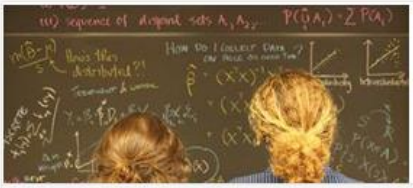

Data Analysis for Social Scientists

MITx - 14.310x
Ended - Dec 20, 2016

Your final grade: 88%.

Estimating the variance of $\hat{\tau}$

1. $s_c^2 = \frac{1}{N_c - 1} \sum_{i:W_i=0} (Y_i(0) - \overline{Y_c^{obs}})^2$
2. $s_t^2 = \frac{1}{N_t - 1} \sum_{i:W_i=1} (Y_i(1) - \overline{Y_t^{obs}})^2$
3. What about the third term? We cannot easily estimate it because we never see $Y_i(1)$ and $Y_i(0)$.
4. Neyman proposed to ignore it and use as estimator of the sampling variance: $V_{Neyman} = \frac{s_c^2}{N_c} + \frac{s_t^2}{N_t}$ and this is typically what we do today.
5. Three justifications:
   - if the treatment effect is constant, it is correct
   - if the treatment effect is not constant, it is conservative (since accounting for variance of the treatment effect would in fact reduce the sampling variance of the estimator of the average treatment effect in the sample).
   - it turns out that if we were interested in the best estimate of the average treatment effect *for the population that the sample is drawn from*, the difference in observed outcome would still be an unbiased estimate, and the third term would drop in the variance.

Professor