Sharp cut $X^c$

If there is a treatment effect, there will be a...

Threats

Null effect / dose-response

If the true pre-post relationship is not linear...

Data Example

$x = T \ 0 \ C$ compensatory assignment (Title I)

The regression equation is

$$\text{posteff} = 49.8 + 0.024 \times \text{precat} + 9.09 \times \text{group} + 0.0196 \times \text{linint}$$

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Coef</th>
<th>Stdev</th>
<th>t-ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>49.7508</td>
<td>0.6957</td>
<td>71.92</td>
<td>0.0001</td>
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<td>precut</td>
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<td>0.03689</td>
<td>13.99</td>
<td>0.000</td>
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<td>group</td>
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<td>0.9538</td>
<td>10.38</td>
<td>0.000</td>
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<tr>
<td>linint</td>
<td>-0.01963</td>
<td>0.00284</td>
<td>-0.24</td>
<td>0.813</td>
</tr>
</tbody>
</table>

$s = 6.639$  \hspace{1cm} R-sq = 47.5\% \hspace{1cm} R-sq(adj) = 47.2\%$

$n = 65$

Note: probabilistic assignment preferred HW 2 #6
Rubin (1977) Assignment on Covariate population, counterfactual picture

FIG. 1
The Treatment Effect in Population $P$:

$$\tau = \text{Ave}_{x \in P} [u_1(x) - u_2(x)]$$

for assignment on $x$ probabilistic or not

Result 4: If $u_1(x)$ and $u_2(x)$ are both linear in $x$ and parallel, then the simple analysis of covariance estimator

$$\bar{y}_1 - \bar{y}_2 - (\bar{x}_1 - \bar{x}_2) \hat{\beta}$$

(8)

where

$$\hat{\beta} = \frac{2 \sum_{i=1}^{n_1} \sum_{j=1}^{n_i} (y_{1ij} - \bar{y}_1)(x_{1ij} - \bar{x}_1)}{2 \sum_{i=1}^{n_1} \sum_{j=1}^{n_i} (x_{1ij} - \bar{x}_1)^2}$$

is unbiased for $\tau$.

Subpopulation $P_x$ cases (e.g., treatment exposure)

Belson ex. (someone using control group slope) common reading

Data example (p.16) $\tau > 0$