

# Assessing balance

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- Motivation: after creating the pseudo-population with IPTW, we would like to check whether we have balance on the covariate's  $X$  distributions between the treated & control groups

## Balance after weighting:

- check covariate ( $X$ ) balance on the weighted sample using standardized differences
  - "Table 1" (summary: mean of each covariate  $X^i$  stratified by treatment groups)
  - Plots

## Recall: standardized differences: (smd)

→ difference in means btw. (treatment) groups, divided by (pooled) standard deviation

$$smd = \left| \frac{\bar{X}_{treat} - \bar{X}_{control}}{\sqrt{\frac{s_{treat}^2 + s_{control}^2}{2}}} \right|$$

$\bar{X}$ ... sample mean

$s^2$ ... sample variance

↳ common to report absolute values

## Computing standardized differences after weighting (with IPTW):

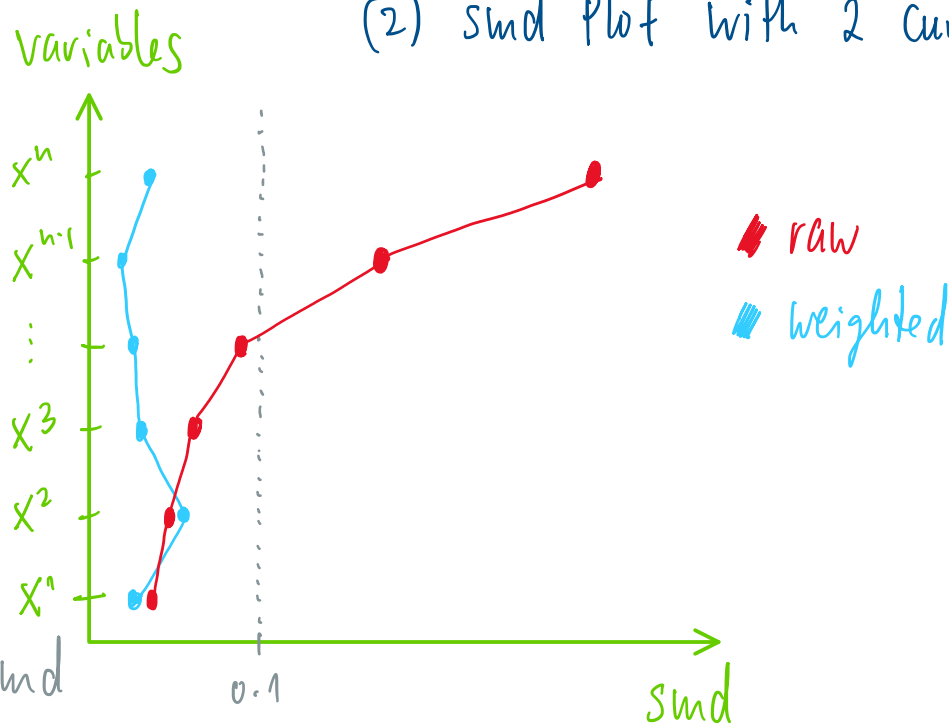
- same idea, except on weighted means and weighted variances
  - o determine weighted (means and variances) for each covariate  $X^{(i)}$  stratified on treatment group
- take diff. in weighted means and divide by an estimate of the (weighted) standard deviation

→ we would like smd-values to be  $< 0.1$ .

- IPTW should decrease smd of most covariates  $X^{(i)}$

↳ visualize with either: (1) Table 1 for weighted vs. unweighted (raw) data  
(2) smd plot with 2 curves (weighted & unweighted)

### SMD plot:



"rule of thumb smd threshold"

↳ ordered by size of raw data smd-values

## If there remains imbalance after weighting:

(1) refine/improve propensity scores

(a) interactions btw. covariates

(b) include non-linearity (in case linearity assumpt. doesn't hold)



iterate a few times

(2) then reassess balance