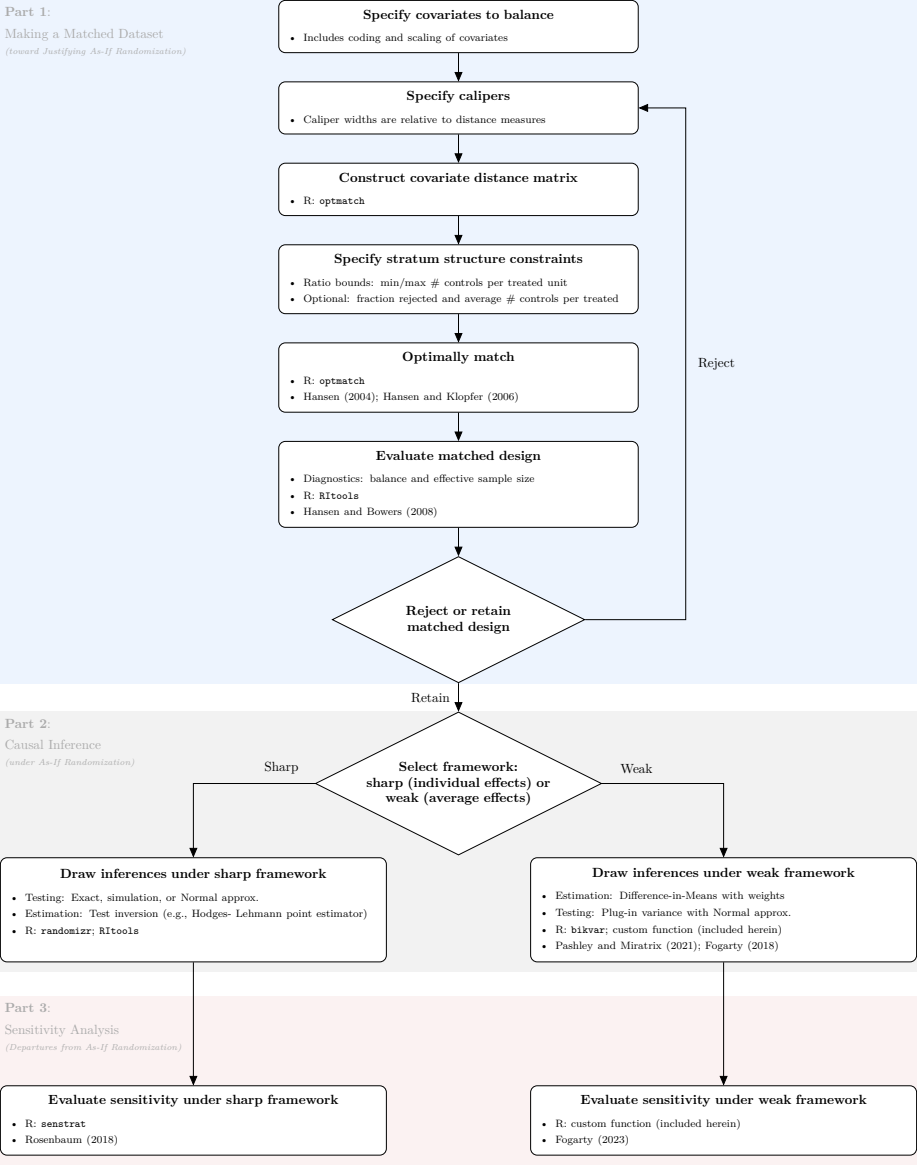
Part 1:
Making a Matched Dataset
(toward Justifying As-If Randomization)
Specify covariates to balance
Includes coding and scaling of covariates
Specify calipers
Caliper widths are relative to distance measures
Construct covariate distance matrix
R: optmatch
Specify stratum structure constraints
Ratio bounds: min/max # controls per treated unit
Optional: fraction rejected and average # controls per treated
Optimally match
R: optmatch
Hansen (2004); Hansen and Klopfer (2006)
Evaluate matched design
Diagnostics: balance and effective sample size
R: RItools
Hansen and Bowers (2008)
Reject or retain matched design
Reject
Retain
Part 2:
Causal Inference
(under As-If Randomization)
Sharp
Select framework: sharp (individual effects) or weak (average effects)
Weak
Draw inferences under sharp framework
Testing: Exact, simulation, or Normal approx.
Estimation: Test inversion (e.g., Hodges- Lehmann point estimator)
R: randomizr; RItools
Draw inferences under weak framework
Estimation: Difference-in-Means with weights
Testing: Plug-in variance with Normal approx.
R: bikvar; custom function (included herein)
Pashley and Miratrix (2021); Fogarty (2018)
Part 3:
Sensitivity Analysis
(Departures from As-If Randomization)
Evaluate sensitivity under sharp framework
R: senstrat
Rosenbaum (2018)
Evaluate sensitivity under weak framework
R: custom function (included herein)
Fogarty (2023)