

# Tutorial 10 - ECON3360

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# National Supported Work (NSW) Program

- ▶ Created by Terra McKinnish.
- ▶ Data from the evaluation of the U.S NSW program.
- ▶ Aimed to help workers lacking basic skills via work experience and counselling.
- ▶ Qualified applicants were randomly assigned to treatment and control groups.
- ▶ Treatment group benefited fully from the NSW program.
- ▶ Control group did not receive any program benefits.
- ▶ **RCT** data was complemented with 2,490 non-experimental untreated individuals from the Panel Study of Income Dynamics (PSID).

# Evaluations and Problem Set

- ▶ LaLonde (1986) discovered biased estimates using non-experimental methods.
- ▶ Heckman and Hotz (1989) suggested careful specification tests to get closer to experimental results.
- ▶ Goal: Use Propensity Score Matching (PSM) on the PSID sample by LaLonde to create an acceptable non-experimental control group.
- ▶ The exercise is detailed further in Smith and Todd (Journal of Econometrics, 2005).

# Why Use Propensity Score Matching?

- ▶ Control for **observational bias** in non-randomized studies.
- ▶ Simulate a **randomized control trial** (RCT) when RCT is not feasible.
- ▶ Reduce the impact of **confounding variables**.
- ▶ Account for differences between treatment and control groups.

# Installing a Package in STATA

1. `findit psmatch2`
2. `ssc install psmatch2`

# Equation

$$\begin{aligned} \text{re78} = & \beta_0 + \beta_1 \text{age} + \beta_2 \text{educ} + \beta_3 \text{nodegree} + \beta_4 \text{black} \\ & + \beta_5 \text{hisp} + \beta_6 \text{married} + \beta_7 \text{re74} + \beta_8 \text{re75} + u \end{aligned}$$

# Propensity Score Matching Steps

1. Probit estimation and prediction to obtain the propensity score  $pr = (D = 1/x)$  (this can also be done within the `psmatch2` command)
2. Check common support
3. Match treated/untreated with the chosen method and run the estimation
4. Assess the quality of the match

# Comparing Matching Techniques

## Nearest Neighbor Matching:

- ▶ Most intuitive technique.
- ▶ For each treated observation  $i$ , select the control observation  $j$  with the closest propensity score:  $\min ||p_i - p_j||$ .

## Caliper Matching:

- ▶ Reduces the risk of bad matches.
- ▶ Restrict matches to control observations close in propensity score within a caliper of the treated observation.



## Radius Matching:

- ▶ A variant of Caliper Matching.
- ▶ Use all control observations whose propensity scores are within the caliper of the treated observation.

## Kernel Matching:

- ▶ Use all control observations for each treated observation.
- ▶ Matching yields weights for control observations based on proximity to the treated observation's propensity score.
- ▶ Controls closer in score get a higher weight; those further away get a lower weight.
- ▶ Weights are inversely proportional to the distance between observations.