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# Monte Carlo Exploration

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# *Introduction*

## **The Econometrics of Policy Evaluation**

- ▶ is important
- ▶ is complicated
- ▶ is multifaceted

## **Fundamental Problems**

- ▶ Evaluation Problem
- ▶ Selection problem
  - ▶ Essential Heterogeneity

## Objects of Interest

- ▶ Conventional Average Treatment Effects
- ▶ Policy-Relevant Average Treatment Effects
- ▶ Local Average Treatment Effect
- ▶ Marginal Effect of Treatment
- ▶ Distribution of Effects
- ▶ Effects on Distribution

## Identification Strategies

- ▶ Random Assignment
- ▶ Matching
- ▶ Control Functions and Extensions
- ▶ Instrumental Variables

## Generalized Roy Model

*Potential Outcomes*

$$Y_1 = \beta_1 X + U_1$$

$$Y_0 = \beta_0 X + U_0$$

*Cost*

$$C = \gamma Z + U_C$$

*Observed Outcomes*

$$Y = DY_1 + (1 - D)Y_0$$

*Choice*

$$S = Y_1 - Y_0 - C$$

$$D = I[S > 0]$$



## Monte Carlo Exploration

We will touch on all these issues in a Monte Carlo exercise using the **grmpy** package. The notebook is available on the course website.

# **Appendix**

# *References*

- Carneiro, P., Heckman, J. J., & Vytlacil, E. J. (2011). Estimating marginal returns to education. *American Economic Review*, 101(6), 2754–2781.
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- Heckman, J. J., & Taber, C. (2010). Roy model. In L. E. Blume & S. N. Durlauf (Eds.), *Microeconometrics* (pp. 221–228). London: Palgrave Macmillan.