

SHARP BOUNDS AND TESTABILITY OF A ROY MODEL OF STEM MAJOR CHOICES

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Abstract.

We analyze the empirical content of the Roy model, stripped down to its essential features, namely sector specific unobserved heterogeneity and self-selection on the basis of potential outcomes. We characterize sharp bounds on the joint distribution of potential outcomes and testable implications of the Roy self-selection model under an instrumental constraint on the joint distribution of potential outcomes we call stochastically monotone instrumental variable (SMIV).

We show that testing the Roy model selection is equivalent to testing stochastic monotonicity of observed outcomes relative to the instrument. Special emphasis is put on the case of binary outcomes, which has received little attention in the literature to date. For richer sets of outcomes, we emphasize the distinction between pointwise sharp bounds and functional sharp bounds, and its importance, when constructing sharp bounds on functional features, such as inequality measures. We analyze a Roy model of college major choice in Canada and Germany within this framework, and we take a new look at the under-representation of women in STEM.