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Essays on Econometric Methods for Panel and Duration Data Analysis

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Abstract

In this dissertation, I propose some new econometric methods for panel and duration data analysis. The dissertation consists of three chapters. In the first two chapters, I propose panel data methods to identify and estimate the average treatment effect (ATE). These methods can identify and estimate the time-varying ATE for the entire population, rather than for limited subpopulations, even when treatment effect heterogeneity depends on unobserved fixed effects. In the third chapter, I propose an approach for partial identification and inference on censored duration models. The approach allows for the censoring to be endogenous.

In Chapter 1, I propose a new approach to identify and estimate the time-varying ATE using panel data to control for unobserved fixed effects. The proposed approach is an extension of the difference-in-differences approach. When treatment effect heterogeneity depends on unobserved fixed effects, the standard difference-in-differences approach can only identify the ATE on the treated, while the proposed approach can identify the ATE for the entire population. The approach exploits panel data with a specific structure in which the treatment exposure expands to the entire population over time. I apply the proposed approach to estimate the effect of the introduction of electronic voting technology for the reduction of residual votes in Brazilian elections.

In Chapter 2, I propose another panel data approach to identify and estimate the time-varying ATE allowing treatment effect heterogeneity to depend on unobserved fixed effects. While existing panel data approaches, except for the approach proposed in Chapter 2, identify the ATE only for limited subpopulations in the presence of such heterogeneity, the proposed approach identifies and estimates the ATE for the entire population. In contrast to the approach proposed in Chapter 1, the approach proposed in Chapter 2 does not require pretreatment data or post-treatment data. Instead, we assume scalar fixed effects in potential outcome models and availability of exogenous variables that are correlated with the fixed effects. The approach exploits

these two assumptions to identify the ATE. As an empirical application, I study the impact of a mother's smoking during pregnancy on her child's birth weight.

In Chapter 3, I study identification and inference for the regression parameters in transformation models with endogenous censoring. Many kinds of duration models such as the accelerated failure time model, the proportional hazard model, and the mixed proportional hazard model can be viewed as transformation models. I allow the censoring of the duration outcome to be arbitrarily correlated with observed covariates and unobserved heterogeneity. Further, I impose no parametric restrictions on the transformation function or the distribution function of the unobserved heterogeneity. In this setting, I derive an identified set for the regression parameters, which is characterized by a conditional moment inequality. Based on the conditional moment inequality, I propose an inference method for the regression parameters. As an empirical application, I apply the proposed inference method to evaluate the effect of heart transplants on patients' survival duration using data from the Stanford Heart Transplant Study.