

Econometric Methods for Microeconomic Analysis of Heterogeneous Agents

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This short course deals with recent methodological developments in microeconomic analysis that treats unobserved heterogeneity in flexible ways. It emphasizes the direct use of preference orderings (e.g. revealed preference), which are potentially powerful in terms of dealing with unobserved heterogeneity in high-dimensions (Kitamura and Stoye (2013)). We explore the approach based on preference orderings in details, though we also contrast it with other recently proposed nonparametric methods which often rely on smoothing techniques. The nonparametric methods discussed in the course require computation in high dimensions, and therefore we investigate their algorithmic aspects as well.

As recognized in the recent literature, accounting for unobserved heterogeneity is tremendously important for applied microeconomic analysis (Compiani and Kitamura (2015)). In particular, it is highly desirable and often crucial to incorporate infinite dimensional heterogeneity in empirical research. This makes some of conventional nonparametric methods, which often demand monotonicity type restrictions and smoothness assumptions, difficult to apply. We pursue an alternative framework based on preference orderings. It enables us to avoid reliance of smoothness assumptions and other *ad hoc* restrictions on functional properties: it instead utilizes geometric properties (see, for example, Ziegler (1995), Gruber (2007) and Grünbaum (2003) for geometric background) provided by economic theory. Another benefit is that implementing this approach typically requires only linear/quadratic programming, which can be carried out even in extremely high dimensions, and recent progress in computational methods can be used to execute them. Our approach is quite general and avoids arbitrary restrictions, and consequently we typically need to deal with partially identified objects. We review basics of modern methods in partially identified models and moment inequalities. Another strand of research, which is highly relevant when we are concerned with endogeneity of certain covariates, is nonparametric identification and estimation of nonlinear models with endogenous regressors. We discuss this topic as well as time permits.

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