Brice Romuald Gueyap Kounga
Department of Economics, Western University, London, Ontario, Canada
bgueyapk@uwo.ca | bricegueyap.github.io

Thesis Abstract

This thesis develops econometric methods for data in which agents are connected by social or economic links. Such data raise two problems. Links are often chosen for the same unobserved reasons that drive outcomes. For example, a teenager's risk tolerance can affect both whether she smokes and whom she befriends, which can render estimators that ignore this heterogeneity inconsistent. Outcomes involving a common agent can also be dependent, as when one country's exports to different partners all reflect that country's fundamentals, invalidating inference that assumes independence. Across three papers, I show how network data can be used to control for unobserved heterogeneity without a parametric model of link formation, and how to conduct valid inference when outcomes are defined for pairs of agents.

Semiparametric Dynamic Logit Model with Endogenous Networks (Job market paper)
This paper studies a binary outcome that depends on observed covariates, the past outcome (state dependence), an individual fixed effect, and an unobserved social component. This component is an unknown function of a time-varying unobserved characteristic that also governs friendship formation. Comparing the same agent across waves removes the fixed effect. Comparing two agents who form links in the same way removes the change in the unobserved social component, provided both agents experience the same change. I propose a pairwise conditional likelihood estimator, establish its consistency, and show that it is root-n asymptotically normal when the unobserved characteristic and the covariates take finitely many values. In simulations with finitely many types, the pairwise estimator's bias decreases as the sample grows and its coverage is close to nominal, whereas fixed-effects and peer-control logits remain biased. A second estimator, which conditions on network classes, has a root mean squared error 6 to 20 percent below that of the pairwise estimator in these simulations. An application to adolescent smoking in the Glasgow Teenage Friends and Lifestyle Study illustrates the method's data requirements and the estimation difficulties that arise with a small sample of students.

Identification and Estimation of a Semiparametric Logit Model using Network Data
This paper studies the cross-sectional setting in which a latent individual trait affects both a binary outcome and link formation. Here, endogenous network formation is what makes identification possible. Slope parameters are point identified by a conditional likelihood argument applied to agents with identical linking behaviour. I propose a kernel-weighted conditional logit estimator that matches agents on how similarly they form links. I derive its asymptotic distribution both when network types take finitely many values and when they vary continuously, and give a jackknife bias correction and variance estimators that account for matching on estimated distances. In an application to microfinance adoption in Indian villages, network matching changes the estimated covariate effects in ways that village-level controls alone do not.

Nonseparable Dyadic Regression
This paper studies a model for dyadic outcomes such as bilateral trade flows. The outcome depends on both agents' characteristics and on a scalar unobservable through an unknown function strictly increasing in that unobservable. I establish identification of a normalized structural function and the error distribution, propose kernel plug-in estimators, and derive their limiting distributions under dyadic dependence. A variance component arising from agents shared across pairs generically dominates. In simulations, confidence intervals that treat dyads as independent have coverage well below the nominal level, with coverage deteriorating as the network grows. An agent-level bootstrap, which I prove consistent in this generic case, substantially improves coverage. In bilateral trade data, conditional dispersion falls by more than half between small and large exporters.