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RESEARCH STATEMENT

As an applied econometrician, I am motivated by the technical challenges practicing economists face. My specializations are panel data methods, GMM, and missing data methods. This has led to my job market paper on missing values in fixed effects models, a work in progress on the Hausman test under heteroskedasticity, and a future agenda with applications across many areas of economics, including my fields of environmental economics and labor economics.

My job market paper considers missing covariate values in fixed effects models. The main assumption is a missing at random assumption which allows observation to be correlated with the outcome variable and the idiosyncratic shocks, but requires that observation is not directly related to the value of the missing covariates. The existing inverse probability weighting technique for missing covariates in a fixed effects model required exogenous observation (Wooldridge 2010[1]), which is violated if observation is directly related to the outcome variable or the idiosyncratic shocks. I propose two inverse probability weighted estimators; a computationally simple pooled OLS estimator, and a more asymptotically efficient GMM estimator. Both estimators are consistent and root-n asymptotically normal under the missing at random assumption, and the respective variances are derived. The proposed IPW-POLS estimator is applied to a hedonic house price model to estimate the willingness to pay for local water quality, where the measure of water quality is missing for many properties in many time periods. Access to panel data allows some investigation of the assumptions, and empirical evidence suggests that the missing at random assumption is more tenable than the exogenous observation assumption from previous literature. My job market paper contains the details.

The estimation technique proposed in my job market paper has wide applicability to panel models, and I have already been approached by economists interested in employing my estimator. The specific application to environmental economics stems from my own interests and research area. I have ongoing projects on the valuation of natural resources and public goods, including a current work measuring the disutility of increasing temperatures. In "Temper! Temper! The Effect of Temperature on Automobile Accidents," joint work with Katherine Keisler, we use data on temperatures and automobile accidents to measure how increased temperatures affect the likelihood and severity of automobile accidents, notably capturing effects on otherwise non-vulnerable teenagers and adults.

My work on missing data and fixed effects models is closely related to my interest in partial identification. In "Bounding Average Treatment Effects using Post-Treatment Variables," I consider the identifying power of what are usually considered confounding variables. I show that existing sharp bounds for the average treatment effect using cross-sectional data can be tightened using post-treatment variables. If the treated and non-treated groups have different distributions of post-treatment variables, and a monotonic treatment selection assumption is employed, then the difference in post-treatment behavior can be used to tighten the bounds on the average treatment effect. I illustrate the bounds by considering the effect of maternal smoking on birth weight, using

[1] Wooldridge, Jeffrey M. "Correlated random effects models with unbalanced panels." *Michigan State University, Department of Economics* (2010).

prenatal visits as post-treatment variables. In future work, I will extend the analysis to panel data where post-treatment variables may be available for multiple time periods.

My work on GMM appears in my job market paper, and in a work in progress on the Hausman test. In "The Hausman test with Heteroskedasticity," joint work with Stephen Donald, we show how the standard Hausman test can be parameterized by stacking exogeneity conditions in the null hypothesis, for example, the OLS and IV first order conditions. The benefit is that an optimal GMM estimator is efficient under the null, even under heteroskedasticity, thus the usual form of the Hausman test statistic remains valid. We show that this test has correct size, and compare its local power to other heteroskedasticity-robust Hausman test statistics that have been proposed in the literature. Notably, with the advance in computing power and the growing availability of canned packages for optimal GMM estimators, our robust Hausman test is straightforward to implement.

Jointly, these works show my ability to work in theoretical econometrics as well as collaborate with applied researchers. In addition to the current works in progress and future directions detailed above, I plan to further explore the use of panel data to identify partial effects conditional on individual heterogeneity, as opposed to the common non-linear practice of averaging over the heterogeneity. This direction is motivated by my interests in labor market outcomes, in particular in evaluating social assistance programs where participants and non-participants are unobservably different.