Research Statement

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November 2023

My research is in applied and theoretical econometrics and aims to expand our understanding of how publication bias impacts the statistical credibility of published research, reproducibility, and evidence-based policy choice. I examine these issues in relation to causal inference methods (e.g. difference-in-differences) and experimental design (e.g. setting statistical power in experiments), and aim to provide solutions for practical use by empirical researchers. A separate line of my research is in development economics.

1 Credibility, Publication Bias & Evidence-Based Policy

In my job market paper, I examine how standard error corrections interact with the selective publication process to affect the statistical credibility of published research. The close connection between them has received little attention. In the paper, I establish general theoretical results on how their interaction affects bias and coverage in studies selected for publication, and then apply them using a newly constructed dataset of difference-in-differences (DiD) studies from the 2000's, when clustered standard errors were growing in popularity. A key insight is that corrections tend to increase standard errors, which effectively raises the bar for statistical significance. This can inadvertently exacerbate publication bias. The theoretical results reveal a striking trade-off that is borne out empirically in the DiD setting: standard error corrections enhance the credibility of published confidence intervals through increased coverage, but can also inadvertently increase bias, leading to a deterioration in the credibility of published DiD estimates. Model estimates in the DiD setting show that both effects are empirically large. To examine the overall impact on evidence-based policy, I develop a model of a policymaker who uses information from published studies to inform policy decisions and overestimates the precision of estimates when standard errors are unclustered. I find that clustering lowers minimax regret when policymakers exhibit sufficiently high loss aversion for mistakenly implementing an ineffective or harmful policy. Overall, this research connects two important literatures — typically considered in isolation — and shows that their interaction has quantitatively important implications for statistical credibility and evidence-based decision-making.

My job market paper examines statistical credibility in a program evaluation setting. I am also interested in the credibility of experimental research. In a second paper, which is currently under review at the *Journal of Econometrics*, I study issues underlying the so-called 'reproducibility crisis'. In the 2010's, a series of large-scale replications of published experimental results from top journals in experimental economics, psychology and social science showed replication rates between 35 and 60 percent. Low rates of replications gave rise to a large literature examining a range of potential causes, including selective publication against null results; p-hacking and other questionable research practices; and heterogeneity across original studies and replications in research design and experimental subjects. My paper proposes an alternative theory. Its central theoretical result shows that the expected replication rate will always fall short of its intended target, owing to issues with common approaches for setting power in replications. Importantly, this holds even when original estimates are *completely unbiased*, with no p-hacking, heterogeneity, and irrespective of whether or not there is selective publication. To test the empirical relevance of this result, I estimate a parsimonious model accounting only for issues with power calculations. I find that it can fully explain observed replication rates in experimental economics and social science, and two-thirds of the replication gap in psychology. In a related and ongoing project, I have preregistered out-of-sample replication rate predictions for the MTurk Replication Project, which will test the reproducibility of 26 social science studies published in PNAS that recruited online research participants. A team member of the MTurk Replication Project informed me of which studies were chosen for replication, but not their outcomes. When the replication outcomes become publicly available, I will compare my preregistered predictions to the actual replication outcomes, providing a further test of the theory.

In another paper, coauthored with one of my advisors, Toru Kitagawa, we develop a model of evidence-based treatment choice in the presence of publication bias. The aim of the paper is to understand how policymakers make decisions when there is publication bias and then to derive the optimal publication rule. Theoretically, we show that the optimal publication rule which minimizes maximum regret is non-selective with respect to statistical significance. This contrasts with the optimal publication rule for Bayesian policymakers studied in the literature, where only 'extreme' results that sufficiently move the prior are published. Thus, the Bayesian model presents a striking tension: selective publication enhances policy relevance while at the same time deteriorating statistical credibility. By contrast, in the minimax regret framework, our results show that the optimal publication regime for policy choice is non-selective and therefore consistent with valid statistical inference. Which optimality criterion is relevant in any given setting – minimax regret or Bayes – may ultimately depend on the factors such as

behavioural axioms of the decision-makers, availability of the prior belief of the policy effect, and the form of publication bias relevant to the empirical literature of interest. We plan to develop this paper further, by examining extensions to the theoretical model and adding an empirical application.

2 Topics in Development Economics

A separate strand of my research is in development economics. In an ongoing project with my coauthor Michael Neubauer, we study the impact of pollution externalities on agricultural production, profits and household consumption in the Mekong Delta, in Vietnam. The project is in partnership with the Mekong Conservancy Foundation, a local NGO. We are conducting fieldwork in areas where large industrial firms are emitting waste into water resources shared with small farmers producing shrimp, the main export in the region. This leads to negative pollution externalities that increase the probability of waterborne diseases and lower shrimp yields. Our research has two primary aims. First, to robustly measure the magnitude of this negative externality on yields, profits and consumption. Second, to implement a randomized intervention that aims to mitigate this externality. The planned intervention will give shrimp farmers with technology that provides periodic measurements of water pollution levels, which will assist them in choosing the optimal time to exchange water in order to minimize pollution.

In a separate paper, published with my undergraduate supervisor Anu Rammohan, we study the role of economic development and kinship norms on gender inequality in educational attainment. We illustrate two main empirical results. First, that economic development is associated with narrowing gender gaps in educational attainment. Second, that the norm of patrilocal exogamy, where wives migrate to co-reside with their husband's kin, is associated with worse outcomes for women's schooling relative to men's schooling. This provides empirical evidence in support of anthropological research which shows that gender-differentiated inequities in education are more pronounced in Northern India, where the norm of patrilocal exogamy is more common.