

Essays on the Search for Economic Efficiency
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Summary of Dissertation

My main areas of research are public finance and urban economics, using methods from applied microeconomics and experimental economics. I am primarily interested in the application of insights from the theory and literature of both experimental and urban economics to address problems in public economics. Public economics seems to encompass the most important policy questions currently under consideration. Experimental economics has provided compelling evidence that connections between the behavior of individuals and the functions of institutions bear more attention, while urban economics makes a strong case that the urban economy is a crucial unit of economic analysis.

I focus on well-grounded econometric and experimental methods to ensure that the research questions being asked are met with the most relevant and appropriate approaches available. My dissertation reflects this approach, as I apply tools and insights from several origins to try to understand problems in public economics.

An Experimental Test of the Pigovian Hypothesis

The first essay in my dissertation presents a laboratory experiment that directly addresses the efficacy of an optimal toll and tests alternative approaches to reducing the impact of externalities. I construct a simple common-pool resource game and present subjects with an intuitive software interface that allows subjects to make “investment” decisions between a common-pool resource (within an anonymous and random group) and a private outside option.

In market experiments, Nash and related game-theoretic equilibria are very good predictors of individual and group behavior. In public goods games and games of personal exchange, however, anomalous results have led to an expansion in the literature to explain and understand behavior that does not accord with non-cooperative equilibria. Previous laboratory experiments on common-pool resources leave the predictive power of Nash equilibria as an open question, and many run into problems of computational complexity and dominance; subjects believe that the cost in time and effort to discern their best strategy outweighs potential gains from improving their strategy. I provide a simplified game, intuitive software, and training, using a double-anonymous protocol, to allow a better test of game-theoretic predictions of individual behavior.

I find that subject behavior accords well with game-theoretic predictions of individual behavior in later periods, but that convergence takes longer than in most market experiments. To date, there had been no experimental tests of Pigovian taxation or subsidy, and my results indicate that an optimal toll has the predicted effect. Straightforward extensions would include easing anonymity or introducing communication, as well as changing group size, to determine the robustness of the convergence result.

In a second treatment, I introduce information to each group on their distance from the social optimum to assess the ability of non-monetary incentives to achieve the social optimum. I find that information provision

has a small, marginally significant, and non-persistent effect. More direct appeals to social norms in future experiments may have a more significant and persistent effect.

Fiscal Need in the United States: Cost and Comparability in a Representative Expenditure Approach

As an intern at the Congressional Research Service, I completed a methodological critique of the Representative Expenditure System (RES), which was later published in *State Tax Notes*. The critique focused primarily on insights from urban economics, and the second essay in my dissertation follows it up with a reassessment of fiscal need using comparable jurisdictions.

Developed by Robert Rafuse at the now-defunct Advisory Commission on Intergovernmental Relations (ACIR) in 1990, the Representative Expenditure System was intended to complement the Representative Tax System in order to provide a more comprehensive measure of fiscal comfort. As originally formulated, the RES method provides useful qualitative information about relative fiscal comfort, but is sensitive to changes in the formula and measures of input cost have been dealt with by controlling for mean annual earnings at the state level.

In order to more accurately account for problems of comparability of services provided and input costs, I aggregate expenditure data from the local level up to the rural- and MSA-level. I sort jurisdictions into comparable clusters using population size and density as the main determinants. I then use spatial econometrics methods to account for interjurisdictional competition in services provided both by geographical distance and by cluster in order to determine true underlying determinants of need. I combine these MSA-level and rural estimates up to the state level to provide new estimates of state fiscal need.

Rationality, Détente, and Initiative: Two New Solution Concepts

Nash equilibrium represents the benchmark equilibrium concept in applied game theory and economic modeling. Empirically, however, Nash equilibrium often performs poorly when predicting actual behavior. In practice, in public goods games and one-shot games like the Travelers' Dilemma, experimental evidence implies that subjects can improve efficiency over the Nash equilibrium, often with economically significant efficiency gains.

This paper presents two solution concepts: détente equilibrium is roughly a generalization of Nash equilibrium, in which players symmetrically consider own-best-response and other-best-response; and no-initiative equilibrium is a refinement of détente equilibrium in that players can consider all own-strategies and other-best-responses.