

*Empirical Essays on Auctions*¹

Chapter 1: Nonparametric Structural Analysis of Asymmetric Auctions: the Case of NJ School Bus Route Auctions

In this set of three essays we apply recent advances in econometric methods to study firm asymmetry in a procurement auction setting. In particular we identify what impact allowing cost asymmetries can have on traditional merger analysis. To our knowledge, this is the first application of these tools in such a setting.

In this first essay we nonparametrically estimate underlying cost distributions based on observed bids using theoretical implications of equilibrium bidding by firms. We modify existing techniques to allow for variation in bidder participation without a reserve price, via the introduction of bid preparation costs. Costs are then estimated using a unique data set collected during an anti-trust investigation into the merger of Laidlaw and First Student, which resulted in the largest student transportation firm in the country. The data set comprises bids from 300 bus route auctions in the state of New Jersey, between 2000 and 2006.

Chapter 2: NJ School Bus Route Auctions: Implications for Merger Analysis

By utilizing previously estimated cost distributions we conduct a series of counterfactual merger simulations. We find that 70% of mergers result in an increase in procurement costs for the state, while the other 30% yield an expected decrease in associated procurement costs. Further analysis suggests that post-merger market size is not the primary factor in explaining auction outcomes. What is of primary concern is not only the number of competing firms, but rather the interaction of the reduced number of firms and changes in bidding behavior induced by bid preparation costs and asymmetric cost distributions. This result suggests that anti-trust authorities should take a more nuanced stance when evaluating proposed mergers.

¹This research was supported in part by: the STIET program the University of Michigan (<http://stiet.si.umich.edu>) NSF DGE-0654014, The State Center (<http://www.statecenterinc.org>), and the SI REU Program (<http://www.si.umich.edu/reu/>) NSF #0755 147. These essays are a joint with Mark J. McCabe.

Chapter 3: Scaling Merger Simulations to Obtain Statewide Effects: a Comparison of Methods

(Work in progress) In this paper we compare two methods for calculating statewide changes in procurement costs due to mergers of firms in the market. We address the applicability of simulation results based on a sample of auctions to state level predictions. Working with cost estimates obtained with observed bids, we predict outcomes in school districts without observed bid data. Utilizing a separate data set of auction outcomes, we compare our out of sample predictions with observed outcomes.

We modify our previously used estimation methods to work when only the winning bids are observed. The cost distributions estimated in this fashion are compared to those estimated with full bid information. The similarity in the results from these two methods provide insight into whether or not statewide predictions can reasonably be drawn from simulations using cost distributions estimated from a subset of the state. Finally, using the merger of Laidlaw and First Student we compare our predictions against actual outcomes.