

# Differentiated product competition and the Antitrust Logit Model: an experimental analysis

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## Abstract

This paper reports a laboratory experiment designed to begin a behavioral examination of the Antitrust Logit Model (ALM), a merger simulation device that U.S. antitrust authorities use to help determine when anticompetitive problems may arise from horizontal mergers in differentiated-product markets. We find that the ALM *screens out* non-problematic mergers rather well, even though the ALM predicts performance in specific markets imprecisely. Further examination of the data suggests that in this context, adjustments to pre-merger deviations from the underlying Nash equilibrium, rather than the exercise of market power drive post-merger performance.

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## 1. Introduction

Antitrust merger enforcement policy has changed substantially in the last decade. In 1992, the Department of Justice (DOJ) and the Federal Trade Commission (FTC) revised their Horizontal Merger Guidelines (Guidelines) and added an enforcement focus on unilat-

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eral activity to existing considerations about the potential for cooperative behavior.<sup>1</sup> Most horizontal merger investigations now focus on potential unilateral effects and are evaluated in terms of specific models of oligopoly performance (Froeb, 1994). Horizontal mergers in differentiated product markets are an important example. DOJ analysts argue that in such contexts the standard concentration measure (the Herfindahl–Hirschman Index) provides little guidance as to when anticompetitive problems might arise (see, e.g., Werden and Froeb, 1996). In such cases, petitioners may reasonably argue either that the merging parties compete in a very broad market and that concentration is thus very low, or that markets are very narrow and that the proposed consolidation presents no problem, since products of the merging entities are unrelated. As a substitute for standard concentration measures DOJ staff have developed an Antitrust Logit Model (ALM) merger simulation to help identify anticompetitive problems in differentiated-product markets.

The ALM assumes a logit demand system, and that sellers interact as Bertrand competitors.<sup>2</sup> The logit demand assumption is extremely useful in this context since investigators need only prices, market shares, a measure of the rate of substitutability between products, and a measure of demand elasticity to generate predictions. The convenience of the ALM is appealing, and the approach may be useful for antitrust work. As Werden and Froeb (1996, p. 65) observe, “even if considered unrealistically simplistic, merger simulations provide a little light in a very dark place.” Nevertheless, a number of questions critical to the usefulness of this approach are unanswered. First, the model’s underlying assumptions may be frequently violated in natural markets. In particular, demand may be mis-specified as a logit system. Second, the incentives that drive unilateral effects are subtle and may fail to affect behavior as predicted. Third, demand parameter estimates from naturally occurring data may not be sufficiently precise to allow accurate predictions of post-merger behavior. The relevance of the ALM’s predictions in these more general circumstances bears scrutiny.<sup>3</sup>

This paper reports an experiment designed to shed light on these issues. The usefulness of experimental methods in this context bears emphasis. The laboratory provides a unique medium for evaluating the predictive power of the ALM under “best shot” circumstances, where the investigator constructs an environment that conforms strictly to the underlying assumptions of the model and where seller choices are not clouded by the rich variety of considerations extraneous to the equilibrium analysis that may affect decisions in natural circumstances. Although observing predicted behavior in the laboratory would say little about the relevance of the model in richer natural circumstances, a failure to observe predicted outcomes in the laboratory should raise serious questions about the potential value of the model as a predictor of behavior in the more complex natural world. Further, provided that the ALM works acceptably well strictly on its domain, the laboratory investigator can

<sup>1</sup> A primary result of several prominent theoretical analyses of horizontal mergers is that reducing the number of sellers alters the underlying strategic situation in a way that results in higher equilibrium prices via unilateral activity (e.g., Deneckere and Davidson, 1985; Farrell and Shapiro, 1990).

<sup>2</sup> Froeb offers simulation alternatives that have been developed for homogeneous Cournot competition and for one-sided auctions.

<sup>3</sup> Crooke et al. (1999) take a first step in exploring the effects of deviations from the ALM’s restrictive assumptions. Using Monte Carlo methods they report that the magnitude of comparative static effects on consolidations can be affected by the choice of the underlying demand system.

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