A new test for monopoly with limited cost data

Charles C. Moul
Miami University

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ABSTRACT: I introduce a monopoly test that requires only limited, if any, cost information. The test's intuition is that demand estimates in isolation will be similar to demand estimates under joint estimation with cost if the monopoly null hypothesis is correct. These estimates, though, may diverge if the monopoly null hypothesis is false. The test's power increases with the extent of inside-outside segmentation and the market's true number of firms. Simulations indicate that the test has substantial power using duopoly data when plausible levels of inside-outside segmentation are present.

Keywords: market structure test, monopoly

I. Introduction

The detailed data required for many economic applications often necessitate that variables be collected at the firm rather than market level, but this implies that the analyst may be unaware of critical aspects of the firm’s environment. A similar issue can arise in cases of uncertain market definition. The number, identity, and price-quantity outcomes of competitors are all likely to be incomplete or missing altogether. Even in the absence of market-level information, though, a firm's actions may reveal key attributes of the competitive environment. I consider what may be learned by comparing demand estimates derived alone and those jointly estimated with cost under a maintained market structure hypothesis.

My market structure test's intuition is somewhat similar to that of a Hausman specification test (1978). If market structure is correctly stated, demand estimates in isolation will be consistent but inefficient while demand estimated jointly with cost will be consistent and efficient. The difference between these estimates will be statistically negligible. If, however, market structure is misstated, both estimates will be inconsistent, though in likely different ways. The difference between these estimates can thus provide a novel test for the hypothesized market structure itself.

While nominally applicable to testing any market structure or conduct hypothesis, the statistical power of the test comes primarily with respect to rejecting the null hypothesis of monopoly. This particular null is somewhat unorthodox but not unprecedented. Panzar and Rosse (1987) employ firm-level revenue functions and their comparative statics to construct a statistic

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1Email: moulcc@miamioh.edu; Department of Economics, Farmer School of Business, 800 E. High St., Oxford, OH 45056; (ph) 513-529-2867
2 See Aguirregabiria (1999) and Villas-Boas and Zhao (2005) for examples respectively regarding inventory management and cost inference.