



# A laboratory study of advertising and price competition

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## Abstract

We use a laboratory experiment to study advertising and pricing behavior in a market where consumers differ in price sensitivity. Equilibrium in this market entails variation in the number of firms advertising and price dispersion in advertised prices. We vary the cost to advertise as well as varying the number of competing firms. Theory predicts that advertising costs act as a facilitating device: higher costs increase firm profits at the expense of consumers. We find that higher advertising costs decrease demand for advertising and raise advertised prices, as predicted. Further, this comes at the expense of consumers. However, advertising strategies are more aggressive than theory predicts with the result that firm profits do not increase.

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## 1. Introduction

In contrast to the classical theory of perfectly competitive markets, many markets are characterized by imperfect price information. Consumers often do not know (or

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perhaps do not care solely about) the prices charged by all sellers in a market, and buyers and sellers must often incur costs to discover or transmit this information. A now well-established literature analyzes how various search frictions can generate imperfect information, and hence affect market performance, and this literature shows that many of the properties of perfectly competitive markets do not carry over to markets with these characteristics. For example, in a market where some consumers are better informed than others about what prices are available, the “Law of One Price” may not hold. That is, in equilibrium, different sellers may charge different prices for a homogeneous product. Moreover, changes in the underlying structure of such markets often have implications that strikingly differ from the perfectly competitive case.

For example, Varian’s “Model of Sales” (Varian, 1980) analyzes price competition among identical sellers supplying a homogeneous product. Demand for the product comes from two types of consumers. Informed consumers know the prices charged by different sellers and buy at the lowest price (as long as this does not exceed their reservation price). Uninformed consumers do not know what prices are available, and simply choose a seller at random and buy from this seller (again, supposing that the seller’s price does not exceed their reservation price). In this model, the unique symmetric equilibrium involves price dispersion as sellers use mixed strategies to generate prices. More broadly, one can view Varian’s model as one in which consumers differ in their price sensitivity. Under this view, when consumers are heterogeneous in their price sensitivities, price dispersion is predicted to be the inevitable outcome.

In a previous paper (Morgan et al., 2003) we derived some comparative static implications of this model, and reported an experiment designed to test them. The data showed substantial and persistent price dispersion, and, although empirical price distributions deviated somewhat from the theoretical distributions, the model was successful in predicting how average prices varied with changes in the underlying market structure. In particular, we noted that, rather intuitively, prices are predicted to decrease as the proportion of informed consumers increases. This prediction was strongly supported by our experimental data. We also noted that, less intuitively, prices are predicted to increase with the number of competing sellers. Again, this prediction found strong support in our experimental data.

One feature of Varian’s model is that the composition of the market faced by a seller—the number of informed and uninformed consumers—is exogenous. Perhaps more importantly, the decision to advertise prices is likewise exogenous in that model. In practice, the decision of how often and at what price to advertise is at the heart of a firm’s marketing strategy. Despite this, the interaction between advertising and pricing strategies of sellers has been little studied in laboratory settings.

In a recent paper, Baye and Morgan (2001) study a market where informed consumers receive their information through an “information gatekeeper,” which might be thought of as a newspaper or an internet price comparison site. In order to advertise its price, a seller must pay an advertising fee set by the gatekeeper. The model captures the idea that even when some consumers are looking for bargains, sellers must incur costs in order to attract their attention. When there is no

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