demonstrate bioequivalence to the pioneer's brand, and generic entry has increased significantly. This has provided a body of very interesting data to analyze the pattern of entry and the pricing strategies followed by the entrants and incumbents.

In this article, we make use of data covering the sales and prices of the pioneer and generic products for eighteen drug products, generally over the time period 1984–88. A number of issues are examined. First,

* Earlier versions of this article were presented at the Second World Congress on Health Economics, the Applied Econometric Association Meetings, the American Economic Association Meetings, and Workshops at Duke University and University of California, Los Angeles. We benefited from the comments from several participants at these meetings as well as those from an anonymous referee.

[1] For an early analysis of this law, see Henry Grabowski & John Vernon, Longer Patents for Lower Imitation Barriers: The 1984 Drug Act, 76 Am. Econ. Rev. Papers & Proc. 195 (1986).

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Exhibit 1066
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and F. M. Scherer and David Ross[4] have provided a recent survey of the empirical literature for the pharmaceutical industry. They conclude that, "under conditions like those found in pharmaceuticals, first movers have natural product differentiation advantages that permit them to charge high prices and retain substantial market shares."[5]

Historically, the strong brand loyalty in pharmaceuticals for innovative brands over generic competitors has been rooted in several institutional considerations. First, physicians generally gained experience with a new drug during its period of patent exclusivity. When patents expired and

[2] Richard Schmalensee, Product Differentiation Advantages of Pioneering Brands, 72 Am. Econ. Rev. 349 (1982).

[3] Cecilia A. Conrad, The Advantages of Being First and Competition between Firms, 1 Int'l. J. Indus. Org. 353 (1983).

[4] F. M. Scherer & David Ross, Industrial Market Structure and Economic Performance (3d ed. 1990).

[5] *Id.* at 592.

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antibiotic products systematically deviating from this observed pattern.

Since the mid-1970s, however, there have been a number of institutional changes in pharmaceuticals that should increase the degree of price sensitivity. First, the state antisubstitution laws have been universally repealed. The new substitution laws allow pharmacists to dispense lower-priced generics in the place of prescribed brands (subject to physician override provisions that vary from state to state). In addition, third-party payers such as Medicaid have instituted requirements limiting reimbursements to generic levels. These programs have been imitated by many private insurers. The growth of managed health programs and health

[6] See Henry Grabowski & John Vernon, Substitution Laws and Innovation in the Pharmaceutical Industry, 43 L. & Contemp. Probs. 43 (1979).

[7] Grabowski & Vernon, *supra* note 1, at 195.

[8] David Schwartzman, Innovation in the Pharmaceutical Industry (1976).

[9] Meir Statman, The Effect of Patent Expiration on the Market Position of Drugs, in Drugs and Health: Economic Issues and Policy Objectives (Robert B. Helms ed. 1981).

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[10] Alison Masson & Robert L. Steiner, Generic Substitution and Prescription Drug Prices: Economic Effects of State Drug Product Selection Laws (Staff report, Federal Trade Commission, Bureau of Economics 1985).

[11] Mark A. Hurwitz & Richard E. Caves, Persuasion or Information? Promotion and the Shares of Brand Name and Generic Pharmaceuticals, 31 J. Law & Econ. 299 (1988); and Richard E. Caves, Michael D. Whinston, & Mark A. Hurwitz, Patent Expiration, Entry, and Competition in the U.S Pharmaceutical Industry: An Exploratory Analysis, Brookings Papers on Economic Activity: Microeconomics (1991).

[12] The study by Caves, Whinston & Hurwitz, *supra* note 11, examined a sample of thirty drugs with patent expiration between 1976 and 1987. There is a significant overlap with our sample, but several of the drugs in their sample experienced initial competition prior to the passage of the Drug Price Competition and Patent Restoration Act in September 1984. They also employ pooled samples throughout their analysis, thereby generally averaging the experiences of the 1970s and early 1980s chronicled by prior researchers (Statman, *supra* note 9; Masson & Steiner, *supra* note 10). Their very different findings on the post-1984 period are reported below. There is no real attempt to isolate the effect of the 1984 Act beyond a general trend variable that is utilized to capture various structural changes during the 1980s. This variable is insignificant for the drug-store market where the lion's share of the sales for the drugs in our sample are made.

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period after entry. Average market price,[16] however, decreases over time as the lower-priced generic products achieve significant gains in market share.

Table 1 provides a summary of our findings for the eighteen drugs. The first row indicates that the average market price declined by a little more than 10 percent per year in the first two years after generic entry. The second row shows that the average pioneer price index rose 7 percent in the first year after entry and an additional 4 percent in the second year

[13] Henry Grabowski & John Vernon, A New Look at the Returns and Risks to Pharmaceutical R&D, 36 Mgmt. Sci. 804 (1990).

[14] For a list of the products and the date of generic entry, see Table A1 in the Appendix. As also shown in Table 1, drugs with patent expiration after 1984 had entry within the same year as or the year immediately after the patent expiration.

[15] IMS America Inc., U.S. Drug Store and Hospital Sales (1983–87) (hereinafter IMS).

[16] Average market price refers to total dollars for pioneers and generics divided by total units.

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