Unilateral Effects with Differentiated Consumer Products: A Response to Scheffman and Simons

Gregory J. Werden

In the April 2010 issue of *The Antitrust Source*, David Scheffman and Joseph Simons identify what they view as a serious flaw in the standard analysis for assessing likely unilateral effects from mergers involving differentiated consumer products.[1] They target the assumption that demand curves are smooth.[2] Their thesis is that this assumption is critical to the prediction of price increases following the merger of competing brands, yet this assumption is empirically unsupportable.

Scheffman and Simons contend that the demand curve for a particular brand is likely to exhibit a sharp kink at the profit-maximizing price,[3] with the quantity demanded significantly more responsive to a small price increase than to a small price decrease. With this sort of kinked demand, they argue, the merger of competing brands might not affect prices.

The kink is hypothesized to derive from the psychology of retail shoppers and the resulting asymmetry in their reactions to price changes. Inspired by the work of psychologists, marketing scientists maintain that shoppers compare prices to internal and external reference values,[4] and they react positively to a price below its reference value and negatively to a price above its reference value. Scheffman and Simons go much further, arguing that the asymmetry in consumer responses to price changes gives rise to a sharp kink in the demand curves faced by manufacturers of consumer products.

For the purposes of this comment, I accept that many shoppers react asymmetrically to price changes, but I presume nothing about the significance of the asymmetry,[5] and I explain below why the asymmetry does not imply a sharp kink in the demand curves faced by manufacturers of consumer products.[6] I also explain that, despite the asymmetry, the standard analysis of unilateral effects provides critical tools that should be used by agencies and courts when assessing proposed mergers involving differentiated consumer products.

■

***Gregory Werden** is Senior Economic Counsel, Antitrust Division, U.S. Department of Justice. The views expressed herein are not purported to reflect those of the U.S. Department of Justice.*

[1] David Scheffman & Joseph Simons, *Unilateral Effects for Differentiated Products: Theory, Assumptions, and Research*, ANTITRUST SOURCE, Apr. 2010, http://www.abanet.org/antitrust/at-source/10/04/Apr10-Scheffman4-14f.pdf.

[2] For a presentation of the standard analysis, see Gregory J. Werden, *Unilateral Competitive Effects of Horizontal Mergers I: Basic Concepts and Models*, *in* 2 ABA SECTION OF ANTITRUST LAW, ISSUES IN COMPETITION LAW AND POLICY 1319 (Wayne Dale Collins ed., 2008).

[3] A "kink" is an abrupt change in the slope of a curve; a "sharp kink" is a change in slope that occurs at a single point.

[4] *See, e.g.*, Tridib Mazumdar, S.P. Raj & Indrajit Sinha, *Reference Price Research: Review and Propositions*, J. MARKETING, Oct. 2005, at 84; Ronald W. Niedrich, Subhash Sharma & Douglas H. Wedell, *Reference Price and Price Perceptions: A Comparison of Alternative Models*, 28 J. CONSUMER RES. 339 (2001).

[5] Empirical research finds small differences between the demand elasticities for price increases and those for price decreases. *See* Sangkil Moon, Gary J. Russell & Sri Devi Duvvuri, *Profiling the Reference Price Consumer*, 82 J. RETAILING 1, 7–8 (2006).

[6] Because the psychology of retail shoppers is relevant only to consumer goods, I consider only mergers involving such goods, and I understand Scheffman and Simons to have done likewise.

The Smooth Demand Assumption

The standard analysis of unilateral effects with differentiated consumer products assumes smooth demand curves at the brand level. Scheffman and Simons assert that this assumption "is not likely to be factually justified,"[7] citing evidence that retail shoppers react asymmetrically to price changes. They reason that a demand curve cannot be smooth if it reflects asymmetric reactions to price changes, but that reasoning is faulty.

Formal theory of consumer behavior with asymmetric reactions does predict kinked demand curves for individual consumers.[8] Empirical evidence, however, indicates that individuals' demand curves do not actually exhibit sharp kinks at prevailing prices. Rather than a sharp kink, empirical research finds "a region of price insensitivity for small increments around a reference price [so] a price change may not be noticed."[9]

More importantly, the demand curves of individual consumers do not matter. The seller of the brand of a differentiated product maximizes its profits with respect to the aggregate demand of all consumers. With inevitable consumer heterogeneity, sharp kinks in individual demand curves are consistent with a smooth aggregate demand curve at the brand level.[10]

Economists sometimes posit that each consumer purchases one unit of a product or none. In this model, the demand curve of an individual consumer has the sharpest possible kink at her "reservation price," the highest price she is willing to pay. Yet the aggregate demand curve is smooth if the population of consumers is characterized by a continuous distribution of reservation prices, which is reasonable to assume when the market has both many, and heterogeneous, consumers.

Brand level demand also can be smooth if individual demand curves are kinked due to asymmetric price reactions. Different shoppers have different information, and they process it differently,[11] so they have a range of reference prices.[12] Indeed, marketing scientists investigating reference prices typically use a choice model that assumes shopper heterogeneity described by a continuous distribution.[13]

A brand level demand curve does not have a sharp kink if the distribution of reference prices is continuous, but it still could be concave, thus exhibiting a proportionately greater quantity response to a discrete price increase than to a discrete price decrease. With smooth, concave demand, asymmetric aggregate price reaction is observed for discrete price changes, yet it does not exist for the infinitesimal price changes involved in the calculus of profit maximization. Hence,

---

[7] Scheffman & Simons, *supra* note 1, at 2.

[8] *See* Daniel S. Putler, *Incorporating Reference Price Effects into a Theory of Consumer Choice*, 11 Marketing Sci. 287, 295 (1992).

[9] Gurumurthy Kalyanaram & Russell S. Winer, *Empirical Generalizations from Reference Price Research*, 14 Marketing Sci. G161, G167 (1995). Kalyanaram and Winer rely on Gurumurthy Kalyanaram & John D. C. Little, *An Empirical Analysis of Latitude of Price Acceptance in Consumer Package Goods*, 21 J. Consumer Res. 408 (1994). Kalyanaram and Little estimate what they term "latitudes of price acceptance" of 8¢ for sweetened drinks and 10¢ for unsweetened drinks, with both categories of drinks having median prices of a bit more than a dollar. *Id.* at 415–16.

[10] *See, e.g.*, Andreu Mas-Colell, Michael D. Whinston & Jerry R. Green, Microeconomic Theory 122–23 (1995).

[11] *See, e.g.*, Donald R. Lichtenstein, Peter H. Bloch & William C. Black, *Correlates of Price Acceptability*, 15 J. Consumer Res. 243 (1988); Moon et al., *supra* note 5.

[12] *See, e.g.*, David R. Bell & James M. Lattin, *Looking for Loss Aversion in Scanner Panel Data: The Confounding Effect of Price Response Heterogeneity*, 19 Marketing Sci. 185 (2000) (finding significant heterogeneity in reference prices); Lakshman Krishnamurthi, Tridib Mazumdar & S.P. Raj, *Asymmetric Response to Price in Consumer Brand Choice and Purchase Quantity Decisions*, 19 J. Consumer Res. 387 (1992) (identifying different customer types and finding that they respond differently to price changes); Moon et al., *supra* note 5 (same).

[13] *See, e.g.*, Kalyanaram & Little, *supra* note 9, at 410–11; Moon et al., *supra* note 5, at 2–3; Putler, *supra* note 8, at 296–98.

a concave brand level demand curve reflecting asymmetric price reactions can be differentiable at every point.[14]

Economists are eager to consider any demand scenario presented in the real world, but smooth demand curves provide an arbitrarily close approximation to whatever the real world presents. For example, output is discrete in the real world, but a continuous demand curve provides a sufficiently close approximation. A smooth demand curve can reflect asymmetric price reactions, so there is no reason to assume a sharp kink.

Scheffman and Simons argue that rivals' responses to price changes also provide a reason to believe there is a sharp kink in brand level demand curves. This argument, however, has fatal flaws.

First and foremost, Scheffman and Simons mistakenly focus on "residual" demand curves. In fact, standard analysis of unilateral effects analysis with differentiated consumer products uses ordinary "Marshallian" demand curves. Marshallian demand curves are constructed under the assumption that all other prices are held constant, while residual demand curves incorporate responsive price changes by rivals. Nearly all economic analysis is performed using Marshallian demand curves.

Second, within the context of the economic model used to analyze unilateral effects with differentiated consumer products,[15] the only potential cause of asymmetric price responses by the merged firm's rivals is that their demand curves have sharp kinks, yet there is no reason to suppose sharp kinks in those demand curves (as discussed above). Profit maximization with respect to smooth demand curves does not produce asymmetric responses to one competitor's price changes by other competitors.

Third, if rivals did not respond to price increases, the implication would not be that the merged firm faces a sharply kinked demand curve. Rather, the implication would be that the analysis of unilateral effects is very simple. Without rivals' responses, the analysis of unilateral effects converges with the analysis of market delineation. Price responses are assumed away when applying the hypothetical monopolist test, and the relevant market is delineated even with differentiated consumer products.

Finally, Scheffman and Simons attribute excessive importance to the merged firm's rivals. Standard analysis of unilateral effects with differentiated consumer products does account for the responses of rivals. Nevertheless, price increases by non-merging rivals normally make a small contribution to the post-merger, market-wide, average increase in price.[16]

If demand is smooth, and there is no general reason to believe otherwise, the predictions of standard analysis remain valid. When a merger brings competing brands of a differentiated product under common ownership and control, competition between them is eliminated. To whatever extent either brand had constrained the pricing of the other, that constraint is lifted, so the product's price increases (absent offsetting effects from the merger). Moreover, when useful in the process of

---

[14] Marketing scientists posited, and estimated, brand level demand curves with asymmetric aggregate price response and found a substantial range of prices within which there is no aggregate asymmetry. *See* Koen Pauwels, Shuba Srinivasan & Philip Hans Franses, *When Do Price Thresholds Matter in Retail Categories?*, 26 MARKETING SCI. 83 (2007).

[15] Scheffman and Simons allude to the kinked oligopoly demand curve, which relates to coordinated effects. Scheffman & Simons, *supra* note 1, at 7–8. Although coordinated effects could be a distinct reason for post-merger price increases, I consider only unilateral effects but note that the concept of kinked oligopoly demand curve has vocal detractors. *See* George J. Stigler, *The Literature of Economics: The Case of the Kinked Oligopoly Demand Curve*, 16 ECON. INQUIRY 185 (1978).

[16] *See, e.g.*, Gregory J. Werden & Luke M. Froeb, *The Effects of Mergers in Differentiated Products Industries: Logit Demand and Merger Policy*, 10 J.L. ECON. & ORG. 407, 413, 418 (1994).

predicting likely price increases, the elasticity of demand for a relevant product can be inferred from the product's price-cost margin (and vice versa). For a differentiated consumer product (sold by a single-product firm) the price-cost margin can be expected to be roughly equal to the reciprocal of its elasticity of demand.

The Scheffman-Simons Example

Scheffman and Simons also argue that a merger could eliminate significant competition between two brands, yet not lead to price increases, because neither brand actually constrained the pricing of the other. They present an example in which each merging brand faces competition from an excellent substitute (not controlled by the merger partner) at prevailing prices, so a small price increase would cause a large reduction in sales. They nominate private label products as candidates for the excellent substitutes.[17]

Scheffman and Simons do not claim this example finds support in empirical research on competition between private labels and major brands. Nor do they present the example as a necessary implication of asymmetric consumer reactions to price changes. Scheffman and Simons do, however, observe that this example is impossible if brand level demand curves are smooth.[18] With smooth demand, competition between merging brands necessarily affects their profit-maximizing prices, and the standard analysis correctly identifies the importance of that competition.

Contrary to the apparent suggestion of Scheffman and Simons, the government should not be required to address their example. If the key pricing consideration for the merging firms were the prospect of massive substitution to an existing product of a non-merging firm, their documents should vividly portray that fact. The failure of the merging firms to trumpet such documents (or comparable evidence) is proof enough that an existing excellent substitute sold by a non-merging firm is not the key consideration in pricing.

Significant competition between merging and non-merging brands, while very common, is far from sufficient to make the Scheffman and Simons example relevant. With heterogeneous consumer preferences, a merging brand faces competition from many substitutes, as econometric studies invariably find. The standard analysis of mergers with differentiated products accounts for competition with all of the substitutes.

Finally, if the facts of a particular case did match up with the Scheffman and Simons example, the standard analysis still could be applied, although not with calculus. The economic model used to predict unilateral effects applies with any demand and cost curves.[19] If calculus cannot be used, it is simple to compute the merged firms' profits at thousands of price combinations, then plot those profits against the prices. Similar analysis sometimes is necessary in market delineation, for example, if a hypothetical monopolist would shut down discrete blocks of productive capacity.[20]

---

[17] Scheffman & Simons, *supra* note 1, at 2–3 & n.8.

[18] *Id.* at 2–3.

[19] Scheffman and Simons also argue that cost curves might not be smooth. *Id.* at 5. That is both true and empirically relevant, but I am not aware of a single example in a merger case involving differentiated consumer products.

[20] *See* Gregory J. Werden, *Beyond Critical Loss: Tailored Application of the Hypothetical Monopolist Test*, 4 COMPETITION L.J. 69 (2005). The analysis can reveal that a hypothetical monopolist would impose a large price increase even if a small price increase is unprofitable.

Unilateral Effects with Asymmetric Consumer Reactions

Contrary to the contention of Scheffman and Simons, asymmetric reactions to price changes are not likely to be of significance in the assessment of the likely unilateral effects of a differentiated products merger. As an empirical matter, shopper psychology does not prevent price increases for consumer products when changes in the economic environment alter the profit-maximizing level of prices. Shopper psychology might affect precisely how price increases are implemented, but antitrust law should not be concerned with such details.

As an empirical matter, shopper psychology does not prevent price increases for consumer products when changes in the economic environment alter the profit-maximizing level of prices.

At the outset, it is must be appreciated that marketing science finds that the impact of shopper psychology is negligible in the long term,[21] and that is just what Scheffman and Simons implicitly assume. They explicitly assume that pre-merger prices are at profit-maximizing levels,[22] yet today's prices could be at profit-maximizing levels only if they had changed in the past following changes in the economic environment. Cost shocks, new product introductions, and mergers all cause the profit-maximizing prices to change.

Shopper psychology might well affect how retail prices are adjusted with changes in the economic environment, but the empirical evidence clearly indicates that retail prices are adjusted when costs change.[23] And contrary to the apparent implication of asymmetric reactions to price changes, empirical research typically finds that prices respond to cost increases more rapidly than to cost decreases.[24] Moreover, a recent study found that supermarkets frequently impose small price increases that likely are not cost related.[25]

What marketing science actually teaches is that manufacturers should account for shopper psychology in deciding exactly how to increase prices.[26] According to an authority on which Scheffman and Simons rely, the "[a]symmetric price response effect suggests that retailers and manufacturers have to devise careful strategies while raising the price of a brand. One approach may be to raise price in small increments so that consumers can be forced to adapt to higher reference prices."[27]

If need be, a manufacturer of consumer products also has other ways to deal with shopper psychology in implementing a post-merger price increase. It can, for example, reduce the amount of product contained in standard package sizes or it can reduce the frequency or extent of temporary price promotions. It also could increase average revenue per unit without affecting retail prices. Slotting allowances or other fixed fees are common in transactions between manufactur-

---

[21] *See* Gadi Fibich, Arieh Gavious & Oded Lowengart, *The Dynamics of Price Elasticity of Demand in the Presence of Reference Price Effects*, 33 J. Acad. Marketing Sci. 66 (2005).

[22] Scheffman & Simons, *supra* note 1, at 5.

[23] *See* David Besanko, Jean-Pierre Dubé & Sachin Gupta, *Own-Brand and Cross-Brand Retail Pass-Through*, 24 Marketing Sci. 123 (2005) (estimating retailer pass-through rates for cost changes).

[24] *See, e.g.*, Sam Peltzman, *Prices Rise Faster than They Fall*, 108 J. Pol. Econ. 466 (2000); John Geweke, Report to the FTC, Issues in the "Rockets and Feathers" Gasoline Price Literature (Mar. 16, 2004), *available at* http://www.ftc.gov/bc/gasconf/comments2/gewecke2.pdf.

[25] Haipeng (Allan) Chen, Daniel Levy, Sourav Ray & Mark Bergen, *Asymmetric Price Adjustment in the Small*, 55 J. Monetary Econ. 728 (2008).

[26] Marketing science also explores the effect of asymmetric consumer reactions on pricing dynamics. *See* Gadi Fibich, Arieh Gavious & Oded Lowengart, *Optimal Price Promotion in the Presence of Asymmetric Reference-Price Effects*, 28 Managerial & Decision Econ. 569 (2007).

[27] Kalyanaram & Winer, *supra* note 9, at G167.

ers and retailers. A merged manufacturer might adjust only the fixed fee and not affect retail prices.[28] The FTC successfully argued just that in the baby food case.[29]

Any presumption of significant anticompetitive effects from the merger of competing sellers of differentiated consumer products arises, not from economic theory, but rather from the demonstration that a proposed merger eliminates an important competitive force.

For all of the foregoing reasons, asymmetric reactions to price changes should not be of concern in assessing the likely unilateral effects of a merger involving differentiated consumer products. Whatever impact the asymmetry might have, it is not of antitrust significance.

Conclusions

Shoppers might react asymmetrically to price changes, but that does not imply that brand level demand curves have sharp kinks. Nor do the teachings of marketing science on asymmetric reactions by shoppers undermine the utility of the basic insights and tools provided by economic theory for assessing the likely competitive effects of differentiated consumer products mergers.

Scheffman and Simons react to what they characterize as a proposal to presume anticompetitive effects on the basis of economic theory.[30] That characterization, however, distorts the roles played by theory and evidence. Any presumption of significant anticompetitive effects from the merger of competing sellers of differentiated consumer products arises, not from economic theory, but rather from the demonstration that a proposed merger eliminates an important competitive force. That elimination is a substantial lessening of competition in violation of Section 7.

The test of a theory is whether it predicts, and the best evidence indicates that mergers of competing manufacturers of differentiated consumer products have led to increases in the retail prices of their products over the short term.[31] More such evidence is welcome, and it could prove valuable in evaluating methods for predicting unilateral merger effects, but for now the weight of evidence is that the prediction of Scheffman and Simons—that mergers of competing brands of differentiated consumers products do not lead to price increases—is not borne out. ●

---

[28] For an analysis of mergers allowing for such effects, see Luke Froeb, Steve Tschantz & Gregory J. Werden, *Vertical Restraints and the Effects of Upstream Horizontal Mergers*, *in* The Political Economy of Antitrust 369 (Vivek Ghosal & Johann Stennek eds., 2007).

[29] *See* FTC v. H.J. Heinz Co., 246 F.3d 708, 718–19 (D.C. Cir. 2001).

[30] Scheffman & Simons, *supra* note 1, at 1 & n.4.

[31] *See* Orley Ashenfelter & Daniel S. Hosken, *The Effect of Mergers on Consumer Prices: Evidence from Five Selected Case Studies*, J.L. & Econ. (forthcoming), *available at* http://ssrn.com/abstract=1106585.