

# Unilateral Effects with Differentiated Consumer Products: A Response to Werden

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In the April 2010 issue of *The Antitrust Source*, we explained that the theoretical economic models underlying the Merger Guidelines' treatment of unilateral effects for differentiated products make a technical mathematical assumption ("differentiability") that leads to a mathematical result that the own-price elasticity of demand can be computed using only the margin (i.e., the "Lerner Equation").<sup>1</sup> This mathematical result, in turn, leads to the general result that *all* horizontal mergers involving "differentiated products" are predicted to increase prices due to anticompetitive unilateral effects, absent offsetting efficiencies. This extreme result is a mathematical theoretical curiosity, not an acceptable basis for a presumption.<sup>2</sup> As we explained, the technical assumption and its result are contradicted by empirical consumer and economic research and by everyday experience. In his June 2010 response to our article, Gregory Werden challenged some of our analysis with respect to research on consumer demand, asymmetric competitor responses, and the significance of our example of "kinked demand."<sup>3</sup> We now reply.

## Research on Consumer Demand

In our article, we discussed research that establishes that the demand functions for consumer products are likely to have kinks, which violates the assumption of differentiability. Werden agrees that "formal theory of consumer behavior with asymmetric reactions does predict kinked demand curves for individual consumers."<sup>4</sup> Werden, however, challenges the empirical support for and/or the significance of kinks. He states: "Empirical research finds small differences between the demand elasticities for price increases and those for price decreases."<sup>5</sup> Yet Werden's statement is based on only one paper, which studied one product, toilet tissue, based on data from 341 households in Sioux Falls, South Dakota, and which used a model specific to that paper.<sup>6</sup> In our article we focused on sources from which basic, general conclusions could be drawn.<sup>7</sup>

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<sup>1</sup> 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>.

<sup>2</sup> We do not take the position that mergers of competing brands of differentiated consumer products never lead to price increases. Individual mergers may very well do so. Rather, theory and empirical research do not support a presumption that such mergers, generally, are anticompetitive absent offsetting efficiencies.

<sup>3</sup> Gregory J. Werden, *Unilateral Effects with Differentiated Consumer Products: A Response to Scheffman and Simons*, ANTITRUST SOURCE, June 2010, <http://www.abanet.org/antitrust/at-source/10/06/Jun10-Werden6-24f.pdf>.

<sup>4</sup> *Id.* at 2.

<sup>5</sup> *Id.* at 1 n.5.

<sup>6</sup> Sangkil Moon et al., *Profiling the Reference Price Consumer*, 82 J. RETAILING 1, 4 (2006).

<sup>7</sup> For example, one of our main sources was a survey of research on the theory and evidence relevant to asymmetric consumer responses. See Gurusurthy Kalyanaram & Russell S. Winer, *Empirical Generalizations from Reference Price and Asymmetric Price Response Research*, 14 MKTG. SCI. G161 (1995).

With respect to kinks specifically, Werden states: “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.’”<sup>8</sup> There are a number of issues with Werden’s interpretation of the articles he cites for this statement. If price changes are “not noticed,” there is little or no demand response and the demand curve is thus highly inelastic in that region. If this is the case, the Lerner Equation cannot be satisfied, since margins will not be consistent with highly inelastic demand. The primary paper cited by Werden estimates demand curves that have at least two kinks.<sup>9</sup> Around the current equilibrium price the demand curve is highly inelastic, and outside this range, demand is less elastic for price increases than decreases.<sup>10</sup>

Werden also argues that “with inevitable consumer heterogeneity, sharp kinks in individual demand curves are consistent with a smooth aggregate demand curve at the brand level.”<sup>11</sup> This is a theoretical possibility. What is more likely is that there are a relatively small number of types of consumers (types driven by historical experience with prices that are likely to be common within groups of consumers). This is the typical approach in marketing research. In such a situation, for example, if some of the consumer types have kinks and/or highly inelastic sections (“latitude of price acceptance”), then the aggregate demand curve will have a number of “sharp” kinks.

Finally, Werden states: “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.”<sup>12</sup> This is also taken from a single paper. This paper assumes a model in which demand is “smooth,” i.e., differentiable.<sup>13</sup> The paper also has the counterintuitive result that demand is more elastic for price cuts than price increases.<sup>14</sup>

What should be clear from this discussion is that there is enough evidence of asymmetric price responses by consumers to make the *assumption* of the Lerner Equation untenable.

### Asymmetric Competitor Responses

Next Werden addresses our second example of why the Lerner Equation may not hold—asymmetric responses by competitors. Werden states:

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.<sup>15</sup>

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<sup>8</sup> Werden, *supra* note 3, at 2.

<sup>9</sup> Gurumurthy Kalyanaram & John D.C. Little, *An Empirical Analysis of Latitude of Price Acceptance in Consumer Package Goods*, 21 J. CONSUMER RES. 408 (1994).

<sup>10</sup> “Three components of the linear model center on the PR (the reference price): a hypothesized *flat* [vertical] place equal in width to the latitude of acceptance around the reference price and two negatively sloping pieces, one on each side. *See id.* at 412 (emphasis added). Marketing researchers generally put price on the horizontal axis, so that “flat” means vertical for an economist’s depiction of a demand curve.”

<sup>11</sup> Werden, *supra* note 3, at 2.

<sup>12</sup> *Id.* at 3 n.14.

<sup>13</sup> “In this model, we incorporate *smooth* transitions of price elasticity between an ‘inner’ regime close to the benchmark and ‘outer’ regimes of gains and losses.” Koen Pauwels et al., *When Do Price Thresholds Matter in Retail Categories?*, 26 MARKETING SCI. 83, 88 (2007) (emphasis added).

<sup>14</sup> *Id.* at 92.

<sup>15</sup> Werden, *supra* note 3, at 3.

In fact, the theoretical economic models of differentiated products do compare the pre-merger equilibrium to the potential effects of the merger. The pre-merger equilibrium necessarily involves residual demands and reaction functions.<sup>16</sup>

### **More on the Assumption of Differentiability—Margins and Demand Elasticities**

According to the Lerner Equation, there is an exact equation linking margins and own-price elasticity. However, economic theory, financial economics and accounting, and common sense make clear that the most important determinant of margins is cost structure, specifically the mix of fixed and variable costs. This is yet another reason why assumption of the Lerner Equation is not likely to be valid. There are many business models for consumer products firms (and for firms in other industries also). Some firms produce their products from primary inputs, e.g., primary food products, such as wheat and milk, for branded consumer food products, using highly automated (low variable labor) manufacturing processes. Typically, for such firms, a substantial percentage of their costs would be fixed. Other firms have other producers make their products for them, i.e., use contract manufacturing. For such firms, typically, a significantly smaller percentage of their costs would be fixed. Obviously, this comparison is much broader than the consumer goods industry. In many industries, firms vary significantly in their degree of vertical integration. Thus, margins will differ due to differences in cost structure, having nothing to do with demand conditions.

Firms also differ in the extent to which they are vertically integrated into distribution. Some self-distribute, with much of their costs being fixed, and others use third-party distribution, where most of their costs are variable. Again, margins differ due to cost structure, having nothing to do with demand conditions. For example, we could have two otherwise similarly situated firms—e.g., both selling corn flakes—that would have quite different cost structures and therefore quite different margins. One is vertically integrated in manufacturing and distribution, and one is not. Holding other things constant, the vertically integrated firm is necessarily going to have significantly higher margins than the non-integrated firm. But according to the fundamental prediction of theoretical differentiated products models (including Farrell-Shapiro's Upward Pricing Pressure, or UPP), other things equal, the firm with significantly higher variable costs should have significantly higher prices. Of course this is highly implausible. And it is not consistent with what we observe about actual products.

What is perhaps even more striking is that in the consumer goods products industry (among others), shifting between self-manufacture and contract manufacture occurs with some frequency. The theoretical differentiated products models, however, predict that such movements should lead to substantial changes in price—even though there is only a change in cost structure, with no change in demand. We are not aware of any evidence supporting the general conclusion of the differentiated products models. Finally, many industries, such as packaged software, have high margins. For example, a specific home financial management software product that is not one of the top sellers likely has high margins (since most costs are likely to be fixed), but it is implausible that such a product has relatively inelastic demand. Other examples include the corner hot dog vendor, restaurants, and men's and women's clothing stores.

Examples like these make clear that inferring demand elasticities from margins is not likely to be valid. Since the predictions of the various theoretical differentiated products models, includ-

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<sup>16</sup> The use of residual demand is appropriate where competitors react to pricing of their rivals. See Joseph Farrell & Carl Shapiro, *Improving Critical Loss Analysis*, ANTITRUST SOURCE, Feb. 2008, at 7, <http://www.abanet.org/antitrust/at-source/08/02/Feb08-Farrell-Shapiro.pdf>. Of course, most mergers of interest to the antitrust authorities would fall into this category.

ing UPP, depend fundamentally on the Lerner Equation, those models cannot, as a matter of empirical economics or public policy, provide a basis for presumptions about anticompetitive effects. If the plaintiff in an antitrust case puts forward the theoretical differentiated products models and/or attempts to create a presumption of anticompetitive effects based primarily on margins and diversions, in our opinion this will likely stimulate a battle of economic experts, in which the plaintiff's expert will usually lose.<sup>17</sup>

Finally, Werden writes: "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."<sup>18</sup> We believe the arguments relating to our discussion of margins are also clearly relevant to the use of the Lerner Equation for industrial and commercial products and services.

### Concluding Comments

We stand by the fundamental conclusions of our earlier article. To summarize, the theoretical economic models of product differentiation are based on a technical mathematical assumption (i.e., differentiability) leading to the Lerner Equation. The assumption and the Lerner Equation are not likely to be valid as a general matter. Thus, neither the Lerner Equation nor the models upon which it is based can be used to create general presumptions in merger analysis.

Werden raises arguments that at most indicate that in some specific circumstances the assumption of differentiability and the resultant Lerner Equation may hold close enough that the conclusions of the models may be approximately correct. We do not disagree that this may be the case in some specific circumstances. However, the weight of the existing research and relevant analyses indicate that, as a general matter, the assumption of differentiability and the resultant Lerner Equation are not likely to hold. This should not be surprising. What would be very surprising is that as a general matter with differentiated products each competitor necessarily uniquely constrains the prices of every other competitor.

As discussed in our earlier article, we agree that diversions between the merging parties may affect the incentives of the merged firm post-merger. However, this is the case for most horizontal mergers, since there will generally be diversions between the parties in the event of a small but significant nontransitory increase in price (i.e., a SSNIP). But, this does not lead to a presumption that the parties to the merger uniquely constrain each other's prices, since the constraints posed by other competitors may nonetheless make an anticompetitive price increase unprofitable. ●

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<sup>17</sup> This is borne out by the litigation of *Swedish Match* discussed in our previous paper. *FTC v. Swedish Match*, 131 F. Supp. 2d 151, 161 (D.D.C. 2000).

<sup>18</sup> Werden, *supra* note 3, at 1 n.6.