CHAPTER 14

Vertical Restraints and the Effects of
Upstream Horizontal Mergers

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Abstract
The downstream effects of mergers between manufacturers of differentiated consumer products are partly determined by the relationship between the merging manufacturers and retailers. The relationship may be such that the retail price effects of the merger are exactly those if the manufacturers sold directly to consumers, and that relationship may be such that the merger produces similar effects with subtle differences, including the possibility of price decreases for non-merging products. Alternatively, that relationship may be such that consumer prices do not change following a merger.

Keywords: vertical restraints, pass-through, mergers, retailing

JEL classifications: L41, L44

14.1. Introduction
Formal modeling of merger price effects has become a standard tool of analysis. A conventional oligopoly model, calibrated to fit the particular industry under review, is often used to assess the likely price effects of proposed mergers. As applied to mergers involving differentiated consumer products, this tool was endorsed by the recent court decision in the Oracle case (2004, p. 1122). To analyze competition among differentiated consumer products, economists generally use a Bertrand model, in which equilibrium is reached when all competitors are

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happy with their prices, given rivals’ prices. A merger internalizes the competition among substitutes brought together by the merger, causing the merged firm to prefer higher prices. Non-merging rivals may prefer higher prices as well when the prices of the merging products rise.

Although the conventional Bertrand model assumes that competing manufacturers sell directly to final consumers, manufacturers normally sell to retailers, which then resell to final consumers. In litigated cases, that scenario most often has arisen with products sold primarily through supermarkets, as in the Coca-Cola (1986), Heinz (2001), Kraft (1995), and Swedish Match (2000) cases. The Federal Trade Commission challenged Coca-Cola’s proposed acquisition of Dr Pepper involving carbonated beverages, Swedish Match’s proposed acquisition of National Tobacco Co. involving snuff, and H.J. Heinz’s proposed acquisition of the baby food division (Beech-Nut) of Milnot Holding Corp. The State of New York challenged Kraft’s acquisition of Nabisco involving breakfast cereal. A larger number of uncontested merger challenges have presented much the same scenario, including the Justice Department’s challenge to a merger involving white bread, details from which are presented by Werden (2000) and are used below in an illustrative example. Of course, a supermarket is just one type of retailer that sells products manufactured by others, and the Justice Department’s challenge to the merger of leading manufacturers of fountain pens, in the Gillette (1993) case, involved specialized pen stores.

Werden et al. (2004) argue at length that the use of a Bertrand model to assess the price effects of differentiated products mergers is warranted only if the model can be said to fit the industry. As Werden (2005) explains, this does not mean that the model must accurately capture all of the institutional details of an industry, but rather that the model explains well for the recent past whatever it is being relied on to predict for the future. Hence, it is important to ask whether a Bertrand model without a retail sector can satisfactorily explain the pricing of differentiated consumer products sold through retailers independent of the manufacturers in the model. Ignoring the retail sector in analyzing a manufacturer merger obviously presents no problem if retailers apply a fixed percentage markup to wholesale prices. In that event, the demand elasticities at the wholesale level are the same as those at the retail level, so a Bertrand model explains wholesale and retail prices without any explicit consideration of the retail sector. Evidence of fixed percentage retail margins justified reliance on a Bertrand model in the bread merger discussed by Werden (2000).

Fixed percentage margins may accurately describe the facts in some cases, but economic theory does not suggest that retailers normally behave in such a manner, and we consider the implications of alternative behavior. In particular, we examine three game theoretic models of the wholesaler and retailer relationship, and to avoid the enormous complexity that can arise in models of the retail sector, we consider only the case of a monopoly retailer. O’Brien and Shaffer (2005) consider two of the same models in analyzing other issues associated with mergers between manufacturers. These models provide an intuitive under-
standing of how the nature of the game played between manufacturers and a retailer influences the price effects of manufacturer mergers.

In one game the retail sector is transparent—manufacturers’ mergers have exactly the effects they would have if there were no retail sector separating merging manufacturers from final consumers. Thus, a Bertrand model without any consideration of the intervening retail section explains pricing perfectly. For another of these games, the retail sector matters, but ignoring the retail sector may not result in a significantly misleading analysis of a merger’s effects. For the remaining game, however, ignoring the retail sector results in a highly misleading analysis. The retail sector in that game is “opaque”—consumers see no change in retail prices following the manufacturers’ merger. Rather, the merger results in a lump-sum profit transfer from the retailer to the manufacturer. This transfer may present much the same antitrust concerns as retail price increases, and the court of appeals found unlawful the proposed merger of baby food manufacturers in the Heinz case (2001) primarily because the court concluded that the merger was likely to produce such a transfer.

Our analysis shows that careful consideration of the retail sector is important in assessing the likely effects of mergers of manufacturers selling differentiated products through retailers. Stronger conclusions are unwarranted on the basis of our analysis because real-world retailers are rarely monopolists, as assumed here, but rather compete on selection, price, and convenience. It is an open question how our results extend to an oligopoly retail sector. What is clear is that the implications of a merger are apt to be quite different when the relationship between manufacturers and retailers resembles the game with the opaque retail sector than when it resembles either of the other games.

14.2. Game I: Transparent retail sector

We assume that Bertrand competitors manufacture differentiated products subject to constant marginal costs. Our exposition of the model considers just two products, but the analysis is easily extended, which we do in a numerical example. Manufactured products are marketed to final consumers through a monopoly retailer, which incurs no costs apart from payments to the manufacturers. Consumer demand is a function of retail prices. Wholesale and retail prices are the outcome of a noncooperative bargaining game played by the retailer and the manufacturers, with full knowledge of all demand and cost functions. Villas-Boas (2004) and Sudhir (2001) consider similar models in empirical attempts to determine which model best fits particular industries.

We denote the retail prices of products 1 and 2 as $p_1$ and $p_2$, and the consumer demand functions as $q_1(p_1, p_2)$ and $q_2(p_1, p_2)$. Manufacturers present the retailers with a (differentiable and increasing) function, $W_i(q_i)$ ($i = 1, 2$), which gives the retailer’s total cost for any given quantity purchased. The marginal wholesale price to the retailer purchasing $q_i$ is $W_i'(q_i) = w_i$.

The retailer maximizes its profit

$$\pi_r = p_1q_1 - W_1(q_1) + p_2q_2 - W_2(q_2)$$

(14.1)
by setting retail prices to satisfy the first-order conditions

\[ 0 = \frac{\partial \pi_r}{\partial p_1} = q_1 + (p_1 - w_1) \frac{\partial q_1}{\partial p_1} + (p_2 - w_2) \frac{\partial q_2}{\partial p_1}, \]  
\[ (14.2) \]

\[ 0 = \frac{\partial \pi_r}{\partial p_2} = q_2 + (p_1 - w_1) \frac{\partial q_1}{\partial p_2} + (p_2 - w_2) \frac{\partial q_2}{\partial p_2}. \]  
\[ (14.3) \]

The retailer’s pricing decision depends only on final demand and the marginal wholesale prices at the equilibrium quantities, which the manufacturers can set arbitrarily.

The bargaining game between manufacturers and the retailer over the division of the profits is indeterminant without additional assumptions. We assume that:

(i) the retailer does not carry a product on which it loses money, and
(ii) the retailer must carry a product on which it does not lose money.

The second assumption implies that the retailer has no bargaining power. Together, these assumptions imply that \( W_i(q_i) = p_i q_i \), i.e., in equilibrium, the retailer passes all profit back to the manufacturers. Under these assumptions, perfect competition among retailers would produce essentially the same result as with a monopoly retailer.

Manufacturer \( i = 1, 2 \) has marginal cost \( c_i \) and sets its marginal wholesale price to maximize

\[ \pi_i = W_i(q_i) - c_i q_i. \]  
\[ (14.4) \]

With all profit going to the manufacturers, \( W_i(q_i) = p_i q_i \) in equilibrium, and the first-order conditions are

\[ 0 = q_i + (p_i - c_i) \frac{\partial q_i}{\partial p_i}. \]  
\[ (14.5) \]

These are the usual first-order profit-maximization conditions in a Bertrand model: The manufacturers choose marginal wholesale prices that induce the retailer to set its prices at the levels that would prevail if the manufacturers sold directly to final consumers. The manufacturers also set fixed fees to extract all of the retailer’s profit.

Subtracting Equation (14.5) for manufacturer 1 from Equation (14.2), and Equation (14.5) for manufacturer 2 from Equation (14.3), yields the equilibrium conditions

\[ 0 = (c_1 - w_1) \frac{\partial q_1}{\partial p_1} + (p_2 - w_2) \frac{\partial q_2}{\partial p_1}, \]  
\[ (14.6) \]

\[ 0 = (p_1 - w_1) \frac{\partial q_1}{\partial p_2} + (c_2 - w_2) \frac{\partial q_2}{\partial p_2}. \]  
\[ (14.7) \]

If products 1 and 2 are substitutes, the cross-price derivatives of the demand functions are positive, while the own-price derivatives are negative. Since retail prices are greater than wholesale prices, the wholesale marginal prices to the retailer must be less than the manufacturers’ marginal costs.
wholesale prices may need to be negative if the cross-price demand derivatives are large enough. (Of course, there may be legal or practical limits on wholesale pricing schemes.) The equilibrium wholesale marginal prices can be computed by solving Equations (14.6) and (14.7) simultaneously for $w_1$ and $w_2$.

When the manufacturers merge, they internalize price competition between their products. The merged manufacturer sets marginal wholesale prices equal to its marginal costs to induce the retailer to set retail prices that maximize total profit on both products. The resulting effect on prices paid by consumers is the same as would occur if the manufacturers sold directly to consumers (e.g., Werden and Froeb, 2006). The manufacturers capture this entire profit by setting $W_i(q_i)$ at the equilibrium quantities equal to the total revenue.

### 14.3. Game II: Opaque retail sector

In Game II, the retailer may carry both products 1 and 2, carry just product 1, carry just product 2, or carry neither product. The first option is “joint dealing,” and middle two options are “exclusive dealing.” The possibility of exclusive dealing gives the retailer some bargaining power and allows it to earn positive profits. Because this game has been analyzed by Shafer (1991), O’Brien and Shaffer (1997), and Bernheim and Whinston (1998), we only sketch the equilibrium.

Crucial to this equilibrium is the assumption that manufacturers can offer contingent contracts to the retailer, i.e., each manufacturer can offer two different wholesale price functions—one with, and one without exclusivity. Because exclusive dealing in product $i$ likely results in a higher equilibrium quantity for product $i$ than would joint dealing, a single continuous wholesale price function may effectively serve as a contingent contract.

The retailer selects the offer providing the greatest profit. If marginal costs and consumer demand are known, the competitive process operates somewhat like a private-values English auction: Either manufacturer may obtain an exclusive arrangement with the retailer by offering slightly more profit than the other manufacturer can afford to offer. This competition, however, is more complex than a simple auction for exclusivity because the retailer can engage in joint dealing and collect payments from both manufacturers.

What matters to the retailer in setting retail prices is the marginal wholesale price, so without loss of generality, we limit consideration to linear contingent contracts. Let $W_i^J(q_i) = a_i^J + b_i^J q_i$ be the offer by wholesaler $i$ for quantity $q_i$ with joint dealing, and let $W_i^E(q_i) = a_i^E + b_i^E q_i$ be its offer with exclusive dealing. The $a$ coefficients determine how the retailer and manufacturer split profits and the $b$ coefficients are the marginal wholesale prices, which determine the retailer’s prices. Let the $q_i^J$ be the demand for each product with joint dealing, while the $q_i^E$ are the demands with exclusive dealing. The total profits available in the three scenarios are: $T_E = (p_i^E - c_1)q_i^E$, $T_E = (p_2^E - c_2)q_2^E$, and $T_J = (p_1^J - c_1)q_1^J + (p_2^J - c_2)q_2^J$. 

In equilibrium, each manufacturer sets its marginal wholesale price equal to its marginal cost, and adjusts the price of initial units (essentially a fixed fee) to extract as much profit as possible. Retail prices and quantities depend on which of its four options the retailer selects. With exclusive dealing, the equilibrium yields the single-product monopoly price and quantity, while with joint dealing, the equilibrium yields the two-product monopoly prices and quantities.

If the total profits from exclusivity were higher than those from joint dealing, one manufacturer would outbid the other for exclusivity. As in an auction, this manufacturer would “pay” the retailer a price equal to the profits the retailer could have earned from an exclusive deal with the other manufacturer. Because products 1 and 2 are substitutes, however, joint dealing must be more profitable to the retailer than exclusive dealing, and the joint dealing profit is likely to be less than the sum of the two exclusive dealing profits. Each manufacturer must “outbid” the retailer’s option of exclusive dealing with the other, so in equilibrium, each earns a profit equal to its marginal contribution to total profits.

If \( T_J \) is greater than \( T_{E1} \) and \( T_{E2} \) but less than \( T_{E1} + T_{E2} \), the retailer sells both products, manufacturer 1 realizes \( T_J - T_{E2} \), and manufacturer 2 realizes \( T_J - T_{E1} \), leaving \( T_{E1} + T_{E2} - T_J \) for the retailer.

In the foregoing scenarios, retail prices always maximize total profits. Since the retailer continues to maximize total profits after a merger of the manufacturers, the effects of such a merger are not seen by consumers, so we say that the retailing sector is “opaque.” Manufacturers’ mergers do not affect retail prices but instead shift rents from the retailer to the merging manufacturers as a consequence of the fact that the manufacturers’ joint marginal contribution to total profits is greater than the sum of their individual marginal contributions. This is essentially what the court of appeals found would be the effect of the proposed merger of baby food manufacturers in the *Heinz* case (2001, pp. 712, 718–19).

### 14.4. Game III: Double marginalization

If the manufacturers are constrained (e.g., by law) to offer a wholesale price independent of quantity supplied, the familiar double marginalization problem arises. The retailer acts as a monopolist with marginal costs equal to the wholesale prices set by the manufacturers. The retailer maximizes profit by setting retail prices satisfying the first-order conditions in Equations (14.2) and (14.3). The manufacturers perceive a derived wholesale demand function based on the reaction of the retailer to their wholesale prices, and in Bertrand equilibrium, they price above their marginal costs of production.

Let \( p_1^*(w_1, w_2) \) and \( p_2^*(w_1, w_2) \) be the retailer’s optimal prices as functions of wholesale prices in accord with the retailer’s first-order conditions, and let \( q_1^*(w_1, w_2) = q_1(p_1^*, p_2^*) \) and \( q_2^*(w_1, w_2) = q_2(p_1^*, p_2^*) \) be the quantities sold to consumers at these prices. The manufacturers maximize profits, \( \pi_i = (w_i - c_i)q_i^* \), by setting wholesale prices satisfying the first-order conditions

\[
0 = \frac{\partial \pi_i}{\partial w_i} = q_i^* + (w_i - c_i)\frac{\partial q_i^*}{\partial w_i}.
\]

(14.8)
In equilibrium
\[ \frac{w_i - c_i}{w_i} = \frac{-1}{\eta_{ii}}, \]  
where
\[ \eta_{ij} = \frac{\partial q_i^*}{\partial w_j} \frac{w_j}{q_i^*} \]  
are the wholesale price elasticities for the manufacturers’ derived demands. The pass-through rates from wholesale to retail prices,
\[ \mu_{ij} = \frac{\partial p_i^*}{\partial w_j}, \]  
are derived by differentiating the retailer’s first-order conditions with respect to \( w_j \). Equilibrium can be computed by simultaneously solving the resulting four equations for \( \mu_{1j} \) and \( \mu_{2j} \).

The retail price elasticities of demand are
\[ \varepsilon_{ij} = \frac{\partial q_i}{\partial p_j} \frac{p_j}{q_i} \]  
and
\[ \eta_{ij} = \varepsilon_{1i} \mu_{1j} w_j / p_1 + \varepsilon_{2i} \mu_{2j} w_j / p_2. \]

The retailer’s equilibrium conditions can be rewritten
\[ 0 = s_1 + m_1 \varepsilon_{11} s_1 + m_2 \varepsilon_{21} s_1 p_1 / p_2, \]  
\[ 0 = s_2 + m_1 \varepsilon_{12} s_1 / p_1 + m_2 \varepsilon_{22} s_2, \]  
where \( s_i = q_i / (q_1 + q_2) \) and \( m_i = (p_i - w_i) / p_i \) is the retail price-cost margin. These are a form of the usual first-order conditions for a two-product monopolist. If the two manufacturers merge, their first-order conditions become the two-product analog to Equation (14.5):
\[ 0 = s_1 + m_1 \varepsilon_{11} s_1 + m_2 \varepsilon_{21} w_1 / w_2, \]  
\[ 0 = s_2 + m_1 \varepsilon_{12} s_1 / w_1 + m_2 \varepsilon_{22} s_2, \]  
where \( m_i^w = (w_i - c_i) / w_i \) is the wholesale price-cost margin. This is easily generalized to more than two manufacturers and to mergers involving any group of manufacturers.

To evaluate the effect of a merger of manufacturers, Equations (14.14)–(14.17) are solved for the new equilibrium. A useful approximation is provided by computing the retailer’s pass-through rates at the pre-merger equilibrium, assuming these are constant, specifying the elasticities of derived wholesale demand and wholesale quantities as functions of wholesale prices, solving Equations (14.16) and (14.17) for the post-merger wholesale prices, and then solving...
(14.14) and (14.15) for the retail prices. The post-merger retail pass-through rates may not equal the rates pre-merger, so the retail prices and quantities from a solution to Equations (14.16) and (14.17) may not equal those from a solution to Equations (14.14) and (14.15). If the inequality is significant, the process can be repeated with the new pass-through rates to iterate to a solution.

In this model, the retailer acts as a monopolist in setting retail prices, and manufacturers also exercise market power, so consumers lose twice. The retail margins are determined essentially by the aggregate elasticity of demand for the two products together, although the share weighting of elasticities may shift as retail prices change. The derived wholesale demand can be significantly less elastic than retail demand because retail prices significantly exceed wholesale prices, and for some functional forms (e.g., linear and logit), pass-through rates are less than one. With relatively inelastic demand at wholesale, prices are likely to increase significantly following a merger. Retail prices increase by a smaller absolute amount if the pass-through rate is less than one. The retail price increase expressed in percentage terms is especially likely to be less than the that at wholesale, because retail prices were already significantly higher than those at wholesale. We analyze only the case of a monopoly retailer, but we conjecture that with substantial retail competition, Game III produces an outcome very similar to that from Game I.

### 14.5. An illustrative example

We illustrate the differing retail effects of mergers in Games I–III with an example based on the facts of a proposed merger involving leading manufacturers of white bread, as described by Werden (2000). To simplify, we normalize all retail prices to $1, and we initially assume logit final demand. The existence of equilibrium consistent with Game III requires that the wholesale own-price elasticity of demand be less than \(-1\) for each brand, and to assure that with logit demand, we must assume that retail demand is more elastic than reported by Werden (2000). At retail, we assume that the aggregate elasticity of demand for premium white bread was \(-1.5\) and that the price coefficient in the indirect utility function was 4.5.

Retail own-price and cross-price elasticities of demand for various brands (each with a separate manufacturer) are as indicated in Table 14.1. The rows correspond to the quantities of the various brands, and columns correspond to their prices. In the “Row” column is the demand elasticity when all retail prices are raised proportionately, which is the aggregate elasticity of demand for all the brands. In the “Column” row are the effects on aggregate demand of a change in the retail price of any single brand.

For each of the brands and each of the three games, Table 14.2 presents the wholesale marginal costs and margins consistent with the observed elasticities and logit demand. For all three games, the retailer marks up the marginal wholesale prices to internalize competition among brands and sets the joint profit
Vertical Restraints and the Effects of Upstream Horizontal Mergers

Table 14.1: Retail elasticity matrix.

<table>
<thead>
<tr>
<th></th>
<th>Brand 1</th>
<th>Brand 2</th>
<th>Brand 3</th>
<th>Brand 4</th>
<th>Brand 5</th>
<th>Others</th>
<th>Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand 1</td>
<td>-3.87</td>
<td>1.08</td>
<td>0.89</td>
<td>0.18</td>
<td>0.11</td>
<td>0.11</td>
<td>-1.50</td>
</tr>
<tr>
<td>Brand 2</td>
<td>0.63</td>
<td>-3.42</td>
<td>0.89</td>
<td>0.18</td>
<td>0.11</td>
<td>0.11</td>
<td>-1.50</td>
</tr>
<tr>
<td>Brand 3</td>
<td>0.63</td>
<td>1.08</td>
<td>-3.61</td>
<td>0.18</td>
<td>0.11</td>
<td>0.11</td>
<td>-1.50</td>
</tr>
<tr>
<td>Brand 4</td>
<td>0.63</td>
<td>1.08</td>
<td>0.89</td>
<td>-4.32</td>
<td>0.11</td>
<td>0.11</td>
<td>-1.50</td>
</tr>
<tr>
<td>Brand 5</td>
<td>0.63</td>
<td>1.08</td>
<td>0.89</td>
<td>0.18</td>
<td>-4.39</td>
<td>0.11</td>
<td>-1.50</td>
</tr>
<tr>
<td>Others</td>
<td>0.63</td>
<td>1.08</td>
<td>0.89</td>
<td>0.18</td>
<td>0.11</td>
<td>-4.39</td>
<td>-1.50</td>
</tr>
<tr>
<td>Column</td>
<td>-0.31</td>
<td>-0.54</td>
<td>-0.45</td>
<td>-0.09</td>
<td>-0.06</td>
<td>-0.06</td>
<td>-1.50</td>
</tr>
</tbody>
</table>

Table 14.2: Calibration to upstream premerger equilibrium.

<table>
<thead>
<tr>
<th></th>
<th>Game I</th>
<th>Game II</th>
<th>Game III</th>
</tr>
</thead>
<tbody>
<tr>
<td>c</td>
<td>m^w</td>
<td>c</td>
<td>m^w</td>
</tr>
<tr>
<td>Brand 1</td>
<td>0.742</td>
<td>-1.23</td>
<td>0.333</td>
</tr>
<tr>
<td>Brand 2</td>
<td>0.708</td>
<td>-1.12</td>
<td>0.333</td>
</tr>
<tr>
<td>Brand 3</td>
<td>0.723</td>
<td>-1.17</td>
<td>0.333</td>
</tr>
<tr>
<td>Brand 4</td>
<td>0.768</td>
<td>-1.31</td>
<td>0.333</td>
</tr>
<tr>
<td>Brand 5</td>
<td>0.772</td>
<td>-1.32</td>
<td>0.333</td>
</tr>
<tr>
<td>Others</td>
<td>0.772</td>
<td>-1.32</td>
<td>0.333</td>
</tr>
</tbody>
</table>

maximizing prices. With $-1.5$ as the aggregate elasticity of demand, the retailer prices to achieve a price-cost margin of 0.666. And since the retail price is assumed to be $1 in all three games, the marginal wholesale prices must be $0.333$ in all three. The games differ with respect to the manufacturing marginal costs necessary to yield this common marginal wholesale price.

In Game I manufacturers set wholesale prices far below marginal costs to induce the retailer to set the prices manufacturers would set if they sold directly to consumers. Wholesale price-cost margins, $m^w$, less than $-1$ imply that marginal wholesale prices are less than half of marginal costs.

In Game II manufacturers set wholesale prices at marginal costs to induce the retailer to set jointly profit maximizing retail prices. All of the marginal cost are the same because we assume equal prices, and with logit demand, the multi-product monopoly first-order conditions require that the difference between price and marginal cost be the same for all products.

In Game III manufacturers set wholesale prices above marginal costs to maximize profits given the derived wholesale demand. The inferred marginal costs are low because the derived wholesale demands are relatively inelastic. This is largely a consequence of the fact that the pass-through rates with logit demand are less than 1 (see Werden et al., 2005), while the retail prices are three times wholesale prices.

Table 14.3 presents the wholesale and retail price effects of the merger of Brands 1 and 2. In Game I retail prices increase as they would if the manufactur-
Table 14.3: Simulated percentage price changes from the proposed merger.

<table>
<thead>
<tr>
<th></th>
<th>Game I Wholesale</th>
<th>Retail</th>
<th>Game II Wholesale</th>
<th>Retail</th>
<th>Game III Wholesale</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand 1</td>
<td>38.2</td>
<td>7.28</td>
<td>0.0</td>
<td>0.0</td>
<td>35.2</td>
<td>8.50</td>
</tr>
<tr>
<td>Brand 2</td>
<td>27.9</td>
<td>3.87</td>
<td>0.0</td>
<td>0.0</td>
<td>19.0</td>
<td>3.13</td>
</tr>
<tr>
<td>Brand 3</td>
<td>17.7</td>
<td>0.46</td>
<td>0.0</td>
<td>0.0</td>
<td>4.9</td>
<td>−1.60</td>
</tr>
<tr>
<td>Brand 4</td>
<td>16.6</td>
<td>0.08</td>
<td>0.0</td>
<td>0.0</td>
<td>0.9</td>
<td>−2.93</td>
</tr>
<tr>
<td>Brand 5</td>
<td>16.5</td>
<td>0.05</td>
<td>0.0</td>
<td>0.0</td>
<td>0.5</td>
<td>−3.04</td>
</tr>
<tr>
<td>Others</td>
<td>16.5</td>
<td>0.05</td>
<td>0.0</td>
<td>0.0</td>
<td>0.5</td>
<td>−3.04</td>
</tr>
<tr>
<td>Average</td>
<td>25.5</td>
<td>3.06</td>
<td>0.0</td>
<td>0.0</td>
<td>15.7</td>
<td>2.03</td>
</tr>
</tbody>
</table>

ers sold directly to consumers. For the merging brands, the difference between the wholesale and retail price increases is largely due to the fact that pre-merger retail prices are triple those at wholesale and the logit own pass-through rates are less than 1. For the non-merging brands, the enormous difference between the wholesale and retail price increases is largely due to the fact that logit demand implies negative cross pass-through rates. That is, the wholesale price increases for the merging brands cause the retailer to reduce the prices of non-merging brands. To keep the retail prices of non-merging brands roughly at pre-merger levels, their wholesale prices must significantly increase to offset the effects of the wholesale price increases for the merging brands.

In Game II both pre and post merger, manufacturers set wholesale prices at marginal cost to induce the retailer to set joint profit maximizing retail prices. Thus, the merger has no effect on prices. However, the merger does affect the profit split between the manufacturer and retailer. Since the joint marginal contribution of the merging products to the total profit is higher than the sum of their individual marginal contributions, the merger transfers rents from the retailer to the merging manufacturers. In this case, the merging manufacturers’ profits increase by 19.9% while the retailer’s profit decreases by 7.1%.

In Game III the wholesale and retail price effects of the merger are similar to those in Game I with respect to the merging brands. The most important differences are in the prices changes of the non-merging brands. The negative cross pass-through rates with logit demand actually cause the prices of non-merging brand to decline as a result of the merger.

Since the foregoing results depend on the logit demand assumption, we perform a second experiment with a different assumption. We continue to calibrate the pre-merger demand elasticities using the logit assumption; hence, the elasticities in Table 14.1 are also those for this experiment. Now, however, we assume that quantity effects of price changes are determined by a SAIDS model (i.e., AIDS demand without income effects). For Games I and II, changing the demand assumption does not affect the pre-merger manufacturing marginal costs, because they are uniquely determined by the retail prices and demand elasticities, which remain the same in this second experiment. For Game III, however, the different demand assumption affects wholesale demand elastici-
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Table 14.4: Simulated percentage price changes with SAIDS demand.

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<th>Game I</th>
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<tr>
<td>Brand 1</td>
<td>15.2</td>
<td>9.6</td>
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<td>Brand 2</td>
<td>9.9</td>
<td>6.8</td>
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<tr>
<td>Brand 3</td>
<td>1.7</td>
<td>2.2</td>
</tr>
<tr>
<td>Brand 4</td>
<td>1.4</td>
<td>2.0</td>
</tr>
<tr>
<td>Brand 5</td>
<td>1.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Others</td>
<td>1.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Average</td>
<td>7.5</td>
<td>5.4</td>
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</tbody>
</table>

ties and hence the inferred manufacturing marginal costs. With SAIDS demand, marginal costs are far higher, and wholesale price-cost margins are in the neighborhood of .5–.6.

Table 14.4 presents the wholesale and retail price effects of the merger of Brands 1 and 2 under this alternative demand assumption. The results for Games I and III differ in important respects from those with logit demand. The wholesale and retail price increases for the merging brands are far closer because the own pass-through rates are roughly twice as high with SAIDS demand as logit demand. The wholesale and retail price increases for the non-merging brands are much closer with SAIDS demand than with logit demand largely because cross-pass-through rates are positive with SAIDS demand, while they are negative with logit demand.

14.6. Conclusions

We examine three game theoretic models of wholesaler and retailer interaction. These models determine profit-maximizing price-setting strategies, and consequently the price effects of manufacturers’ mergers. Just as the literature on vertical restraints demonstrates that effects depend on details in the specification of the strategic games being played, we find that the explicit introduction of the vertical dimension of horizontal mergers makes the impact of the mergers dependent on the particular game played between the merging manufacturers and their retailers. Consideration of the retail sector, therefore, is important in assessing the likely affects of mergers of manufacturers selling differentiated products through retailers.

If the game actually being played among retailers and manufacturers were known to be one of the three we consider, a cursory examination of wholesale margins would suffice to indicate which game was being played and hence to indicate how properly to analyze the effects of manufacturers’ mergers. With a transparent retail sector, wholesale margins are negative; with an opaque retail sector, they are zero; and with double marginalization, they are positive. With the substantial positive wholesale margins as typically are observed, only the double
marginalization case is possible. Villas-Boas (2004) and Sudhir (2001) attempt to infer the game being played by manufacturers and retailers in essentially this way.

Of course, the real world is not nearly as simple as any of these games, but an examination of margins nevertheless is apt to be useful in determining whether any particular model satisfactorily explains industry pricing. Also useful is an examination of the actual practices of retailers in their dealings manufacturers and in setting their prices. At noted at the outset, retailers applied fixed percentage mark-ups in the bread case, thus eliminating any need for explicit modeling of the retail sector.

A major limitation of our analysis is the assumption of a monopoly retailer. Retailers may have market power, but we cannot recall observing retail margins as high as those in our example. Real-world competition among retailers also is extremely complex, featuring spatial and brand differentiation, and competition for shelf space both within and across product categories. Considerable further efforts are required to gain a better understanding of this process. It would not surprise us to find that fixed percentage margins is a boundedly rational retailing strategy. In addition, the absence of significant retailing market power in a particular case may cause the retail sector to have little impact on the effects of an upstream merger.

Uncited references

(Froeb et al., 2005) (Werden and Froeb, 1994)

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