Buyer-Induced Exclusive Dealing\textsuperscript{1}

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Abstract

Large retailers or distributors may exercise buyer power in their interactions with manufacturers in order to obtain preferential terms of sale. This paper explores the use of exclusive dealing arrangements by a monopoly retailer to win advantageous pricing from competing manufacturers of a differentiated product. When consumers’ brand preferences are weak and/or when one brand is preferred by a significant majority of consumers, it is more profitable for the retailer to negotiate an exclusive dealing arrangement with one of the manufacturers than to distribute every manufacturers’ product. Buyer-induced exclusive dealing may increase consumer welfare if some of the retailer’s savings from negotiating an exclusive deal are passed on to consumers in the form of lower retail prices in order to encourage “brand switching” by consumers who favor the excluded brand. The likelihood that buyer-induced exclusive dealing increases consumer welfare is greater when consumers’ brand preferences are weak and/or when no brand is preferred by a significant majority of consumers. Whether or not consumer welfare increases with buyer-induced exclusive dealing, total welfare always decreases.
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Key Words

exclusive dealing
buyer power
vertical contracting

JEL Codes

L-12, L-13, L-42
I. Introduction

Exclusive dealing arrangements obligate a buyer to purchase a good exclusively or chiefly from a single supplier. The buyer may be a retailer or distributor who resells the good, or may be an end user. In most instances it is the seller who imposes exclusive dealing. A seller’s motivation for the restraint may be procompetitive, as for instance preventing competing suppliers from free riding on the seller’s investments in a retailer’s sales effectiveness (Marvel, 1982). Seller-induced exclusive dealing also may be anticompetitive if it forecloses the supplier’s competitors from a sufficiently large portion of the market for a sufficient period of time. Exclusive dealing may exclude even an entrant who is more efficient than the incumbent seller who imposes exclusive dealing on its buyers.²

Although the extensive literature on exclusive dealing concerns mainly those arrangements imposed by sellers, some exclusive dealing arrangements are imposed by buyers rather than sellers. For instance, a chain of convenience stores may choose to sell a single brand of light bulbs or sunglasses, or a chain of fast-food restaurants may sell a single company’s fountain beverages. In the health sector, insurers and health maintenance organizations may impose tight restrictions on patients’ choice of prescription drugs and care providers.

Buyer-induced exclusive dealing arrangements have different motivations and effects than seller-imposed deals. The emergence and growth of large retailers in the distribution sector

² There is a substantial literature on the uses of exclusive dealing to deter entry, beginning with Aghion and Bolton (1987) and followed by Rasmusen, Ramseyer and Wiley (1991), Bernheim and Whinston (1998) and Segal and Whinston (2000) among others. This literature was precipitated by, and ultimately qualified, Bork’s (1978) claim that an exclusive dealing agreement can only increase rather than decrease consumer benefits because retail competition compels the retailer to act as an agent for consumers. Bork reasoned that the manufacturer would have to compensate the retailer for any loss in consumer benefits created by exclusive dealing, and that this requirement would make anticompetitive exclusive dealing unprofitable for the manufacturer. With Bork’s line of reasoning, the only exclusive dealing agreements that would be consummated are those that increase consumer welfare. The subsequent literature established that for exclusion to be profitable, there must be contracting externalities that enable the parties to an exclusionary agreement to gain at the expense of an excluded party even though total profit in the vertical structure is not maximized.
of the U.S., U.K. and European economies has kindled the interest of economists and antitrust authorities in the exercise of buyer power – the ability of large buyers to obtain preferential terms of sale from suppliers that are not available to small buyers.\(^3\) In many distribution channels, there is more market power at the downstream stage than upstream at the manufacturing stage because “consumers are more disposed to switch brands within store than switch stores within brand” (Steiner, 1985). Dobson (2008) observed that “buyer-led restraints . . . occur most commonly . . . [when] the buyer holds some bargaining advantage over suppliers that ensures their compliance or consent” (p. 1931).

One tactic for such a buyer is to use the prospect of exclusivity to play one supplier off against another to reduce purchase prices as Galbraith (1952) once argued. Steuer (2000) wrote that a large customer with buying power “may announce to would-be suppliers that it will commit to buy from only one of them and that if they hope to be selected they had better offer their products on the most attractive terms . . . . It is an all-or-nothing game, with each supplier knowing that it must offer the best terms to obtain any of that customer’s business” (p.239-240). Similarly, Abbott and Wright (forthcoming) note that large buyers may use exclusive dealing “to intensify competition by manufacturers for their business and to improve purchase terms” (p. 28).\(^4\)

\(^3\) Inderst and Shaffer (2008, p. 1612) define buyer power as “the ability of buyers to obtain advantageous terms of trade from their suppliers”. Similarly, Noll (2005, p. 589) defines it as “the circumstance in which the demand side of a market is sufficiently concentrated that buyers can exercise market power over sellers”.

\(^4\) The UK Competition Commission conducted a survey of nearly 500 suppliers to grocery retailers in the UK in 2006. This survey revealed that 35 percent of suppliers had been asked to enter into an exclusivity agreement by a customer, and “[o]verall 19 percent of all suppliers actually entered into an exclusivity agreement” (2006, p. 39). Large customers were the most active solicitors of exclusivity agreements. Of those suppliers receiving these requests, two-thirds were made by one of the four largest supermarket chains in the UK. These responses include both exclusive dealing and exclusive distribution agreements. (An exclusive dealing arrangement occurs when the supplier is the retailer’s exclusive source for some line of goods. An exclusive distributor arrangement occurs when the retailer is the supplier’s exclusive customer.) This survey provides some evidence that large retailers pit suppliers against each other in contests to win distribution. The Commission reported that 30 percent of the suppliers indicated that they had “tendered for business via auctions” (2006, p. 65). Of those suppliers who claimed they have bid for business via auction, 72 percent indicated that the auction was with one of the four largest
When a retailer commits to a single supplier of a branded consumer good, exclusive dealing reduces consumers’ choices. Faced with limited brand selection, those consumers who do not find their preferred brand in stock at a retailer must either switch brands or switch stores. Having driven its acquisition costs down by playing one supplier off against another, the retailer may reduce retail prices to discourage store switching and encourage brand switching (Klein and Murphy, 2008). Whether consumer welfare decreases because brand selection is limited or increases because retail prices are lower is unclear a priori. That is the question examined in this paper.

Section II briefly summarizes some related literature to provide a context for the paper. Section III examines the interactions between a monopoly retailer and two manufacturers of differentiated brands of the same good. These interactions are modeled in a pair of two-stage games between the retailer and the manufacturers. The games are distinguished by whether the retailer commits to the pursuit of a single supply contract before play begins. If the retailer does not make such a commitment, the firms play the common representation game. In this game the retailer negotiates supply contracts simultaneously with both manufacturers. If the retailer commits in advance, the firms play the exclusive supplier game. In this game the retailer pursues a supply contract with only one manufacturer. The Nash bargaining framework is used to predict outcomes of the firms’ interactions in both games and the retailer chooses which game the firms will play at the outset. A necessary and sufficient condition is derived for predicting when the retailer opts for inducing an exclusive dealing arrangement over a common representation arrangement.

supermarket chains. This survey also indicates that 79 percent of the suppliers who bid for business via auction earned lower gross margins on these sales than on other sales.
Section IV extends the analysis by introducing a parameterized model to highlight market conditions that favor buyer-induced exclusive dealing. This analysis shows that the retailer opts for an exclusive supplier arrangement when consumers’ brand preferences are not too strong and when one of the brands is preferred by a super-majority of consumers. Both manufacturers make less profit if the retailer distributes only one brand. Consumer welfare may increase or decrease when the retailer dispenses with the second brand and charges a lower price for the exclusive brand, but total welfare always decreases.

II. Related Literature

There is an extensive literature on whether and why exclusionary practices arise in vertically related markets when exclusion precludes the maximization of joint profits in the vertical structure. This literature encompasses a variety of vertical structures and a variety of assumptions about the interactions between vertically related firms. One branch of this literature investigates exclusive dealing arrangements in vertical structures (like the one examined in this paper) with a monopoly retailer and competing manufacturers. In papers by Mathewson and Winter (1987), O’Brien and Shaffer (1997) and Bernheim and Whinston (1998), among others, the initiative in vertical contracting is assigned to the manufacturers rather than the retailer. Mathewson and Winter’s manufacturers compete in linear tariffs coupled with the option to offer the retailer an exclusive dealing requirement. They find that exclusive dealing may arise at equilibrium. O’Brien and Shaffer, and Bernheim and Whinston do not restrict manufacturers to linear tariffs and find that where nonlinear tariffs are feasible, exclusive dealing does not arise at equilibrium.\(^5\)

\(^{5}\) Another branch of this literature concerns vertical structures with an upstream monopoly and competing downstream retailers. In a sequence of such papers by Marx and Shaffer (2007), Miklós-Thal, Rey and Vergé
In this paper, the initiative in vertical contracting is assigned to the monopoly retailer rather than the manufacturers. This is in keeping with the paper’s focus on the buyer power of large buyers. The retailer announces at the outset whether it will negotiate a contract for an exclusive brand or instead pursue common representation and negotiate supply contracts simultaneously with both manufacturers. After the retailer makes this decision, negotiations ensue and an equilibrium is reached. Negotiated terms are not the outcome of a game that imposes a specific order of moves or specific kinds of offers (e.g., linear prices or a multi-part tariff), but the Nash bargaining solution is used instead to characterize these outcomes.

In a related branch of the literature, Mathewson and Winter (1997), Marvel and Yang (2008), Dana (2012) and Chen and Li (2013) examine the welfare effects of exclusive supply arrangements orchestrated by buying groups. Independent buyers of intermediate products form buying groups and consolidate orders to exercise buyer power when purchasing from sellers of competing brands. Hospital buying groups, for instance, are formed to negotiate the purchase of hospital supplies and equipment for their members. Diverse state and municipal agencies often pool their purchasing of supplies in the same way. These buying groups exist mainly because they are able to leverage their sales volume to wrest advantageous terms from suppliers. These organizations differ from large retailers with buyer power in that they are comprised of end users of the goods purchased. This paper examines vertical structures in which the buyers are retailers who resell rather than consume goods.

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(2011) and Rey and Whinston (2013) in which the initiative in vertical contracting is assigned to the retailers, it emerges that if retailers may issue take-or-leave offers to suppliers that consist of menus of contracts or contracts that are contingent on exclusivity, then exclusion is averted.

6 The same holds for the contributions of Anton and Yao (1989), Perry and Sákovics (2003) and others that compare the efficiency properties of single-sourcing and split-awards in input procurement contracting.
Gabrielsen and Sørgard (1999) investigate buyer-induced exclusive dealing in a model with a monopoly retailer and two manufacturers of a differentiated product. This model assumes that the retailer marks wholesale prices up in double-marginalization fashion for resale to consumers. In the absence of an exclusivity arrangement, manufacturers’ wholesale prices are determined by Bertrand interactions. In certain circumstances an exclusive dealing contract between the retailer and a single manufacturer can reduce retail prices of the exclusive brand enough to increase consumer welfare even though some consumers do not purchase their preferred brand.

Klein and Murphy also investigate buyer-induced exclusive dealing in a model with one retailer and two manufacturers of a differentiated product. This model assumes that the retailer has buyer power in the upstream market but faces downstream competition. Competing retailers compel the firm to charge retail prices that merely cover costs. Klein and Murphy’s analysis provides no indication that a retailer would ever choose to distribute the products of both manufacturers. Their retailer always runs an auction to determine which product it will distribute. This triggers Bertrand competition between the manufacturers and drives the retailer’s purchase price down to the manufacturers’ cost.

Although Gabrielsen and Sørgard’s model and Klein and Murphy’s model throw some light on the practice of buyer-induced exclusive dealing, their results depend on strong, specialized assumptions about interactions among the firms. The double-marginalization in Gabrielsen and Sørgard’s model assumes that the retailer and the manufacturers cannot avoid squandering a significant share of the joint surplus latent in the vertical structure. Klein and

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7 Klein and Murphy’s (2008) analysis of buyer-induced exclusive dealing is not the focal point of their paper. The main thrust is that a retailer’s ability to shift incremental sales from one brand to another can reduce wholesale and retail prices.
Murphy’s model assumes that competition downstream always prevents allocative inefficiency in the vertical structure. Gabrielsen and Sørgard’s retailer exercises market power downstream, but Klein and Murphy’s does not. At the same time, Klein and Murphy emphasize the role of “playing off” in the retailer’s upstream interactions while Gabrielsen and Sørgard do not. Unlike Gabrielsen and Sørgard, the model in this paper assumes that the firms are able to negotiate their way out of the double-marginalization trap. And unlike Klein and Murphy, the buyer power exercised by the retailer in this paper is coupled with and sustained by downstream market power.

III. Bargaining with Suppliers

The vertical structure consists of a single retailer and two suppliers that manufacture differentiated brands of the same good. Manufacturer $i$ produces the good at a constant marginal cost $c_i \geq 0$ and has no fixed costs. The retailer resells one or both brands to consumers whose brand preferences are heterogeneous. The retailer’s operating costs are fixed and sunk. The retailer has market power in the downstream market due to the firm’s size, location, or other distinguishing characteristics.\(^8\) Or in the case of grocery stores, mass merchandisers and the like, some degree of market power is due to consumers’ shopping for several items simultaneously instead of single items. Shopping for several items simultaneously conserves shopping costs, but it reduces consumers’ in-store demand elasticities for specific goods.\(^9\) In addition, large retailers

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\(^8\) Size is essential. Inderst and Shaffer (2008, p. 1630) write that “[t]he main source of buyer power . . . is the ability to substitute away from any given supplier’s input. . . . [I]n general the profitability and thus the credibility of substitution should increase with the buyer’s relative size.”

\(^9\) Bliss (1988, p. 38) identifies this “captive buyer” effect as a contributing factor to retailers’ market power in the sale of specific goods.
have significant populations of loyal customers who incur switching costs if they shop elsewhere.\footnote{Dobson (2005) attributes some of the buyer power acquired by large retailers that distribute many products to the asymmetry between the large number of products and suppliers these firms have and the small number of products and customers served by the suppliers.}

The firms’ joint surplus function is \( V(q_1, q_2) = \sum_{i=1}^{2} q_i (f_i(q_1, q_2) - c_i) \), where \( q_i \geq 0, i = 1, 2 \), are the quantities sold and where consumers’ inverse demand functions \( f_i(q_1, q_2) \geq 0, i = 1, 2 \) are non-increasing in both quantities.\footnote{This framework permits demand functions with discontinuities.} Assume that there is a unique quantity pair \( (q_1^*, q_2^*) \) that maximizes this surplus and that \( q_i^* > 0, i = 1, 2 \). Assume that the firms have complete information about demands and costs, and that the retailer cannot price discriminate among consumers.

In vertical structures such as this, with a single party at one level and two (or more) parties at the other level, it is plausible (and in fact generally assumed) that the single party can initiate the form of contract negotiations with the parties at the other level.\footnote{For instance, the literature on single-sourcing and split-awards in input procurement contracting begins with this presumption.} In keeping with that convention, events in the vertical structure take place as follows. At the outset, the retailer chooses whether to open negotiations with both suppliers simultaneously with the intention of distributing both brands, or to commit to the pursuit of an exclusive supply contract in which case the firm negotiates first with one manufacturer and subsequently (if ever) with the other. If the retailer does not make a single-brand commitment, then the firm contracts simultaneously and separately with both manufacturers. This is the common representation game. If the retailer announces a single-brand commitment, then the firm negotiates an exclusive supply contract with one of the suppliers. This is the exclusive supplier game.
Each of these games have two stages. Contracts between the retailer and one or both manufacturers are determined at the first stage in each game. If the retailer contracts with manufacturer $i$ in either game, the contract specifies both a purchase quantity $q_i \geq 0$ and a payment $T_i \geq 0$ to the manufacturer.\(^{13}\) The retailer sets the retail prices $p_1$ and or $p_2$ at the second stage in each game.

In both the common representation game and the exclusive supplier game, the outcomes negotiated by the firms are given by the Nash bargaining solution. Outcomes in models of vertical contracting are unusually sensitive to the specific assumptions made about the order of moves and the dimensions of offers made during negotiations. The only such assumption in this model is that the retailer has the ability to choose at the outset whether to negotiate simultaneously with both manufacturers or to negotiate with them sequentially, one at a time. Once this choice is made, there are no constraints placed on the form of the firms’ negotiations. The Nash bargaining framework is predicated on what Whinston (2006, p. 139) called the “bilateral contracting principle:” when negotiating parties contract in isolation under conditions of complete information, it is reasonable to expect that “they will reach an agreement that maximizes their joint payoff.”\(^{14}\)

\(^{13}\) The assumption that contractual terms are given by the Nash bargaining solution makes it plausible that those terms would encompass both payments and quantities rather than setting prices alone and allowing the retailer to choose quantities unilaterally. Moreover it is not unusual for large buyers and their suppliers to have long-term, fixed-quantity contracts. Noll (2005, p. 603), for instance, observes that large buyers often do not exercise their dominance by “posting a low buying price and waiting for sellers to arrive. Instead the common practice is for buyers and sellers to negotiate a long-term contract that specifies both price and quantity.”

\(^{14}\) The Nash bargaining solution has been used by Horn and Wolinsky (1988), Stole and Zwiebel (1996), Chipty and Snyder (1999), O’Brien and Shaffer (2005) and Inderst and Mazzarotto (2008) among others to depict outcomes in a variety of settings with simultaneous bilateral bargaining. Blair and Harrison (1993) discuss the antecedents in early economic theory of the notion that vertically related firms can achieve a vertically-integrated outcome. Although it is unnecessary to go into details, the Nash bargaining solution is formally implemented by a dynamic, noncooperative bargaining game, as Rubinstein (1982) demonstrated.
III. A. The Common Representation Game

Assume that the retailer opts for common representation and negotiates simultaneously and separately with both manufacturers at the first stage. With Nash bargaining, the retailer’s equilibrium contracts with each manufacturer are for the quantities \((q_i^*, q_j^*)\). At the second stage the retailer sets retail prices \(p_i^* = f_i(q_i^*, q_j^*), i = 1, 2\).

At equilibrium, the contractual payments \(T_i^*, T_j^*\) distribute the surplus \(V(q_i^*, q_j^*)\) among the firms. The distribution depends on the relative bargaining power of the firms and on their disagreement payoffs. Let \(\tau \in [0,1]\) be the bargaining weight of the retailer when negotiating with either manufacturer, and let each manufacturer’s bargaining weight be \(1 - \tau\). The disagreement payoff for each of the manufacturers is zero because these firms make no profit in the vertical structure unless they negotiate a contract with the retailer. With this, the equilibrium payments to the manufacturers are simply a share \((1 - \tau)\) of the incremental contributions to the joint surplus that their agreements with the retailer make. These incremental contributions are \(V(q_i^*, q_j^*) - V(0, q_j^*)\) for manufacturer 1, and \(V(q_i^*, q_j^*) - V(q_i^*, 0)\) for manufacturer 2.\(^{15}\) These expressions are henceforth written as \(V_{i2}^* - V_2^*\) and \(V_{i2}^* - V_i^*\) to economize on notation. Because \(q_i^* > 0\) and \(q_j^* > 0\), we have:

\[
V_{i2}^* > V_i^*, \quad V_{i2}^* > V_2^* \quad \text{and} \quad V_i^* + V_2^* \geq V_{i2}^*
\]  

The equilibrium payments \((T_i^*, T_j^*)\) are:

\(^{15}\) In specifying incremental contributions in similar models, Horn and Wolinsky and Iozzi and Valletti (2014) identify two possibilities. When a breakdown occurs in negotiations between the retailer and a manufacturer, the other manufacturer observes the breakdown and has an opportunity to react, or else does not observe the breakdown and cannot react. The specification employed here is that breakdowns are not observable to outside parties.
\begin{align}
T_i^* &= (1 - \tau)(V_{i2}^* - V_2^*) + c_iq_i^* \\
T_2^* &= (1 - \tau)(V_{12}^* - V_1^*) + c_2q_2^* 
\end{align}

Subtracting \((T_1^* + T_2^*)\) from \(\sum_{i2} q_i^*( f_i(q_i^*, q_{i2}^*)\) gives the retailer’s profit:

\[\pi_R^* = (2\tau - 1)V_{i2}^* + (1 - \tau)(V_1^* + V_2^*)\]  

In the symmetric bargaining case where \(\tau = \frac{1}{2}\), the retailer’s profit is:

\[\pi_R^* = \frac{V_1^* + V_2^*}{2}\]

Manufacturer \(i\)’s profit is \(T_i^* - c_iq_i^*\). In the case where \(\tau = 1\), the retailer’s profit is \(\pi_R^* = V_{i2}^*\) because both manufacturers sell goods to the retailer at cost.

Equation (3) and the inequalities in (1) indicate that the retailer’s profit \(\pi_R^*\) is increasing in \(\tau\) for \(\tau \in (\frac{1}{2}, 1)\). This together with equation (4) implies that the retailer’s share of the surplus \(V_{i2}^*\) is always greater than half. The payoffs in equations (1) – (3) represent the outcome of efficient, simultaneous bilateral contracting.

**III. B. The Exclusive Supplier Game**

Even though the firms’ joint surplus is maximized with common representation and efficient contracting, the retailer’s profit may be greater if the firm forgoes negotiations that culminate in efficient contracts with both manufacturers and instead pursues an exclusive supply contract with a single manufacturer. For the retailer, this option is a matter of carving out a larger piece of a smaller pie. Because the retailer has market power, the firm can distribute one brand instead of both and still retain sales to some consumers who would prefer the excluded brand. In effect, these consumers can be induced to “switch brands” rather than “switch stores”
if the retailer does not offer their preferred brand. By making an *ex ante* commitment to distribute only one brand, the retailer can bargain with the manufacturers sequentially and from a strategically advantageous position. If the retailer approaches one manufacturer first and negotiations break down, then the retailer can turn to the second manufacturer. Although the retailer’s disagreement payoff would be zero when bargaining with the second manufacturer, this manufacturer is a backstop that enhances the retailer’s disagreement payoff when bargaining with the first manufacturer. By negotiating an exclusive supply contract, the retailer exploits what Galbraith called “the opportunity of a strong buyer to play one seller off against the other” (1952, p. 123).

Suppose that the retailer chooses to play the exclusive supplier game and announces that it will limit its distribution to a single brand. At stage one in this game, the firm decides which manufacturer to bargain with first. If the retailer and the chosen manufacturer cannot reach an agreement, the retailer irrevocably terminates negotiations with that firm and opens negotiations with the competing manufacturer. The outcome of the firms’ negotiations is determined by the Nash bargaining solution.

Let $\hat{q}_1 > 0$ and $\hat{q}_2 > 0$ be the unique quantities that maximize the joint surplus in the vertical structure when the retailer contracts with only one of the manufacturers:

$$\hat{q}_1 = \arg \max_x [V(x,0)] \quad \text{and} \quad \hat{q}_2 = \arg \max_x [V(0,x)]$$

(5)

To simplify notation, let $\tilde{V}_1$ and $\tilde{V}_2$ denote $V(\hat{q}_1,0)$ and $V(0,\hat{q}_2)$ respectively, where:

$$V_{12} > \tilde{V}_1 \geq V_1^* \quad \text{and} \quad V_{12} > \tilde{V}_2 \geq V_2^*$$

(6)

With no loss of generality, assume that good 1 is the more popular brand in the sense that $\tilde{V}_1 \geq \tilde{V}_2$. The Nash bargaining solution has the retailer contracting with manufacturer 1 for the
quantity $\hat{q}_i$ at the first stage and purchasing nothing from manufacturer 2. At the second stage the retailer sets the retail price $\hat{p}_i = f_i(\hat{q}_i, 0)$.

Consider the retailer’s first-stage negotiations with manufacturer 1. The retailer’s contractual payment $\hat{T}_i$ to manufacturer 1 depends on the relative bargaining power of the firms and on their disagreement payoffs. Manufacturer 1’s disagreement payoff is once again zero. To find the retailer’s disagreement payoff, consider what would happen if the retailer, having failed to reach an agreement with manufacturer 1, turns to manufacturer 2. In this event the retailer would contract with the second manufacturer for the quantity $\hat{q}_2$ in exchange for a payment of $\hat{T}_2 = (1 - \tau)\hat{V}_2 + c_2\hat{q}_2$. Consequently, the retailer’s disagreement payoff when bargaining with manufacturer 1 is $\tau\hat{V}_2$ and the incremental contribution to the firms’ combined profit when the retailer reaches an agreement with the first manufacturer is $\hat{V}_1 - \tau\hat{V}_2$. The retailer’s contractual payment to manufacturer 1 contains a share $(1 - \tau)$ of this contribution:

$$\hat{T}_i = (1 - \tau)(\hat{V}_1 - \tau\hat{V}_2) + c_i\hat{q}_i$$  \hspace{1cm} (7)

The retailer’s profit is $\hat{q}_i f_i(\hat{q}_i, 0) - \hat{T}_i$ or:

$$\hat{\pi}_R = \tau\hat{V}_1 + \tau(1 - \tau)\hat{V}_2$$  \hspace{1cm} (8)

and is increasing in $\tau$ for any $\tau \in (\frac{1}{2}, 1)$. Equation (8) shows that the retailer always captures more than half of the joint surplus $\hat{V}_1$ when opting for an exclusive brand. In the symmetric bargaining case where $\tau = \frac{1}{2}$, the retailer’s profit is:

$$\hat{\pi}_R = \frac{\hat{V}_1 + \hat{V}_2}{2}$$  \hspace{1cm} (9)
In the case where $\tau = I$, the retailer’s profit is $\hat{\pi}_R = \hat{V}_1$ and manufacturer $I$ sells the good to the retailer at cost.

**III. C. Equilibrium**

Whether the retailer decides to play the common representation game or the exclusive supplier game depends on how the firm’s profit $\hat{\pi}_R$ with an exclusive supplier compares to its profit $\pi^*_R$ under common representation. Based on equations (3) and (8), the retailer’s optimal distribution policy is:

$$\text{Play } \begin{cases} \text{exclusive supplier} \\ \text{common representation} \end{cases} \text{ if } \tau(\hat{V}_1 + \hat{V}_2 - V^*_{i2}) - (1 - \tau)(V^*_1 + V^*_2 - V^*_{i2}) - \tau^2\hat{V}_2 \begin{cases} \geq \ 0 \end{cases} \ (10)$$

Without a more complete specification of consumer demands, such as the example in the next section, the rule in (10) does not make it possible to say whether $\hat{q}_i$ is greater or less than $q^*_i$, or whether $\hat{p}_i$ is greater or less than $p^*_i$. But the rule in (10) offers some insight into the market conditions that bear on the retailer’s choice of an optimal distribution policy.

First,

$$\lim_{\tau \to 1}(\hat{\pi}_R - \pi^*_R) = \hat{V}_1 - V^*_{i2} < 0$$

Equation (11) implies that the retailer never opts for an exclusive brand if the firm’s bargaining weight is sufficiently great. If $\tau$ is sufficiently great, then the firm’s share of any joint surplus produced by bargaining is large. With this, the fact that $\hat{V}_1 < V^*_{i2}$ induces the retailer to reject its exclusive brand option in favor of common representation. If the retailer can capture a large enough share of $V^*_{i2}$, it has nothing to gain from pursuing an exclusive brand.

Another implication of the rule in (10) is:
Equation (12) shows that as bargaining power in the vertical structure is more equally distributed, the retailer’s optimal distribution policy depends on the size of $\hat{V}_i - V_i^*$, for $i=1, 2$.

For example, suppose that $\tau = \frac{\tau}{2}$ and that consumers’ brand preferences are weak in the sense that they are unwilling to pay a large premium for their preferred brand. If the retailer distributes only brand $i$, it is not difficult for the firm to induce consumers who weakly prefer brand $j$ to switch to brand $i$ by charging a slightly lower price for brand $i$. The firm’s brand $i$ sales in this instance $\hat{q}_i$ are much greater than $q_i^*$ and $\hat{V}_i$ is much greater than $V_i^*$ (although less than $V_{12}^*$). If $\hat{V}_i - V_i^*$ and/or $\hat{V}_2 - V_2^*$ are great enough, it becomes profitable for the retailer to distribute an exclusive brand. That is, if the retailer’s bargaining weight is not too great and consumers’ brand preferences are weak, then the retailer opts for an exclusive brand.

IV. A Model with Two Consumer Types

To illustrate and clarify possibilities, consider a parameterized model with an explicit specification of demands. This model illuminates the effects the retailer’s distribution policy has on consumers. Assume that $c_i = 0$ for $i=1,2$ and assume that the retailer’s bargaining weight is $\tau = \frac{\tau}{2}$. The retailer serves just two types of consumers. Type 1 consumers prefer brand 1 over brand 2, and conversely for type 2 consumers. The retailer has a continuum $[0, 1]$ of consumers where $a \in (1/2, 1)$ are type 1 and the remaining $1-a$ are type 2. (This is in keeping with the previous assumption that brand 1 is more popular.) Consumers purchase a single unit of one brand or else purchase nothing. Every type-$i$ consumer has a reservation price of $I$ for a unit of brand $j$ and a reservation price of $I+D$ for a unit of brand $i$ where $D > 0$ is a measure of the
strength of consumers’ preferences. That is, every consumer is willing to pay a premium of $D$ for a preferred brand. Assume that if the retailer’s prices are such that $(1 + D - p_i) = (1 - p_j)$, then a type-$i$ consumer chooses brand $i$. The retailer cannot observe an individual consumer’s brand preferences and so cannot price discriminate among consumers.

Because there are only two types of consumers, there is a finite set $Q$ of feasible quantity vectors $(q_1, q_2)$:

$$Q = \{(0,0), (a,0), (1,0), (0,1-a), (0,1), (a,1-a)\}$$

(13)

Any $(q_1, q_2) \notin Q$ is precluded because consumers’ choices maximize their consumer surplus.

The inverse demand function $f : Q \to \mathbb{R}^+$ assigns a price vector $(p_1, p_2)$ to each $(q_1, q_2) \in Q$ as follows. First, $f(0,0) = (\infty, \infty)$ because if the price of both brands is prohibitively high or, equivalently if neither brand is offered for sale, then there are no sales. Next, $f(a,0) = (1 + D, \infty)$ and $f(0,1-a) = (\infty, 1 + D)$ because type-$i$ consumers are willing to pay at most $1 + D$ for a unit of brand $i$, and type-$j$ consumers purchase nothing if brand-$j$ is not offered for sale and $p_i > 1$. To sell every consumer a unit of brand $i$, the retailer sells only that brand and sets $p_i = 1$. This means that $f(1,0) = (1, \infty)$ and $f(0,1) = (\infty, 1)$. Finally, $f(a,1-a) = (1 + D, 1 + D)$ because $1 + D$ is the most any consumer is willing to pay for his/her preferred brand.

If the retailer plays the common representation game, then the firm’s profit-maximizing prices are $p_i^* = p_j^* = 1 + D$. With these prices, the retailer’s unit sales are $q_i^* = a$ and $q_j^* = 1 - a$. 
If the retailer plays the exclusive supplier game, then the firm either sets \( p_1^* = 1 + D \) and sells \( q_1^* = a \) or sets \( p_1^* = 1 \) and sells \( q_1^* = 1 \), whichever is more profitable.\(^{16}\)

IV. A. The Optimal Distribution Policy

Based on equation (12), the retailer’s optimal distribution policy in this model is:

\[
\text{Play } \begin{cases} \text{exclusive supplier} & \text{if } \hat{V}_1 + \frac{\hat{V}_2}{2} \geq V_1^* + V_2^* \\ \text{common representation} & \text{if } \hat{V}_1 + \frac{\hat{V}_2}{2} < V_1^* + V_2^* \end{cases}
\]

where values of \( V_1^* \), \( V_2^* \), \( \hat{V}_1 \) and \( \hat{V}_2 \) depend on the values of the parameters \( a \) and \( D \). Applying this rule gives the following result:

*Proposition 1: The retailer opts for an exclusive brand iff*

\[
D \leq \max \left\{ \frac{1}{2}, \frac{a - \frac{1}{2}}{1 - a} \right\}
\]

*If the retailer exercises this option, then \( \hat{q}_1 \geq q_1^* \), \( \hat{p}_1 \leq p_1^* \) and \( \hat{T}_1 < T_1^* \).*

*Proof: Appendix*

This proposition indicates that if the retailer opts to distribute an exclusive brand, then unit sales of that brand are higher and its retail price is lower than otherwise. Also, the manufacturer of the exclusive brand receives a smaller contractual payment and earns less profit than when the retailer distributes both brands. These results show that opting for a single brand and playing the manufacturers off against each other reduces the effective wholesale price of the exclusive brand:

\[
\frac{\hat{T}_1}{\hat{q}_1} < \frac{T_1^*}{q_1^*}
\]

\(^{16}\) The retailer will never choose to sell brand 2 exclusively because \( a \geq l/2 \).
**Proposition 1** identifies the values of $a$ and $D$ where the retailer opts to distribute an exclusive brand. These values are illustrated in **Figure 1** from which several generalizations may be drawn. It is more profitable for the retailer to distribute an exclusive brand when the premium consumers are willing to pay for their preferred brand is not great ($D$ is small). By adopting an exclusive brand distribution policy in lieu of distributing both brands when brand preferences are weak, the retailer charges a lower price for brand 1 to induce some consumers who prefer brand 2 to switch brands. Inversely, if consumers’ brand preferences are strong then the retailer forgoes the opportunity to negotiate an exclusive deal because it does not want to reduce the price of an exclusive brand enough to cause the minority to switch brands. Instead, the firm distributes both brands. This result explains why a retailer’s distribution strategy may be different for different consumer good categories. For instance, a convenience store that sells only one brand of light bulbs may sell more than one brand of beer because consumers’ brand preferences are more pronounced for beer than light bulbs. The same result also suggests an explanation for why some prominent retailers, such as Costco, stock many fewer brands of all consumer goods than other retailers. This explanation is that Costco serves a population of loyal consumers whose brand preferences are not notably strong.

**Proposition 1** and **Figure 1** also indicate that it is more profitable for the retailer to distribute an exclusive brand when one of the brands is preferred by a significant majority of consumers ($a$ is large). If one brand is favored by a large majority of consumers, the retailer has little to lose if the brand preferred by the minority is not distributed. Similarly, when neither brand is preferred by a significant majority of consumers ($a$ is small), it is more profitable for the

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17 “A typical Costco store stocks 4,000 types of items, including perhaps just four toothpaste brands, while a Wal-Mart typically stocks more than 100,000 types of items and may carry 60 sizes and brands of toothpastes. Narrowing the number of options increases the sales volume of each, allowing Costco to squeeze deeper and deeper bulk discounts from suppliers” (Greenhouse, 2005).
retailer to distribute both brands unless consumers’ preferences are weak ($D$ is small). The size of the preferred-brand supermajority that is necessary for an exclusive brand to be more profitable is greater the stronger are consumers’ brand preferences ($D$ is large). For instance, suppose 75 percent of homeowners prefer brand 1 heating and air conditioning equipment over brand 2. A heating and air conditioning service may sell brand 1 new equipment exclusively yet stock replacement parts for both brands. Here the explanation is that once homeowners have purchased and installed durable equipment, their brand preferences for non-interchangeable replacement parts are stronger than their brand preferences for new equipment.\(^\text{18}\)

The retailer opts for an exclusive brand when that option is more profitable even though the joint surplus $\hat{V}_i$ that this choice makes available is less than the joint surplus $V_{i2}^*$ with common representation. This means, of course, that the manufacturers’ combined profit is less when the retailer distributes an exclusive brand. Even stronger, as long as $\tau < 1$ each manufacturer’s profit is less when the retailer distributes an exclusive brand. Equation (2) indicates that manufacturer 2’s profit with common representation is positive, so the excluded manufacturer forfeits all of this profit if the retailer distributes an exclusive brand. \textit{Proposition 1} indicates that $\hat{T}_i < T_i^*$, so the manufacturer of the exclusive brand also makes less profit even though the firm’s unit sales are greater. It is unsurprising that the retailer’s gain comes at the expense of the excluded manufacturer. \textit{Proposition 1} shows that the retailer’s gain also comes at the expense of the exclusive brand manufacturer.

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\(^{18}\) Gabrielsen and Sørgard also predict that the retailer is more likely to seek an exclusive supplier where one of the brands is preferred by a significant majority of consumers. However, they also predict that the retailer is more likely to seek an exclusive supplier where the brands are strongly differentiated. This prediction is counterintuitive. It means that the retailer denies consumers variety where consumers value variety most. Insofar as a large value of $D$ means the brands are strongly differentiated, \textit{Proposition 1} predicts the opposite.
IV. B. Consumer Welfare

The analysis thus far has focused exclusively on interactions between the retailer and its suppliers and on the retailer’s optimal distribution policy. The analysis has not explored how consumers are affected by that distribution policy. In certain circumstances, exclusive dealing arrangements imposed by sellers reduce consumer welfare. Is it necessarily the case, when consumers have divergent brand preferences, that consumer welfare is always reduced when a retailer willingly forgoes the distribution of both brands in order to sell an exclusive brand? Or, as in the case with seller-imposed arrangements, are there circumstances where buyer-induced exclusive dealing increases consumer welfare?

If the retailer distributes both brands, then the firm’s prices are \( p_1^* = p_2^* = I + D \) and its unit sales are \( q_1^* = a \) and \( q_2^* = I - a \). Every consumer purchases his/her preferred brand but consumers’ surplus in the vertical structure is zero. If the retailer distributes only brand 1 and charges \( \hat{p}_1 = I + D \), then the firm’s brand-1 sales are \( \hat{q}_1 = a \). Type-1 consumers purchase their preferred brand and type-2 consumers purchase nothing. Once again, consumers’ surplus is zero.

But suppose the retailer distributes only brand 1 and reduces \( p_1 \) to encourage type-2 consumers to switch brands. By charging a lower price \( \hat{p}_1 = I \), the retailer increases brand-1 sales to \( \hat{q}_1 = I \) because every consumer purchases brand 1. The type-2 consumers, who are in the minority and whose reservation price for brand 1 is \( I \), receive no consumers’ surplus with their purchase, but type-1 consumers enjoy a surplus. In keeping \( p_1 \) low, the retailer concedes a surplus to type-1 consumers in order to profit from the sales of brand 1 to type-2 consumers. The retailer’s decision to distribute an exclusive brand increases total consumers’ surplus by \( aD \).

For consumer welfare to be greater when the retailer distributes an exclusive brand, the retailer must pass some of the savings it achieves with exclusive dealing (Proposition 1) on to
consumers by reducing \( p_i \). In this model, the welfare of consumers who prefer the excluded brand is neither greater nor less than in the common representation game if \( \hat{p}_i = 1 \) and \( \hat{q}_i = 1 \) in the exclusive supplier game.

The parameter values that increase consumer welfare when the retailer distributes an exclusive brand are given by:

**Proposition 2:** Consumer welfare is greater when the retailer distributes an exclusive brand instead of both brands iff \( D \leq \frac{1-a}{a} \). Total welfare is always less when the retailer distributes an exclusive brand.

**Proof:** Appendix

The values of \( a \) and \( D \) where consumer welfare is greater if the retailer opts to distribute an exclusive brand are illustrated in **Figure 1**. Consumer welfare is greater when the premium that consumers are willing to pay for their preferred brand is not too great (\( D \) is small) and when neither brand is preferred by a large majority of consumers (\( a \) is not too large). If one of the brands is preferred by a substantial super-majority (\( a \) is large), it becomes less likely that consumer welfare increases. And in any case it is only the type-1 consumers who are beneficiaries.\(^{19}\)

Comparing **Propositions 1** and 2 shows that when the retailer opts for an exclusive brand, consumer welfare may or may not be greater than when both brands are distributed. As can be seen in **Figure 1**, it is when \( D \leq \min\left\{\frac{1}{2}, \frac{1-a}{a}\right\} \) that both the retailer and consumers are

\(^{19}\)This is for much the same reason as when a seller who offers both a high- and a low-quality version of a product at different prices cannot extract all of the surplus of consumers who choose high quality even though the seller can extract the entire surplus of those who choose low quality (Tirole, pp. 148-150).
better off with an exclusive brand. Generalizing, the interests of consumers and the retailer are aligned only where consumers’ brand preferences are weak.

The possibility that buyer-induced exclusive dealing increases consumer welfare harkens back to Galbraith’s early argument that price concessions won by large retailers upstream translate into lower prices for consumers downstream. Galbraith’s claim does not apply to every large retailer with buyer power, but research on the downstream effects of countervailing power supports his claim in certain circumstances. Heretofore, all such circumstances have required competition at the retail level to discipline a large retailer’s retail prices even though that firm exercises countervailing power upstream. This paper identifies a different mechanism whereby countervailing power reduces retail prices and increases consumer welfare. Strictly speaking, this mechanism does not require downstream competition to compel a large retailer to share its gains from the exercise of buyer power upstream. A large retailer may reduce acquisition costs by playing suppliers off against each other and offering consumers a limited selection of brands. The firm then reduces retail prices to encourage brand switching in lieu of store switching. If retail prices are reduced sufficiently, consumer welfare may increase.

Taking stock of the effects of buyer-induced exclusive dealing, we see that the retailer’s profit is greater and manufacturers’ profit is less. Consumers in the aggregate may or may not benefit from the retailer’s decision to distribute an exclusive brand, and in any case it is only those consumers who prefer the exclusive brand in the first place who stand to benefit. Finally, the effect of this practice on total welfare is negative regardless whether buyer-induced exclusive dealing increases consumer welfare.21

20 For example, see von Ungen-Sternberg (1996), Dobson and Waterson (1997), Chen (2003), Mills (2013) and Gabrielsen and Johansen (2015).
21 Klein and Murphy’s model suggests that buyer-induced exclusive dealing always increases total welfare. Zenger (2010) shows that this result depends on the assumption in Klein and Murphy’s model that the demand for the
V. Conclusion

The motivation and effects of exclusive dealing arrangements that are solicited by retailers and distributors with market power are different than exclusivity arrangements orchestrated by manufacturers and suppliers with market power. When a retailer plays the suppliers of different brands of a consumer good off against each other by offering exclusive distribution to win advantageous wholesale pricing, there are mixed effects for consumers. The obvious first effect of buyer-induced exclusive dealing is that consumers served by the retailer have fewer brand choices. The excluded brands are the least popular. At the same time, the analysis indicates that buyer-induced exclusivity may reduce the retail price of the exclusive brand. When this happens, it is to encourage those customers who prefer an excluded brand to switch brands rather than switch stores. Consumers who prefer the brand selected for exclusive distribution are better off as a result. Aggregate consumer welfare may increase as a result of this exclusivity. The conditions that cause consumer welfare to increase when a retailer selects an exclusive supplier are different than, but overlap with, the conditions that cause the retailer to opt for an exclusive supplier.

The analysis in this paper has implications for vertical relationships in markets where firms bundle their own goods $X$ with complementary products $Y$. When complementary products are differentiated and are produced by two or more independent sellers, the producer of $X$ may bundle $X$ with the $Y$ of a single supplier (whether contractually or technologically). This denies the firm’s customers the opportunity to choose a different brand of $Y$ when they purchase $X$. For available brands is symmetric. If one of the brands is notably more popular, then exclusive dealing may reduce rather than increase total welfare. In Gabrielsen and Sørgard’s model, buyer-induced exclusive dealing may have a positive effect on total welfare but “will reduce welfare if the products are sufficiently differentiated” (1999, p. 135).
instance, automobile manufacturers select the brands of tires and audio systems that are installed in new cars. Microsoft selects the software products that occupy the Windows desktop on new personal computers. A hospital may select the anesthesiology practice that its patients must use for surgical procedures, and a cable TV system may limit the programming choices that are available to its subscribers. Where a large producer of X chooses a brand of Y for its customers, rather than allowing the customers to choose, the firm may leverage this ability to win advantageous terms of sale from Y producers. The welfare effects of this practice are similar to buyer-induced exclusive dealing in the distribution sector.

Exclusive dealing arrangements that are sought by suppliers with market power sometimes have anticompetitive exclusionary effects. It is unlikely that an exclusive dealing arrangement instigated by a retailer would be motivated by the goal of excluding other retailers or impeding the entry of new retailers. But it is worth asking whether a dominant retailer or distributor’s buyer-induced exclusive dealing might injure competition by restricting the distribution of less popular brands or brands introduced by new entrants. It is not inevitable, and probably not even likely, that buyer-induced exclusive dealing has serious exclusionary effects upstream. Even when the consumer population served by a large retailer have characteristics that make exclusive dealing advantageous for that retailer, this does not prevent the brands excluded by that retailer from being distributed by other retailers who serve different customer populations. Nor does it prevent consumers from switching retailers although such consumers would be expected to incur switching costs. And of course the retailer is not interested in driving the excluded supplier out of business because that would strengthen the strategic position of the retailer’s exclusive supplier.

22 This claim obviously cannot apply to an arrangement in which a supplier agrees to distribute its brand exclusively through a single retailer.
At present, the consensus view of exclusive dealing arrangements is that they can be either anticompetitive or efficiency-promoting depending on several factors. This view is predicated mainly on the analysis of seller-induced exclusive dealing. This paper’s analysis of buyer-induced exclusive dealing reinforces the consensus view.23 Exclusive dealing arrangements arise for different reasons in different commercial environments, and their effects on competition and welfare are not always the same. Submitting these practices to the rule of reason, rather than *per se* prohibition, remains the best antitrust response.

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23 In his survey of a wide variety of buyer-led vertical restraints, Dobson (2008) reaches a similar conclusion.
Retailer opts for an exclusive brand

Consumer welfare is greater with an exclusive brand
Appendix

**Proposition 1:** The retailer opts for an exclusive brand iff

\[ D \leq \max \left\{ \frac{1}{2}, \frac{a^{-\frac{1}{2}}}{1-a} \right\} \]

If the retailer exercises this option, then \( \hat{q}_1 \geq q_1^* \), \( \hat{p}_1 \leq p_1^* \) and \( \hat{T}_1 < T_1^* \).

**Proof:** If the retailer plays the common representation game, then the equilibrium values of prices, quantities and the associated values of the surplus created and distributed among the firms are as shown in the top row of the table. These expressions apply for all feasible values of the parameters \( a \) and \( D \). The values of \( \hat{V}_1 \) and \( \hat{V}_2 \), however, are not the same for all parameter values. There are three cases to consider as depicted in the table.

<table>
<thead>
<tr>
<th>Case</th>
<th>Parameters</th>
<th>( \hat{p}_1 )</th>
<th>( \hat{q}_1 )</th>
<th>( \hat{V}_1 )</th>
<th>( \hat{V}_2 )</th>
<th>( \hat{T}_1 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( D \geq \frac{a}{1-a} )</td>
<td>( 1+D )</td>
<td>( a )</td>
<td>( a(1+D) )</td>
<td>( (1-a)(1+D) )</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>( \frac{1-a}{a} &lt; D &lt; \frac{a}{1-a} )</td>
<td>( 1+D )</td>
<td>( a )</td>
<td>( a(1+D) )</td>
<td>1</td>
<td>( \frac{a(1+D)}{2} - \frac{1}{4} )</td>
</tr>
<tr>
<td>3</td>
<td>( D \leq \frac{1-a}{a} )</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>( \frac{1}{4} )</td>
</tr>
</tbody>
</table>

If the retailer plays the exclusive supplier game, the firm either charges \( p_1 = 1+D \) and sells \( q_1 = a \) units for a joint surplus of \( \hat{V}_1 = a(1+D) \), or charges \( p_1 = 1 \) and sells \( q_1 = 1 \) unit for a joint surplus of \( \hat{V}_1 = 1 \). The firm chooses the option that creates the larger joint surplus \( \hat{V}_1 \). In Cases 1 and 2, the retailer sets \( p_1 = 1+D \). In Case 3, the retailer sets \( p_1 = 1 \).
The disagreement point when the retailer bargains with manufacturer 1 is $\hat{V}_2$. If the retailer were to distribute only brand 2, there are two possibilities. The firm would either charge $p_2 = 1+D$ and sell $q_2 = 1-a$ units for a joint surplus of $\hat{V}_2 = (1-a)(1+D)$, or charge $p_2 = 1$ and sell $q_2 = 1$ unit for a joint surplus of $\hat{V}_2 = 1$, whichever joint surplus is greater. If $D \geq \frac{a}{1-a}$ as in Case 1, then $\hat{V}_2$ is greater with $p_2 = 1+D$. If $D < \frac{a}{1-a}$ as in Cases 2 and 3, $\hat{V}_2$ is greater with $p_2 = 1$.

Based on these values of $V_i^*, V_2^*, \hat{V}_i$ and $\hat{V}_2$, and on the retailer’s optimal distribution policy (14), the retailer never opts for an exclusive brand with Case-1 parameter values because
\[
\hat{V}_i + \frac{\hat{V}_2}{2} < V_i^* + V_2^* .
\]
With Case-2 parameter values, $\hat{V}_i + \frac{\hat{V}_2}{2} \geq V_i^* + V_2^*$ iff $D \leq \left( \frac{a-\frac{1}{2}}{1-a} \right)$. With Case-3 parameter values, $\hat{V}_i + \frac{\hat{V}_2}{2} \geq V_i^* + V_2^*$ iff $D \leq \frac{1}{2}$. When combined, the circumstances where $\hat{V}_i + \frac{\hat{V}_2}{2} \geq V_i^* + V_2^*$ holds are $D \leq \max \left\{ \frac{1}{2}, \frac{a-\frac{1}{2}}{1-a} \right\}$.

With Case-2 or Case-3 parameter values, we have $\hat{q}_i \geq q_i^*$ and $\hat{p}_i \leq p_i^*$. Also, equation (7) and the Case-2 and Case-3 values of $\hat{V}_i$ and $\hat{V}_2$ yield the values of $\hat{T}_i$ shown in the table. Equation (2) implies that $T_i^* = \frac{a(1+D)}{2}$, which is greater than both the Case-2 and Case-3 values of $\hat{T}_i$. ■
Proposition 2: Consumer welfare is greater when the retailer distributes an exclusive brand instead of both brands iff $D \leq \frac{1-a}{a}$. Total welfare is always less when the retailer distributes an exclusive brand.

Proof: Consumer welfare is greater with an exclusive brand only when the retailer sets $p_t = l$. The only parameter values that cause the retailer to set $p_t = l$ are those Case-3 parameter values as described in the proof of Proposition 1: $D \leq \frac{1-a}{a}$. If the retailer distributes both brands, then total welfare is $1+D$. But if the firm opts for an exclusive supplier, total welfare is $a(1+D)$ with Case-1 or Case-2 parameter values and $1+ad$ with Case-3 parameters.
References


