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Buyer Power and Intrabrand Coordination

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Abstract
We analyze the competitive effects of various contractual provisions in a situation where rival retailers make offers to a common manufacturer. In contrast to Marx and Shaffer (2007, *Rand Journal of Economics*, 38(3), 823–843), who find that a strong retailer can use slotting allowances (that is, upfront payments from manufacturers) to exclude its weaker rival, we show that foreclosure is no longer inevitable once retailers' offers can be contingent on the relationship being exclusive or not. There then exist equilibria that sustain the industry monopoly outcome; moreover, as long as retailers can use non-linear tariffs, such equilibria exist irrespectively of whether slotting allowances are allowed or banned. Non-contingent contracts, on the other hand, necessarily lead to exclusion, with or without slotting allowances. A ban on slotting allowances may therefore prove ineffective, while a ban on exclusive dealing options in supply contracts leads to foreclosure. (JEL: L14, L42)

1. Introduction

In recent years, contracts between manufacturers and retailers have become increasingly complex. Supply contracts nowadays tend to include a variety of discounts and lump-sum payments instead of simply stating a uniform unit price. Some of these contract terms, in particular upfront payments made by manufacturers to retailers, are at the center of heated competition policy debates in Europe and in the United

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States.[1] Such payments include slotting fees for access to (sometimes premium) shelf space, fees related to the introduction of new products, or listing and pay-to-stay fees that suppliers pay to be or remain on a retailer's (formal or informal) list of potential suppliers. The magnitude of such fees is substantial: the Federal Trade Commission (2003) reports that average (across products) slotting fees in the year 2000 ranged from $2,313 to $21,768, depending on the identity of the retailer. While pro-competitive justifications have been brought forward for fees related to the allocation of shelf space, advertising, or the introduction of new products,[2] listing and pay-to-stay fees are particularly contentious and trigger concerns that manufacturers could use them to dampen competition[3] or to exclude smaller rivals.[4]

At the same time, the grocery sector has witnessed a shift in bargaining power from suppliers towards retail chains.[5] Large supermarket chains often account for a high share of a manufacturer's production: in the United Kingdom, even large manufacturers typically rely on their main buyer for more than 30% of domestic sales. In contrast, the business of a leading manufacturer usually represents a very small proportion of business for each of the major retail chains. While large manufacturers certainly continue to possess a strong bargaining position on some must-stock brands, this strength does not necessarily carry over to other goods, since negotiations mostly take place on a product-by-product basis.[6]

Anecdotal evidence indicates that both the incidence and the magnitude of slotting allowances are related to this growing buyer power.[7] To capture this relationship, Marx and Shaffer (2007a) (MS hereafter) analyze the role of slotting fees in a framework where competing retailers make (simultaneous) take-it-or-leave-it offers to a common manufacturer.[8] They find that a strong retailer can exclude a weaker rival by requiring an upfront payment from the manufacturer (for example, a slotting fee) in exchange for a large conditional fee paid by the retailer only if it eventually buys from the manufacturer. Anticipating that the retailer will pay this fee only if it enjoys exclusivity,

1. See the reports by the US Federal Trade Commission (2001, 2003) and by the UK Competition Commission (2000, 2007). In France, manufacturers' payments were heavily debated during the 2005 reform of the 1996 Galland Act.

2. Fees related to promotional activities can compensate a retailer for additional effort (see, for example, Klein and Wright 2007). Fees related to the introduction of a new product may serve risk-sharing, signalling or screening purposes (see Kelly 1991).

3. Shaffer (1991) shows for example how manufacturers can maintain higher prices by combining slotting allowances with wholesale prices above marginal cost.

4. See, for example, Bloom, Gundlach, and Cannon (2000), and Shaffer (2005) for a formal analysis.

5. See Inderst and Mazzarotto (2008) for more evidence on the growing buyer power in retailing, as well as for a survey of the academic literature on buyer power and its implications.

6. See Competition Commission (2007).

7. See for example the Federal Trade Commission (2001) staff report. The Competition Commission (2000) also states that "some suppliers said that they regarded these charges as exploitation of the power differences between the retailer and the supplier."

8. Inderst (2005) analyzes slotting allowances in connection to buyer power in a situation where several manufacturers negotiate with a monopolistic retailer. He shows that when the retailer has a weak bargaining position it may gain by committing ex ante to carrying only one product, thereby transforming upstream competition into an auction where suppliers bid on slotting allowances.

the manufacturer declines the weaker rival's offer. MS's analysis thus suggests that upfront payments can play a key role in foreclosing retail markets, and provide a way to get around existing legislation against explicit exclusive dealing provisions.

In contrast to MS, we show that foreclosure is no longer inevitable once retailers can offer options that are contingent on the relationship being exclusive or not. In a framework similar to that of MS, except that retailers offer contingent contracts to the manufacturer, we find that firms can achieve the industry monopoly outcome in equilibrium. Moreover, there exist common agency equilibria that strictly Pareto-dominate, from the firms' point of view, the exclusive dealing equilibrium. Three-part tariffs of the type used by MS are sufficiently flexible to achieve industry monopolization. First, wholesale prices can be set so as to maintain final prices at the monopoly level. Imperfect retail competition however generates positive margins, which creates a risk of opportunistic behavior: each retailer is tempted to offer a lower wholesale price in order to eat into its rival's downstream profit. We show that conditioning fixed fees on actual trade provides an effective protection against such opportunism. It allows a retailer to opt out and waive the fee if a rival tries to undercut it, which makes the manufacturer less receptive to opportunistic offers. Upfront payments by the manufacturer can then be used to give ex ante each retailer (up to) its entire contribution to the industry profits.

Whether contractual terms can be conditional on exclusivity thus affects the findings dramatically. The intuition for this is as follows. In either case, whenever both retailers are active in equilibrium, the manufacturer must be indifferent between dealing with both or only one of the retailers, otherwise the rival retailer could ask for a better deal. If contracts are noncontingent, as in MS, each retailer is better off if the supplier accepts only its own offer: while fixed fees remain unchanged, the retailer earns higher variable profits. The manufacturer and each retailer can therefore increase their joint profits by excluding the rival retailer, which, as MS show, is possible by means of slotting allowances and conditional fees. Contingent contracts, on the other hand, provide many different ways to keep the manufacturer indifferent between accepting one or both offers and, as we will see, can easily be structured so as to ensure that no retailer can profitably deviate to exclusivity.

Allowing for contingent contracts, as in Bernheim and Whinston's (1998) seminal paper on exclusive dealing,[9] seems a reasonable modeling assumption. Firms may indeed discuss contingent plans. Moreover, even if in practice they negotiate a single option, allowing for contingent contracts can be viewed as a convenient short-cut for the renegotiation that a significant event, such as the termination of a rival, would likely trigger. Bedre (2007) confirms this conjecture by extending our analysis to include an explicit model of sequential bilateral bargaining à la Stole and Zwiebel (1996).[10]

9. Inderst and Wey (2003) also allow for contracts fully contingent on market structure in the bargaining procedure they use for endogenizing the Shapley value.

10. De Fontenay and Gans (2005a, 2005b) also apply Stole and Zwiebel's bargaining approach to vertical relations. The first paper considers secret contracts each stipulating a price–quantity pair, and shows that while the outcome is bilaterally efficient, it fails to maximize industry profits. The second paper studies the impact of vertical integration.

We also show that upfront payments are not necessary to achieve full intrabrand coordination. What matters is the retailers' ability to protect themselves against rivals' opportunism. Conditioning fees on a minimum positive quantity is equally effective and does not require any negative upfront payment. This observation also applies to the setting of MS: when only noncontingent offers are permitted, a strong retailer can exclude a weaker rival without relying on any negative upfront payment. This suggests that banning slotting allowances would not prevent exclusion, but lead retailers to turn to alternative forms of contracts that achieve the same outcome. Moreover, a restrictive public policy towards exclusive dealing provisions may in fact render exclusion more likely.

Related Literature. If the manufacturer had all the bargaining power, it could sustain monopoly prices by setting wholesale prices high enough to offset intrabrand competition, and recover retail profits through fixed fees. If offers are private, however, an opportunism problem arises: when negotiating with one retailer, the manufacturer has an incentive to free-ride on rivals' downstream margins. In various settings, Hart and Tirole (1990), McAfee and Schwartz (1994), O'Brien and Shaffer (1992) and Rey and Vergé (2004a) show how this prevents the manufacturer from sustaining the industry monopoly outcome.[11] De Fontenay and Gans (2005c) note however that, as long as contracts become public before retailers actually compete, conditional fixed fees solve this opportunism problem: as in our model, conditional fees deter opportunistic moves by allowing a retailer to opt out should the manufacturer, together with another retailer, attempt to free-ride on the retailer's downstream margin.[12]

Our framework is also related to the bidding games analyzed by Martimort and Stole (2003) and Segal and Whinston (2003), in which the downstream firms make the offers, but the upstream firm is the one that eventually chooses how much to supply. In that case, both downstream firms may be active in equilibrium but there always remains some downstream competition. In manufacturer–retailer relationships, however, it is more likely that retailers determine volumes.

Finally, it is interesting to contrast the situation studied here, in which competing retailers offer contracts to a common supplier, with the situation where competing suppliers offer contracts to a common retailer. As shown by Bernheim and Whinston (1985) in the case of potential retail competition, and by Bernheim and Whinston (1998) and by O'Brien and Shaffer (1997) in the case of retail bottlenecks, simple two-part tariffs (with wholesale prices reflecting marginal production costs) suffice to implement the industry monopoly outcome in that case. The retailer plays the role of a gatekeeper

11. Rey and Vergé (2004) also show that (under passive beliefs) the problem might be so important that no common agency equilibrium exists when retailers are close competitors. McAfee and Schwartz (1995) were the first to notice a (very different) non-existence issue when the number of retailers increases. Segal and Whinston (2003) note an existence problem when the manufacturer faces non-constant returns to scale. See Rey and Tirole (2007) for an overview of this literature.

12. In a similar context, Marx and Shaffer (2004) highlight the role of option menus in encouraging relationship-specific investments by retailers. In a sequential bargaining framework, the manufacturer can commit to refrain from opportunism by offering the first retailer two options, between which the retailer chooses after observing the other retailer's contract.

for consumers and fully internalizes the contracting externalities.[13] In contrast, in our framework simple two-part tariffs do not eliminate each retailer's incentive to free-ride on its rival's downstream margin. In the same vein, noncontingent contracts suffice to coordinate pricing decisions when competing manufacturers deal with a common retailer, whereas contingent offers are required when competing retailers make offers to a common supplier. The industry structure hence affects the degree of contractual sophistication needed to achieve the industry monopoly outcome.

The paper is organized as follows. Section 2 outlines the general framework and discusses exclusive dealing equilibria. Section 3 shows that three-part tariffs contingent on market structure suffice to maximize industry profits. Section 4 discusses other contractual arrangements that could be used to achieve the same outcome, including some that do not require slotting allowances. It also shows that (contingent) two-part tariffs do not suffice to generate the industry monopoly profits. Finally, Section 5 discusses some policy implications of our findings and concludes.

2. Framework and Preliminary Results

Two differentiated retailers, R_1 and R_2, can distribute the product of a manufacturer M. The manufacturer produces at constant marginal cost c, while retailers incur no additional distribution costs. Retailers have all the bargaining power in their bilateral relations with the manufacturer. The three firms interact as follows:

1. R_1 and R_2 simultaneously make take-it-or-leave-it offers to M. Offers can be contingent on exclusivity, that is, each R_i offers a pair of options $\left(T_i^C, T_i^E\right)$ where T_i^C and T_i^E, respectively, specify the terms of trade when the manufacturer accepts both offers or R_i's offer only.[14]
2. M decides whether to accept both, only one, or none of the offers. All offers and acceptance decisions are public.[15]
3. The retailers with accepted contracts compete on the downstream market, and the relevant contracts are implemented.

We do not specify the nature of downstream competition; in particular, our analysis applies to quantity as well as price competition. Denoting by $P_i\left(q_i, q_{-i}\right)$ the inverse demand function at store $i = 1, 2$ when R_i and R_{-i} sell q_i and q_{-i} units respectively,[16]

13. This holds in the absence of other sources of contracting externalities, such as externalities on third parties not present at the contracting stage, or vertical incentive problems. See Bernheim and Whinston (1986, 1998), Rasmusen, Ramseyer, and Wiley (1991), Segal and Whinston (2000), and Comanor and Rey (2000). We assume away any such contracting externalities.

14. Throughout the paper, superscripts C and E respectively refer to common agency and exclusive dealing situations.

15. Since the manufacturer always observes both contract offers, no problem of opportunism would arise in the first two stages of the game if offers were private. However, if retailers could not observe each other's contracts before competing on the product market, then each retailer would have an incentive to free-ride on its rival, which would limit the retailers' ability to avoid competition.

16. Throughout the paper, the notation "$-i$" refers to retailer i's rival.

the industry monopoly profit is

$$\Pi^M = \max_{q_1,q_2} \{(P_1(q_1, q_2) - c) q_1 + (P_2(q_2, q_1) - c) q_2\}.$$

The bilateral monopoly profit when only R_i is active is

$$\Pi_i^m = \max_{q} \{(P_i(q, 0) - c) q\}.$$

We assume that retailers are imperfect substitutes and, without loss of generality, that R_1 alone is at least as profitable as R_2 alone:

$$\Pi_1^m + \Pi_2^m > \Pi^M > \Pi_1^m \geq \Pi_2^m.$$

The above strict inequalities rule out the cases where retailers either serve independent markets, or are perfect substitutes. Both cases would be trivial: two-part tariffs suffice to achieve the monopoly outcome when markets are independent, while exclusive dealing is efficient (and monopoly profits are easily achieved) in case of perfect substitutability.

While we do not restrict attention to particular tariffs, for the sake of exposition we assume that there is a unique retail equilibrium for any pair of linear wholesale prices (w_1, w_2). We denote the continuation flow profits for R_i, M and the entire industry by, respectively, $\pi_i(w_1, w_2)$, $\pi_M(w_1, w_2)$ and $\Pi(w_1, w_2)$. We then make the following two assumptions.

ASSUMPTION 1. There exist wholesale prices (w_1^M, w_2^M) that sustain the monopoly outcome and thus generate the monopoly profits: $\Pi(w_1^M, w_2^M) = \Pi^M$.

ASSUMPTION 2. For $i = 1, 2$, $\partial \pi_i(w_1, w_2)/\partial w_{-i} > 0$.

Both assumptions hold in standard models. The first assumption simply asserts that setting wholesale prices at the appropriate level induces the retailers to charge monopoly prices despite intrabrand competition; it is always satisfied if the retail equilibrium is "stable" in the sense that an increase in the wholesale price charged to a retailer has a larger impact on that retailer's own price than on its rival's price. The second assumption is satisfied, for instance, whenever the increase in a retailer's wholesale price causes that retailer to increase its own price in the subsequent downstream competition stage.

Exclusive Dealing Equilibria. There always exist exclusive dealing equilibria. Clearly, if R_i insists on exclusivity (for example, by offering only exclusivity, or by degrading its non-exclusive option), then R_{-i} cannot do better than also insist on exclusivity. Furthermore, each R_i can easily generate the bilateral monopoly profit Π_i^m by offering to buy at cost $(w_i = c)$, and share the profit with M through a lump-sum fee. The contracting stage then boils down to a Bertrand-like competition for being the exclusive distributor, in which R_1 benefits from a comparative advantage whenever $\Pi_1^m > \Pi_2^m$. It is then straightforward to establish the following lemma.

LEMMA 1. *There always exist exclusive dealing equilibria:*

- *If* $\Pi_1^m > \Pi_2^m$, *in any such equilibrium* R_1 *is the active retailer while* R_2 *gets zero profit; among these equilibria, the retailers' preferred equilibrium yields* $\Pi_1^m - \Pi_2^m$ *for* R_1 *and* Π_2^m *for* M.[17]
- *If* $\Pi_1^m = \Pi_2^m$, *there exist two exclusive dealing equilibria, where either retailer is active. In both cases, retailers earn zero profits and* M *gets* Π_2^m.

3. Upfront Payments and Conditional Fixed Fees

Since R_{-i} and M can jointly obtain Π_{-i}^m through an exclusive deal, in any equilibrium R_i cannot obtain more than its contribution to the industry monopoly profit,

$$\Delta_i = \Pi^M - \Pi_{-i}^m.$$

This, in turn, implies that in any equilibrium where the industry profits are maximal, M must get at least

$$\Delta_M = \Pi^M - \Delta_1 - \Delta_2 = \Pi_1^m + \Pi_2^m - \Pi^M > 0.$$

We now show that three-part tariffs, with terms that are contingent on exclusivity, allow the retailers to implement monopoly prices and to obtain their contributions to the monopoly profits (Δ_1 and Δ_2, respectively).

The retailers can maintain the monopoly prices $(p_1, p_2) = (p_1^M, p_2^M)$ by setting wholesale prices at the appropriate levels (that is, $(w_1, w_2) = (w_1^M, w_2^M)$), and they can obtain their respective contributions to industry profits by adjusting fixed fees accordingly. For this to be an equilibrium outcome, two types of deviations must be deterred.

First, each retailer has an incentive to free-ride on its rival's downstream margin, which is positive since retailers are differentiated. Indeed, a slight reduction in R_i's wholesale price would generate only a second-order loss of total profits, since those are maximal when prices are at the monopoly level, but a first-order reduction in R_{-i}'s variable profit (see assumption A2). Therefore, as long as fixed payments remain unaffected, M and R_i's joint profits would increase, making such a deviation profitable. As will be shown, R_{-i} can protect itself against such opportunistic behavior by making fixed payments conditional on procuring a positive quantity from M. This allows R_{-i} to opt out ex post in case of a deviation and waive the conditional payment, which makes the deviation unprofitable. Second, a retailer may deviate to an exclusive dealing arrangement, which in the absence of contingent offers would eliminate any common agency equilibrium.

To see how both types of deviations can be deterred simultaneously, suppose that each retailer $i = 1, 2$ offers the following two options:

17. This is also the unique equilibrium in pure strategies in which the inefficient retailer's strategy is the limit of undominated strategies, and the unique equilibrium in undominated strategies if mixed strategies are allowed—see for example Deneckere and Kovenock (1996) and Blume (2003).

1. A three-part tariff for common agency,

$$T_i^C(q) = \begin{cases} -\Delta_i & \text{if } q = 0, \\ -\Delta_i + \pi_i\left(w_1^M, w_2^M\right) + w_i^M q & \text{if } q > 0, \end{cases}$$

where wholesale prices yield monopoly prices and quantities, and
   - R_i pays $\pi_i(w_1^M, w_2^M)$ as a conditional fee, that is, only if it actually buys a positive quantity—such that M recovers all retail profits;
   - M makes an upfront transfer Δ_i to R_i, so as to give R_i its full contribution to the industry profits.
2. A simple two-part tariff for exclusive dealing:[18]

$$T_i^E(q) = \Delta_M + cq,$$

where the wholesale price is set at cost and the fixed fee gives M its equilibrium profit Δ_M.

Acceptance of both contracts induces the retailers to implement the monopoly outcome: wholesale prices generate monopoly prices and quantities if both retailers buy at these prices, and they are indeed willing to buy since conditional payments do not exceed their corresponding profits. M is willing to accept both retailers' offers, since it earns the same profit, Δ_M, by accepting either one or both offers. Therefore, if these contracts are proposed, M accepts both, and this yields the monopoly outcome. Finally, the upfront payments give each R_i its contribution to industry profits, Δ_i. Moreover, no retailer has an incentive to offer an alternative contract (even outside the class of three-part tariffs):

- Since M can also obtain its profit Δ_M by opting for either retailer's exclusive offer, R_i must increase its joint profits with M in order to benefit from a deviation.
- Since R_{-i} gets exactly its contribution $\Delta_{-i} = \Pi^M - \Pi_i^m$, these joint profits are already equal to Π_i^m in the candidate equilibrium. Therefore, R_i cannot lure M into a more profitable exclusive dealing arrangement.
- Bilateral profits cannot be higher than Π_i^m in any common agency situation either, since total industry profits cannot exceed Π^M and, through the upfront payment, R_{-i} can always secure Δ_{-i} by not selling in the last stage.

The above contracts thus constitute an equilibrium in which both retailers are active and each retailer R_i earns its maximal achievable profit, Δ_i.[19] Both retailers therefore prefer this equilibrium to any other (exclusive dealing or common agency) equilibrium. The following proposition summarizes this discussion:

18. Whether the fixed fee is upfront or conditional does not matter for this exclusive dealing option, since the retailer always finds it profitable to order a positive quantity ex post.

19. It is easy to adapt the contracts so as to support different distributions of the monopoly profit Π^M among the firms. Any profile of profits $(\hat{\pi}_1, \hat{\pi}_2, \hat{\pi}_M)$ satisfying $0 < \hat{\pi}_i \leq \Delta_i$ for $i = 1, 2$, $\hat{\pi}_M \leq \Pi_2^m$ and $\hat{\pi}_1 + \hat{\pi}_2 + \hat{\pi}_M = \Pi^M$ can be supported by adjusting the upfront payments for common agency to $\hat{\pi}_1$ and $\hat{\pi}_2$, and the fixed fee for exclusive dealing to $\hat{\pi}_M$. There thus exists a continuum of common agency equilibria which, compared with the exclusive dealing equilibrium in Lemma 1, give the same profit to M ($\hat{\pi}_M = \Pi_2^m$) but higher profits to both R_1 and R_2. There also exist more profitable equilibria for M (giving it up to Π^M), but these are not trembling-hand perfect.

PROPOSITION 1. *When retailers can offer contingent three-part tariffs or more general contracts, there exists an equilibrium in which both retailers are active, industry profits are at the monopoly level* $\left(\Pi^M\right)$, *and the retailers earn their respective contributions to these profits* (Δ_1 *and* Δ_2).

Conditional payments give retailers the possibility of opting out, and thereby provide an effective protection against rivals' opportunistic moves. To sustain the monopoly outcome, however, the conditional fixed fees must be equal to the retailers' variable profits; to obtain their share of the profits, retailers therefore need to rely on compensation payments from the manufacturer (the upfront payments). Proposition 1 shows how contingent contracts of this type can eliminate retail competition.

Contingent vs. Noncontingent Contracts. Allowing retailers to offer different options for exclusive and non-exclusive relations—our only departure from MS's framework—thus suffices to restore the efficiency (from the point of view of the firms) of the equilibrium outcome. When contracts cannot be contingent, exclusion necessarily arises in equilibrium; in contrast, common agency equilibria exist once retailers can offer options that are conditional on market structure.

As already noted, in any common agency equilibrium M must be indifferent between accepting both retailers' offers or only one offer, otherwise the rival retailer could insist on a lower fixed fee. In the case of noncontingent contracts, however, each retailer earns strictly more if M rejects its rival's offer: fixed fees remain unchanged, but the retailer sells more and hence earns higher variable profits. Therefore, R_i and M could increase their joint profits by excluding retailer R_{-i}, which in turn implies that, they must get less than Π_i^m in this candidate equilibrium. Since, as shown by MS, they can achieve Π_i^m even without any explicit exclusive dealing provision, a profitable deviation always exists. Therefore, common agency cannot arise in equilibrium.

With contingent contracts, there are many ways to make the manufacturer indifferent between dealing with one or both retailers. The key difference with respect to noncontingent contracts is that it is now possible to structure contracts so that R_i prefers M accepting both offers and this bilateral pair's joint profits are at least equal to Π_i^m, which rules out deviations to exclusivity.

As mentioned in the introduction, we believe that allowing for contingent contracts is a reasonable modeling assumption. First, one may indeed expect firms to discuss both options. Second, even if they formally discuss a single option only, they do so with a specific market configuration in mind, and may renegotiate contract terms if the market configuration turns out different from expected.[20] Bedre (2007) models such renegotiation explicitly, using Stole and Zwiebel's (1996) model of sequential bilateral bargaining in which the outcome of each negotiation is observed by the rival retailer. If one negotiation breaks down the other retailer–manufacturer pair renegotiates "from scratch" the terms of what is now de facto an exclusive dealing agreement. Bedre (2007) shows that in equilibrium three-part tariffs similar to those presented previously

20. Indeed, contracts often stipulate a clause triggering renegotiation in case of a "material change in circumstances."

implement the industry monopoly outcome, thus confirming our insights. In addition, while we focus on take-it-or-leave-it offers by the retailers, Bedre (2007) allows for arbitrary relative bargaining power in each bilateral negotiation. She shows that the order of negotiations and the retailers' bargaining power do not affect equilibrium prices, but only profit sharing.[21]

So far, we have interpreted each option of a contingent contract as applying specifically to one, and only one, market configuration (common agency or exclusive dealing). To implement this in practice, a retailer could instead simply offer one option that leaves it up to the manufacturer whether to deal with one or both retailers, along with another option requiring exclusivity. To see that this would not affect our analysis, suppose that each R_i proposes the above contract, except that the option T_i^C now also allows M to deal exclusively with R_i if it wishes to do so. M can thus deal with a single retailer, say R_1, using either the exclusive dealing option, T_1^E, or the "free" option, T_1^C. In the former case, M obtains as before Δ_M. In the latter case, it obtains[22]

$$\begin{aligned}\pi_M\left(w_1^M, \infty\right) + \pi_1\left(w_1^M, w_2^M\right) - \Delta_1 &< \pi_M\left(w_1^M, \infty\right) + \pi_1\left(w_1^M, \infty\right) - \Delta_1 \\ &\leq \Pi_1^m - \Delta_1 = \Delta_M.\end{aligned}$$

Hence, whenever M chooses to deal with a single retailer, it prefers the exclusive dealing option; therefore, the previous analysis still applies.

4. Other Contractual Arrangements

The previous section shows that contingent three-part tariffs restore the existence of a common agency equilibrium with monopoly prices. We now show that alternative contractual arrangements, some of which do not rely on any payment by the manufacturer, can achieve the same result. We then note that, in contrast, simple two-part tariffs are not sufficient, even when their terms can be contingent on exclusivity.

4.1 Alternative Ways to Sustain Monopoly Prices

As noted in the previous section, to sustain the monopoly outcome each retailer must deter its rival from free-riding on its downstream margin. The above-described contracts (T_i^C and T_i^E) achieve this by allowing each R_i to respond drastically to any such attempt by opting out, that is, by ordering nothing and thereby waiving the conditional fee.

Such drastic responses are necessary to maintain the monopoly outcome.[23] Suppose for instance that retailers compete in quantities and let $\rho_i\left(q_i, q_{-i}\right) = P_i\left(q_i, q_{-i}\right) q_i$ denote the revenue generated by R_i's sales, which is assumed to be

21. Finally, Bedre (2007) also shows that, in the absence of renegotiation, noncontingent contracts no longer suffice to sustain monopoly prices, except in the special case where the manufacturer has all the bargaining power vis-à-vis the second retailer.

22. Since the retailer's variable profit increases, it is still willing to pay the conditional fee.

23. We are grateful to Mike Whinston for very insightful comments that provided the basis for the following discussion.

differentiable.[24] Starting from a candidate equilibrium sustaining the monopoly prices and quantities, consider a deviation by R_i that induces M to keep accepting both offers, but yields a slightly modified quantity q_i.[25] R_{-i}'s best response on the downstream market is then given by

$$q_{-i}^{BR}(q_i) = \arg\max_{q_{-i}} \left[\rho_{-i}(q_{-i}, q_i) - T_{-i}^{C}(q_{-i})\right],$$

and the joint profits of R_i and M are

$$\pi_{R_i-M}(q_i) = \rho_i\left(q_i, q_{-i}^{BR}(q_i)\right) - cq_i + T_{-i}^{C}\left(q_{-i}^{BR}(q_i)\right) - cq_{-i}^{BR}(q_i).$$

Suppose now that the tariff $T_{-i}^{C}(q_{-i})$ induces a reaction function $q_{-i}^{BR}(q_i)$ that is differentiable. We then have

$$\frac{d\pi_{R_i-M}}{dq_i} = \frac{\partial \rho_i}{\partial q_i} - c + \left(\frac{\partial \rho_i}{\partial q_{-i}} - c + \frac{dT_{-i}^{C}}{dq_{-i}}\right)\frac{dq_{-i}^{BR}}{dq_i}. \tag{1}$$

Given that R_{-i} chooses q_{-i} optimally, we also have

$$\frac{\partial \rho_{-i}}{\partial q_{-i}} = \frac{dT_{-i}^{C}}{dq_{-i}},$$

and therefore (1) can be rewritten as

$$\frac{d\pi_{R_i-M}}{dq_i} = \left(\frac{\partial \rho_i}{\partial q_i} - c\right) + \left(\frac{\partial \rho_i}{\partial q_{-i}} + \frac{\partial \rho_{-i}}{\partial q_{-i}} - c\right)\frac{dq_{-i}^{BR}}{dq_i}. \tag{2}$$

For the monopoly quantities (q_1^M, q_2^M), the second term on the right-hand side of (2) is equal to zero, but the first term is positive because it excludes the direct effect of a change in q_i on the profits generated by R_{-i}'s sales. Therefore, the monopoly outcome cannot prevail in equilibrium unless a small change in R_i's induces a large (that is, discontinuous) change in R_{-i}'s behavior.

This insight also applies to the bidding games considered by Martimort and Stole (2003) or Segal and Whinston (2003), where downstream firms offer non-linear contracts to a common supplier, but it is the supplier that eventually chooses the quantities to procure. Contracting externalities then generate an inefficient outcome for the firms: since q_{-i} is chosen by M, the negotiation over $T_i(.)$ has no effect on q_{-i}, which is simply set so as to maximize $T_{-i}(q_{-i}) - cq_{-i}$. Thus, $dq_{-i}^{BR}/dq_i = 0$.[26] In addition, when the manufacturer directly chooses quantities, retailers play no strategic role anymore once contractual terms are determined. As a result, whether contracts are public or secret, and whether the terms are set by the upstream or downstream parties,

24. The Appendix provides a similar analysis for the case of price competition.

25. R_i can for example achieve this through a simple point tariff specifying a fixed price for q_i.

26. (Dis-)economies of scale or scope, or congestion problems might reintroduce some interdependency. However, negative externalities would exacerbate the inefficiency by giving each pair $R_i - M$ an additional incentive to expand q_i (in order to induce R_{-i} to reduce its own quantity q_{-i}).

does not matter. Either way, each vertical structure maximizes its joint profits, which results in the same retail outcome.

There are a number of ways involving negative upfront fees that generate the necessary drastic responses to deviations:

- The common agency option can be a non-linear tariff of the form $T_i^C(q_i) = \rho_i(q_i, q_{-i}^M) - U_i$, where U_i is an upfront payment by M. Any attempt by R_{-i} to free-ride on R_i's sales induces R_i not to buy, and upfront payments can again be used to share the overall profits.
- A more radical solution would consist in selling the right to determine tariffs to the manufacturer.
- In the case of price competition, the common agency option can combine a two-part tariff with resale price maintenance. Suppose for example that the wholesale and the (imposed) retail prices are all equal to the monopoly price ($w_i^C = p_i^C = p_i^M$). This eliminates downstream margins and prevents each pair $R_i - M$ from free-riding on R_{-i}'s margin. In this way, M recovers all the industry profits, which can be redistributed through upfront payments.[27]

These alternative solutions all involve down-payments from the manufacturer to the retailers.[28] However, as we will see now, such "reverse" payments are not necessary: common agency equilibria with monopoly prices exist even when tariffs are restricted to be non-negative (that is, $T_i(q) \geq 0$ for any q).

For the sake of exposition, assume again that retailers compete in quantities and let $\widetilde{\Pi}_i(q_i, q_{-i}) = \rho_i(q_i, q_{-i}) - cq_i$ denote the profits generated by R_i's sales. Assume further that $\widetilde{\Pi}_i$ is continuous, concave in q_i, decreasing in q_{-i}, and that quantities are strategic substitutes, that is, $\partial^2 \widetilde{\Pi}_i / \partial q_i \partial q_{-i} < 0$, and consider the following tariffs:

$$T_i^C(q) = \begin{cases} cq & \text{if } 0 \leq q \leq \hat{q}_i, \\ cq + T_i & \text{if } \hat{q}_i < q \leq q_i^M, \\ +\infty & \text{if } q > q_i^M, \end{cases}$$

where $T_i = \widetilde{\Pi}_i(q_{-i}^M, q_i^M) - \Delta_i > 0$ and $\hat{q}_i$ is such that $\widetilde{\Pi}_i(\hat{q}_i, q_{-i}^M) = \widetilde{\Pi}_i(q_i^M, q_{-i}^M) - T_i - \Delta_i$.[29]

Within each range $[0, \hat{q}_i]$ and $\left]\hat{q}_i, q_i^M\right]$, R_i obtains the product at marginal cost and would thus be willing to buy more than q_i^M, which is prevented by making the

27. O'Brien and Shaffer (1992) make a similar point in the case of a manufacturer offering secret contracts to competing retailers; resale price maintenance then allows the manufacturer to eliminate any risk of opportunism by squeezing downstream margins.

28. Yet another solution is to allow R_i's offer to depend on the contract with R_{-i} (or simply on q_{-i}), as shown by Marx and Shaffer (2007b) in the present context, and by Battigalli, Fumagalli, and Polo (2006) in the bidding game context (where quantities are decided ex post by the manufacturer). However, such contract usually violates competition laws, since it can be seen as a horizontal agreement rather than a purely vertical contract.

29. Since $\widetilde{\Pi}_i(q_i, q_{-i}^M)$ is continuous, increases with q_i for $q_i \leq q_i^M$, and satisfies $\widetilde{\Pi}_i(0, q_{-i}^M) = 0$ and $\widetilde{\Pi}_i(q_i^M, q_{-i}^M) > \Delta_i$, there exists a unique threshold $\hat{q}_i \in]0, q_i^M[$ satisfying this condition. When retailers compete in prices rather than quantities, the threshold should be $\hat{q}_i = D_i(\hat{p}_i, p_{-i}^M)$, where $\hat{p}_i$ is such that $(\hat{p}_i - c)D_i(\hat{p}_i, p_{-i}^M) = \Delta_i$.

tariff prohibitively expensive for quantities above q_i^M. The relevant choice for R_i is therefore between $\hat{q}_i$ (bought at cost) and q_i^M (which involves the additional payment T_i). The threshold $\hat{q}_i$ such that R_i is indifferent between these two options when R_{-i} sells its monopoly quantity q_{-i}^M. This ensures that the monopoly outcome is a retail equilibrium if M accepts both contracts. Furthermore, in this equilibrium each R_i obtains its contribution to the industry profit, Δ_i; M thus obtains Δ_M, and each R_{-i} and M jointly obtain Π_{-i}^m, which is the most they could achieve under exclusive dealing, thereby ensuring that any deviation to exclusivity would be unprofitable. Moreover, any increase in q_{-i} above q_{-i}^M would lead R_i to drastically reduce its sales to (at most) $\hat{q}_i$ and hence reduce the payment to M down to production costs; it would therefore lower the joint profits of R_{-i} and M.[30] Exclusive dealing options guaranteeing M its equilibrium profit, Δ_M, then suffice to deter such deviations, since they prevent R_{-i} from deviating in a way that lowers M's profit.

Thus, the monopoly outcome can be sustained with tariffs that are not only positive, but also everywhere above cost. Similarly, in the case of noncontingent tariffs considered by MS, above-cost tariffs can be used to sustain exclusive dealing. Consider for instance the following contracts:

$$T_1^*(q) = \begin{cases} cq & \text{if } 0 \leq q \leq \hat{q}_1, \\ cq + \Pi_2^m & \text{if } q > \hat{q}_1, \end{cases} \quad \text{and} \quad T_2^*(q) = \begin{cases} 0 & \text{if } q = 0, \\ cq + \Pi_2^m & \text{if } q > 0. \end{cases}$$

Choosing $\hat{q}_1$ so that[31] $\widetilde{\Pi}_1(\hat{q}_1, 0) = \Pi_1^m - \Pi_2^m$ makes R_1 indifferent between buying $\hat{q}_1$ or the bilateral monopoly quantity $q_1^m \equiv \arg\max_q \widetilde{\Pi}_1(q, 0) (> \hat{q}_1)$ when it expects R_2 to be inactive; if instead R_1 expects R_2 to be active, then it reduces its order (to at most $\hat{q}_1$) and thus its payment, and the joint profits of R_2 and M cannot exceed $\widetilde{\Pi}_2(q_2, 0) \leq \Pi_2^m$. Similarly, R_2 is indifferent between buying $q_2^m \equiv \arg\max_q \widetilde{\Pi}_2(q, 0)$ or being inactive when it expects R_1 to be inactive, but prefers to remain inactive whenever R_1 is active, in which case the joint profits of R_1 and M cannot exceed $\widetilde{\Pi}_1(q_1, 0) \leq \Pi_1^m$. Therefore, if these tariffs are offered, there exists a continuation equilibrium where only R_1 is active (this is the case whenever M accepts R_1's offer), and no deviation by R_i can increase the joint profits of R_i and M, and thus can be profitable for R_i, since M can always secure the profit Π_2^m by accepting only the rival's offer. The above-cost tariffs T_1^* and T_2^* thus sustain the exclusive dealing outcome.

4.2 Two-Part Tariffs

In contrast to the various arrangements listed above, contingent two-part tariffs, of the form

$$T_i^k(q) = F_i^k + w_i^k q, \text{ for any } q \geq 0 \text{ and } k = C, E,$$

30. $\widetilde{\Pi}_i(\hat{q}_i, q_{-i}^M) = \widetilde{\Pi}_i(q_i^M, q_{-i}^M) - T_i$ and $\partial^2 \widetilde{\Pi}_i(q_i, q_{-i})/\partial q_i \partial q_{-i} < 0$ imply $\widetilde{\Pi}_i(\hat{q}_i, q_{-i}) > \widetilde{\Pi}_i(q_i^M, q_{-i}) - T_i$ for any $q_{-i} > q_{-i}^M$. Since $T_i^C(q_i) = cq_i$, the joint profits of M and R_{-i} boil down to $\widetilde{\Pi}_{-i}(q_{-i}, q_i)$ and thus cannot excced $\widetilde{\Pi}_{-i}(q_{-i}, 0) \leq \Pi_{-i}^m$.

31. In the case of price competition, $\hat{q}_i$ should be chosen so that $(P_i(\hat{q}_i, 0) - c)\hat{q}_i = \Delta_i$.

do not allow retailers to sustain monopoly prices. Indeed, under Assumption 2, a simple revealed preference argument shows that, in response to $w_{-i}^C = w_{-i}^M$, R_{-i} offers a wholesale price $w_i^C < w_i^M$ (adjusting the fixed fee F_i^C so as to absorb any impact on M's profit).

Moreover, with two-part tariffs, common agency equilibria may fail to exist. In any common agency equilibrium with wholesale prices $(\tilde{w}_1, \tilde{w}_2)$, $\tilde{w}_i$ must maximize the profits that R_i and M jointly achieve. The wholesale prices $(\tilde{w}_1, \tilde{w}_2)$ must therefore satisfy, for $i = 1, 2$,

$$\tilde{w}_i = W_i^{BR}(\tilde{w}_{-i}), \tag{3}$$

where the best reply function $W_i^{BR}(w_{-i})$ is given by

$$\begin{aligned} W_i^{BR}(w_{-i}) &= \arg\max_{w_i} \{\pi_i(w_1, w_2) + \pi_M(w_1, w_2)\} \\ &= \arg\max_{w_i} \{\Pi(w_1, w_2) - \pi_{-i}(w_1, w_2)\}. \end{aligned}$$

The above-mentioned revealed preference argument implies $W_i^{BR}(w_{-i}^M) < w_i^M$, and thus $(\tilde{w}_1, \tilde{w}_2) \neq (w_1^M, w_2^M)$. In addition, to rule out deviations to exclusive dealing, the industry profit $\widetilde{\Pi}$ corresponding to the wholesale prices $(\tilde{w}_1, \tilde{w}_2)$ must satisfy

$$\widetilde{\Pi} \geq \Pi_1^m, \tag{4}$$

otherwise R_1 and M would jointly earn less than Π_1^m (since R_2 cannot earn negative profits in equilibrium) and could therefore profitably deviate to exclusive dealing. Since $\widetilde{\Pi} < \Pi^M$,[32] condition (4) may be violated, in which case it cannot be that both retailers are active in equilibrium, even though this would be optimal for a fully integrated structure.

Conversely, with contingent tariffs, under condition (4) there exists a common agency equilibrium in which the industry profit is $\widetilde{\Pi}$ and each R_i gets its contribution, $\widetilde{\Pi} - \Pi_{-i}^m$. To see this, suppose that retailers offer common agency options that sustain $\widetilde{\Pi}$ (that is, $w_i^C = \tilde{w}_i$) and give each retailer its contribution (that is, $F_i^C = \pi_i(\tilde{w}_1, \tilde{w}_2) - (\widetilde{\Pi} - \Pi_{-i}^m)$), together with exclusive dealing options that generate the bilateral monopoly profit Π_i^m (that is, $w_i^E = c$) and leave M indifferent between common agency and exclusive dealing (that is, $F_i^E = \Pi_1^m + \Pi_2^m - \widetilde{\Pi}$). Since M can obtain the equilibrium profit by accepting either offer, to be profitable a deviation by R_i must increase its joint profits with M. The wholesale prices $(\tilde{w}_1, \tilde{w}_2)$ then rule out deviations to other common agency outcomes, and since the common agency fees already leave Π_i^m to each pair R_i–M, deviations to exclusive dealing are also unprofitable. The following proposition summarizes this discussion.

PROPOSITION 2. *When contracts are restricted to (contingent) two-part tariffs, common agency equilibria (that is, equilibria where both retailers are active) exist if and only if there exists a solution to the system (3) that generates an aggregate profit* $\widetilde{\Pi}$ *no lower than* Π_1^m. *Equilibrium industry profits are then* $\widetilde{\Pi} < \Pi^M$.

32. $\widetilde{\Pi} < \Pi^M$ whenever $\partial \pi_{-i}(w_1^M, w_2^M)/\partial w_i \neq 0$ for at least one R_i.

Thus, contingent options again reduce the scope for deviations to exclusivity, and, as a result, both retailers may well be active in equilibrium. Retailers can never fully coordinate, however, and industry profits are hence bound to remain below Π^M.[33] Finally, if this failure to coordinate is too severe (that is, $\widetilde{\Pi} < \Pi_1^m$), common agency cannot prevail in equilibrium.

One would expect $\widetilde{\Pi}$ to exceed Π_1^m when retailers are highly differentiated. At the extreme, if the two retailers operate in independent markets, then $\Pi^M = \Pi_1^m + \Pi_2^m$ and the pair R_i–M no longer has an incentive to free-ride on R_{-i}'s sales (in particular, Assumption 2 does not hold). Hence, the equilibrium profit is equal to the monopoly profit, that is $\widetilde{\Pi} = \Pi^M > \Pi_1^m$, implying that both retailers can be active even with two-part tariffs. If instead retailers are perfect substitutes, then $\widetilde{\Pi} < \Pi^M = \Pi_1^m$, so that exclusion necessarily occurs as long as general tariffs are infeasible. The inequality $\widetilde{\Pi} < \Pi_1^m$ is also more likely to hold when one retailer contributes much more than the other to the industry profit (that is, Π_1^m is close to Π^M). Banning sophisticated tariffs thus seems more likely to induce exclusion when retailers are rather undifferentiated and/or asymmetric, which is precisely when the exclusion of the weaker retailer is socially less costly.

We can illustrate this discussion using linear inverse demand functions:

$$P_1(q_1, q_2) = 1 - \frac{(1-\alpha)q_1 - \sigma q_2}{1-\sigma} \quad \text{and} \quad P_2(q_2, q_1) = 1 - \frac{(1+\alpha)q_2 - \sigma q_1}{1-\sigma}.$$

The parameter α measures the asymmetry between the two retailers (retailers are equally profitable when $\alpha = 0$, while R_1 becomes relatively larger than R_2 as α increases) while σ represents the degree of substitutability between the retailers (retailers face independent demands when $\sigma = 0$, and become closer substitutes as σ increases). Valid parameters must satisfy $\alpha, \sigma \in [0, 1[$ and $\alpha + \sigma < 1$, which ensures that the industry monopoly outcome involves a positive quantity for R_2. Production costs are normalized to zero ($c = 0$).

This linear specification satisfies all the assumptions of our general model and the system (3) has a unique solution $(\tilde{w}_1, \tilde{w}_2)$. Figure 1 shows the range of parameter values for which common agency equilibria exist, for the cases of quantity (bold line) and price (dashed line) competition. It confirms that exclusion is more likely when retailers are close substitutes (σ high) and/or relatively asymmetric (α high). Common agency is also more likely under price competition. Compared with quantity competition, it reduces downstream margins, which limits retailers' incentives to free-ride on each other; this in turn increases the candidate common agency profit, $\widetilde{\Pi}$, which is therefore more likely to exceed Π_1^m.

33. In a previous version, we analyzed the situation where retailers offer (contingent) two-part tariffs with fixed fees conditional on trade. In the absence of upfront payments, retailers then limit the size of the conditional fees, so as to retain some of the profits. While conditional fees contribute again to limit the risk of undercutting and sustain higher prices, they are never high enough to maintain the monopoly outcome.

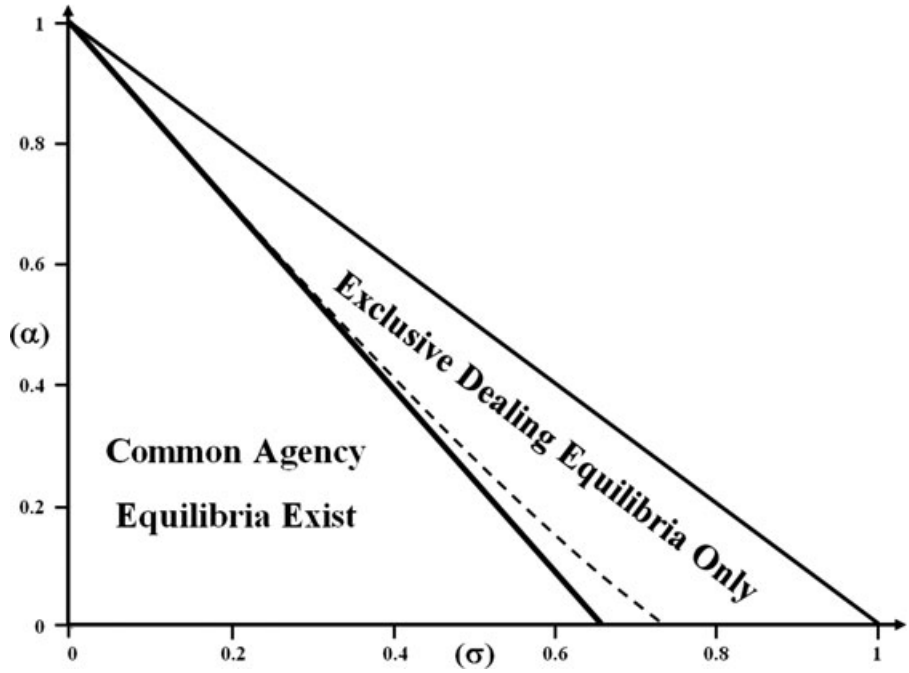

FIGURE 1. Equilibrium outcomes with (contingent) two-part tariffs.

It is also interesting to compare the equilibrium outcomes for different classes of contractual arrangements. Figure 2 shows the impact on consumer surplus of a restriction to two-part tariffs for the case of quantity competition (results are qualitatively the same for price competition, or for total welfare instead of consumer surplus), assuming that a common agency equilibrium prevails whenever multiple equilibria coexist.

Limiting contractual arrangements to two-part tariffs generates lower prices and thus benefits consumers (and society) as long as both retailers remain active, but it hurts them when it leads to exclusive dealing. However, as already observed, exclusion is more likely to occur when retailers are good substitutes and/or rather asymmetric (high values of σ and/or α in the linear demand example), which is precisely when the exclusion of the weaker retailer is socially less costly. As a result, the harm from exclusion, when it occurs, tends to be lower than the benefits from lower prices when both retailers remain active.

5. Policy Implications and Concluding Remarks

Our analysis highlights the role of buyer power in the design of contracts between manufacturer and retailers. As mentioned earlier, much of the literature on vertical contracting assumes that bargaining power rests upstream. Yet, in the course of the

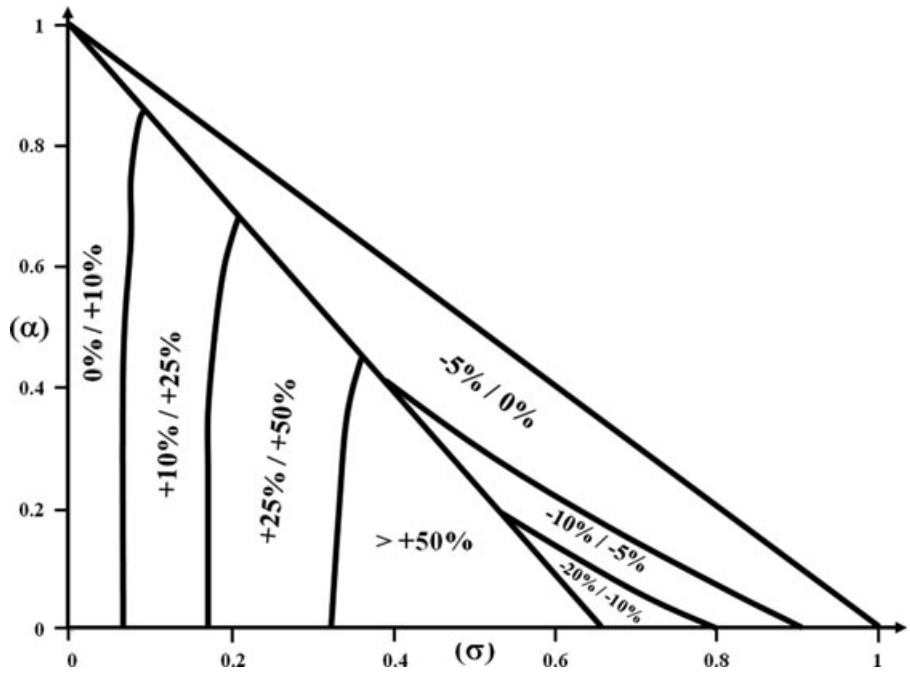

FIGURE 2. Impact on consumer surplus of a restriction to two-part tariffs.

past years bargaining power has often shifted towards large retailers. Our analysis is in line with the observation that retailer buyer power is positively correlated with the growing importance of contracts that are more sophisticated than simple two-part tariffs. When bargaining power lies upstream, the industry monopoly outcome can be achieved with two-part tariffs. Once retailers have some bargaining power, however, two-part tariffs no longer suffice to sustain the industry monopoly outcome, and the weaker retailer may moreover be excluded. More sophisticated contracts are thus needed to maintain monopoly prices and profits.

We show in this paper that contingent contracts combining slotting allowances with large conditional fees suffice to sustain the industry monopoly outcome. This result is robust: it does not depend on the type of retail competition (for example, prices vs. quantities), or the degree of differentiation or asymmetry among retailers. Even retailers that are close substitutes can maintain monopoly prices (through adequate wholesale prices) and discourage undercutting by adopting conditional fees, payable only in case of actual trade, equal to their anticipated variable profits. This allows each retailer to opt out and waive the fee if a rival tries to undercut it, which makes such deviation unappealing. This mechanism provides an effective protection against rivals' price cuts, but it also gives (ex post) all the profits to the manufacturer. Upfront payments by the manufacturer, such as slotting allowances, are thus required to transfer (ex ante) some of the profits to the retailers. In this way, retailers can obtain up to their full contribution to industry profits.

To sustain the monopoly outcome, contracts must be contingent on market structure.[34] Otherwise, as shown by MS, the stronger retailer always excludes its rival. Contingent contracts permit retailers to protect themselves against (explicit or de facto) exclusive dealing offers. In practice, firms often negotiate contractual terms with a specific market structure in mind. Allowing for contingent offers, as in Bernheim and Whinston (1998), provides a reasonable way to model this. Alternatively, Bedre (2007) captures this by assuming that firms negotiate a new contract if another bilateral negotiation breaks down. The industry monopoly outcome then again prevails, whatever the amount of buyer power in each bilateral negotiation.

However, (contingent) three-part tariffs are not the only way to achieve the monopoly outcome: more general non-linear tariffs or two-part tariffs combined with resale price maintenance generate the same outcome. More importantly, slotting allowances are not necessary. Contingent tariffs with conditional payments payable only if the retailer buys more than some critical level can also achieve the industry monopoly solution, even if one insists on tariffs being non-negative. Slotting allowances are not necessary in MS' framework either. If contracts are restricted to be noncontingent, exclusion always occurs, even if slotting allowances are ruled out.

Our results have two implications for competition policy. First, they suggest that basing policy rules on specific practices, such as slotting allowances, is likely to be ineffective. As just noted, banning slotting allowances does not prevent retailers from excluding weaker rivals in MS' framework, and does not prevent industry monopolization in our setup.

Second, comparing our analysis with that of Marx and Shaffer questions the relevance of a ban on exclusive dealing provisions. If exclusivity provisions are banned, then the weaker retailer is de facto excluded in equilibrium. If instead contracts can include exclusive dealing provisions, then both retailers are active in the most profitable equilibria. In other words, it is precisely when explicit exclusive dealing provisions are banned that exclusion necessarily occurs.

Appendix A: Price Competition

In this appendix, we show that large responses are needed to sustain the monopoly outcome when retailers compete in prices. Consider a deviation by R_i that induces M to accept both offers and leads to a slightly modified price p_i(R_i can for example

34. We suspect that this insight carries over to bilateral oligopoly situations. Rey and Vergé (2010) analyze a situation where two manufacturers have all the bargaining power in their relationships with two retailers. They show that, with noncontingent two-part tariffs, it can be the case that no equilibrium exists in which all channels are active, although each active channel would increase industry profits. The analysis of the present paper suggests that allowing for contracts contingent on the market structure (that is, on which channels are active) may restore the existence of "double common agency" equilibria. Mouraviev (2007) analyses a simplified framework (where the parties only decide whether to enter into a relationship) that supports this conjecture.

achieve this through resale price maintenance). R_{-i}'s best response is then given by

$$p_{-i}^{BR}(p_i) \equiv \arg\max_{p_{-i}} \; p_{-i} D_{-i}(p_{-i}, p_i) - T_{-i}^{C}(D_{-i}(p_{-i}, p_i)),$$

where $D_i(p_i, p_{-i})$ is the demand faced by R_i, when R_i and R_{-i} set retail prices equal to p_i and p_{-i} respectively. The joint profits of R_i and M then write as

$$\begin{aligned}\pi_{R_i-M}(p_i) = {} & (p_i - c) D_i\left(p_i, p_{-i}^{BR}(p_i)\right) \\ & + T_{-i}^{C}\left(D_{-i}\left(p_{-i}^{BR}(p_i), p_i\right)\right) - c D_{-i}\left(p_{-i}^{BR}(p_i), p_i\right).\end{aligned}$$

Assuming that R_{-i}'s reaction function $p_{-i}^{BR}(p_i)$ is differentiable, this change writes as

$$\begin{aligned}\frac{d\pi_{R_i-M}}{dp_i} = {} & D_i + (p_i - c)\frac{\partial D_i}{\partial p_i} + \left(\frac{dT_{-i}^{C}}{dq_{-i}} - c\right)\frac{\partial D_{-i}}{\partial p_i} \\ & + \left((p_i - c)\frac{\partial D_i}{\partial p_{-i}} + \left(\frac{dT_{-i}^{C}}{dq_{-i}} - c\right)\frac{\partial D_{-i}}{\partial p_{-i}}\right)\frac{dp_{-i}^{BR}}{dp_i}.\end{aligned} \tag{A.1}$$

Given that p_{-i} has been chosen optimally by R_{-i}, we have

$$\frac{dT_{-i}^{C}}{dq_{-i}}\frac{\partial D_{-i}}{\partial p_{-i}} = p_{-i}\frac{\partial D_{-i}}{\partial p_{-i}} + D_{-i},$$

and (A.1) thus rewrites as

$$\begin{aligned}\frac{d\pi_{R_i-M}}{dp_i} = {} & D_i + (p_i - c)\frac{\partial D_i}{\partial p_i} + (p_{-i} - c)\frac{\partial D_{-i}}{\partial p_i} + D_{-i}\frac{\partial D_{-i}}{\partial p_i}\Big/\frac{\partial D_{-i}}{\partial p_{-i}} \\ & + \left((p_i - c)\frac{\partial D_i}{\partial p_{-i}} + (p_{-i} - c)\frac{\partial D_{-i}}{\partial p_{-i}} + D_{-i}\right)\frac{dp_{-i}^{BR}}{dp_i}.\end{aligned} \tag{A.2}$$

Since the monopoly prices (p_i^M, p_{-i}^M) satisfy

$$(p_i - c)\frac{\partial D_i}{\partial p_i} + D_i + (p_{-i} - c)\frac{\partial D_{-i}}{\partial p_i} = 0, \quad \text{for } i = 1, 2,$$

evaluating (A.2) at the monopoly prices yields

$$\left.\frac{d\pi_{R_i-M}}{dp_i}\right|_{p_i^m} = D_{-i}\frac{\partial D_{-i}}{\partial p_i}\Big/\frac{\partial D_{-i}}{\partial p_{-i}} \neq 0.$$

Hence, the equilibrium tariffs cannot induce the equilibrium outcome. In order to generate the efficient outcome (from the firms' point of view), a small change in R_i's contract must therefore induce a "large" (that is, discontinuous) change in R_{-i}'s behavior.

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