Opportunism and Nondiscrimination Clauses

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October 2001

Abstract

When an upstream seller negotiates with multiple downstream buyers, the upstream firm may have an incentive to engage in opportunistic behavior by first negotiating contract terms with one downstream firm and then offering a lower wholesale price to a rival downstream firm. In these situations, we show that the upstream firm can commit not to act opportunistically by including nondiscrimination clauses in its contracts. Our results are surprising because previous literature has suggested that nondiscrimination clauses are ineffective in these environments. In addition to providing a new explanation for the use of nondiscrimination clauses in intermediate goods markets, we also discuss the implications of our results for the problem of encroachment in franchising.

JEL Classification Codes: D43, D45, L14, L42

Keywords: Most-Favored-Customer Clauses, Best-Price Provisions

*We thank two anonymous referees, Tim Besley, Jim Brickley, Terry Hendershott, Glenn MacDonald, Cliff Smith, Jerry Zimmerman, seminar participants at University of Bergen, Cornell University, University of Rochester, University of Wisconsin, Yale University, the Federal Trade Commission, the 1999 Southeast Economic Theory Meetings, and the 2000 Summer Industrial Organization Conference at University of British Columbia for helpful comments on previous drafts of the paper. We thank the National Science Foundation (Grant SES-0001903) for financial support. The authors can be reached at the William E. Simon Graduate School of Business, University of Rochester, Rochester, NY 14627, or by e-mail at marx@simon.rochester.edu or shaffer@simon.rochester.edu.

1 Introduction

Nondiscrimination clauses, also known as most-favored-customer clauses or best-price provisions, make a seller's best terms available to all buyers. Such clauses are frequently found in both final goods and intermediate goods markets.[1]

The predominant explanation for nondiscrimination clauses is that they allow a seller to commit not to lower its price to future buyers. For example, in durable-goods markets with sales to final consumers, Butz (1990) shows that a monopolist seller can solve the well-known dynamic inconsistency problem by offering nondiscrimination clauses in its sales contracts. The idea is that nondiscrimination clauses allow a monopolist to commit to its initial contract offer because if it were to offer better terms to a later buyer, all of its previous buyers would request the same treatment, and the seller's attempt to discriminate would be defeated.[2]

However, the premise that a buyer would automatically invoke its nondiscrimination clause if a future buyer were to receive better terms (e.g., a lower average price) has been challenged by McAfee and Schwartz (1994) in the case of intermediate goods markets. They show that nondiscrimination clauses may be ineffective in committing a seller to its initial sales contract when its buyers' payoffs are interdependent and contracts have multiple terms.[3] Although the buyers in these markets would all prefer to have the favored buyer's lower marginal price, each might prefer to operate under its own sales contract rather than accept the rest of the favored buyer's terms.

McAfee and Schwartz's insight has far-reaching implications for theory and public policy because nondiscrimination clauses are often observed in intermediate goods

[1] Contracts are publicly available on the Internet for companies such as IBM, Intel, and BlueCross BlueShield.

[2] In Cooper (1986), a nondiscrimination clause allows a firm to commit to high prices over time to induce less agressive pricing on the part of its rivals. See also Salop (1986), Neilson and Winter (1992, 1993), and Schnitzer (1994). In Crocker and Lyon (1994), a nondiscrimination clause assuages fears of future opportunism by committing a seller to treat new and locked-in buyers alike.

[3] DeGraba and Postlewaite (1992) show that nondiscrimination clauses can prevent seller opportunism in intermediate goods markets when each buyer purchases at most one unit. In their model, the optimal contracts consist only of fixed fees.

markets, and because in antitrust cases in which these clauses are alleged to be anticompetitive,[4] it is claimed that nondiscrimination clauses lead to higher prices.[5] However, if McAfee and Schwartz are correct that nondiscrimination clauses do not reduce a seller's incentive to offer discriminatory discounts, then there currently is no explanation in the literature for the role of nondiscrimination clauses in many intermediate goods markets, and thus there currently is no theoretical support for the claim that nondiscrimination clauses lead to higher prices in these markets.

In this paper we offer a new perspective on the role of nondiscrimination clauses in intermediate goods markets. In contrast to existing literature, which assumes that nondiscrimination clauses work by enabling a seller to commit to its *initial* sales contract, we propose that nondiscrimination clauses work by enabling a seller to commit to its *final* sales contract. The seller chooses the terms of its initial set of contracts so that when the last contract is offered, the buyers that already have contracts will want to invoke their nondiscrimination clauses. We find that in the absence of nondiscrimination clauses, the incentive to act opportunistically against buyers that are committed to contracts, in favor of buyers that have not yet committed to contracts, leads to lower prices for consumers. With nondiscrimination clauses, the seller's opportunism problem is solved and consumer prices are indeed higher.

We illustrate these ideas in a model with one seller and two potential buyers (our results generalize to any number of buyers), and we show that, under some weak conditions on joint payoffs, equilibria exist in which the first buyer's contract is optimal even if there is uncertainty about whether or not the second buyer will enter the market. In the initial contract of these equilibria, the seller offers a nondiscrimination clause and terms that maximize the joint payoff of itself and the first buyer,

[4]Although the literature has focused on the anticompetitive potential of nondiscrimination clauses, nondiscrimination clauses can also be procompetitive, especially in markets in which buyers would otherwise be reluctant to invest in relationship-specific assets (Crocker and Lyon, 1994).

[5]See U.S. v. Eli Lilly, 1959 Trade Cases [CCH] ¶69,536 (D. N.J. 1959), U.S. v. General Electric Co., 42 Fed. Reg. 17,005-10 (March 30, 1977), and Ethyl Corp., 101 FTC 425 (1983). Other antitrust cases involving nondiscrimination clauses include industries such as physicians and hospital services, infant formula, dental care, pharmaceuticals, shipping, oil pipelines, and TV programming.

conditional on there being only one buyer. If the second buyer does not enter the market, then the seller does not need to change anything and the joint payoff of the seller and first buyer is maximized. But if the second buyer does enter the market, then the seller offers a nondiscrimination clause and terms to the second buyer that maximize the joint payoff of itself and *both* buyers. In equilibrium, the first buyer invokes its nondiscrimination clause and once again overall joint payoff is maximized.

These results suggest that nondiscrimination clauses can solve the problem of encroachment in franchising. Franchisees often claim that franchisors are acting opportunistically when they open additional outlets, while franchisors claim that multiple outlets are needed to exploit profitable opportunities in a given geographic area. The problem is how to preserve the franchisor's incentive to maximize overall joint payoff and at the same time eliminate its incentive to act opportunistically. While policy-makers have debated the merits of enacting legislation to protect franchisees against hold-up,[6] the market solution that is often proposed is that franchisors should offer exclusive territory provisions in their contracts, thus granting local monopolies to their franchises (Caves and Murphy, 1976; Blair and Kaserman, 1982; Mathewson and Winter, 1994). However, exclusive territory provisions and legislation that limits a franchisor's ability to open additional outlets are widely recognized to be second-best solutions. Surprisingly, with the exception of DeGraba and Postlewaite (1992), the use of nondiscrimination clauses as a market solution has received little attention.

The rest of the paper proceeds as follows. In Section 2, we describe the model and discuss the seller's opportunism problem. In Section 3 we show how nondiscrimination clauses can solve the opportunism problem when contracts are offered sequentially, and we discuss their application to the problem of encroachment in franchising. In

[6] Most of the legislation pertains to car dealerships, as 37 states have statutes that restrict auto makers from establishing additional franchisees in the vicinity of an existing franchisee (ABA, 1991, p. 89). More generally, Wisconsin has a "Fair Dealership Law," Washington and Indiana have franchising statutes that make encroachment potentially a deceptive trade practice, and Iowa has a law that restricts encroachment in all franchising systems operating within its state boundaries. Franchisees have occasionally sought redress from antitrust laws, but successful challenges have been few. For an exception, see Photovest Corp. v. Fotomat Corp., 606 F.2d 704 (7th Cir. 1979).

Section 4, we show that our results are robust to environments in which contracts are offered simultaneously to both buyers. In Section 5, we conclude.

2 Model and preliminary results

Suppose an upstream monopolist sells an input to two potential downstream firms, which then use the input to produce substitute products. The monopolist offers its supply terms on a take-it-or-leave-it basis. Denote the monopolist's offer to firm i as the pair (r_i, f_i), where r_i is the wholesale price of the input and f_i is a fixed fee. The monopolist produces at constant marginal cost $z \geq 0$ and has no fixed cost.

The monopolist makes an offer to firm 1. Firm 1 either accepts or rejects its offer. The monopolist then makes an offer to firm 2. Firm 2 either accepts or rejects its offer. For now, we assume firm 2 observes firm 1's offer and decision before making its own decision. If a firm rejects its offer, it earns zero and exits the market. If a firm accepts its offer, it spends $k > 0$ on relationship-specific assets (these costs are not contractible and sunk once incurred). After both firms make their accept-or-reject decisions, all offers and decisions are observed. The firms can then either exit or participate in the product market. If a firm exits, its continuation payoff is zero; otherwise, it competes in the product market under the terms of its accepted contract.

We assume the product market equilibrium is unique for any (r_1, r_2) in which both firms are active, with firm i's equilibrium flow payoff given by $\pi_i(r_1, r_2)$. For r_i sufficiently large, firm i's flow payoff is zero. If both firms are active, we assume π_i is decreasing in r_i and increasing in r_j for $i \neq j$, so that a firm's flow payoff is decreasing in its own wholesale price and increasing in the wholesale price of its competitor. We also assume, as in McAfee and Schwartz (1994), that the cross-partial of π_i is negative:

$$\frac{\partial^2 \pi_i(r_1, r_2)}{\partial r_1 \partial r_2} < 0, \tag{1}$$

which implies that firm i's flow payoff is less sensitive to a decrease in its own wholesale price the lower is the wholesale price of its competitor.[7] Intuitively, a firm benefits from a decrease in its own wholesale price in proportion to how much it produces. The lower is its competitor's wholesale price, the lower is its own output, and thus the less it gains from a decrease in its own wholesale price. This assumption holds when demand is linear in both Cournot and Bertrand models of product-market competition.

Let $q_i(r_1, r_2)$ be firm i's equilibrium input demand as a function of the wholesale prices. Then the monopolist's flow payoff is $\sum_{i=1}^{n}(r_i - z)q_i(r_1, r_2)$ and, if both firms are active, the overall joint payoff of the monopolist and downstream firms is

$$\Pi(r_1, r_2) \equiv \sum_{i=1}^{2}(r_i - z)q_i(r_1, r_2) + \sum_{i=1}^{2}(\pi_i(r_1, r_2) - k).$$

Let $u_i(r_1, r_2)$ be the joint payoff of the monopolist and firm i ignoring fixed fees:

$$\begin{aligned} u_i(r_1, r_2) &\equiv \sum_{j=1}^{2}(r_j - z)q_j(r_1, r_2) + \pi_i(r_1, r_2) - k \\ &= \Pi(r_1, r_2) - (\pi_j(r_1, r_2) - k). \end{aligned}$$

We assume $\Pi(r_1, r_2)$ and $u_i(r_1, r_2)$ are twice differentiable, concave in r_i, and have the property that own price effects dominate cross price effects, i.e., $\left|\frac{\partial^2 \Pi}{\partial r_i^2}\right| > \left|\frac{\partial^2 \Pi}{\partial r_i \partial r_j}\right|$ and $\left|\frac{\partial^2 u_i}{\partial r_i^2}\right| > \left|\frac{\partial^2 u_i}{\partial r_i \partial r_j}\right|$. We also assume the downstream firms are symmetric.[8]

Seller's Opportunism Problem

Assuming it is optimal for the upstream monopolist to sell to both downstream firms, if the monopolist could commit to a single contract, it would want to offer (r^*, f^*), where $r^* \equiv \arg\max_{r \geq 0} \Pi(r, r)$ and $f^* \equiv \pi(r^*, r^*) - k$.[9] Given (r^*, f^*), each downstream firm would accept its offer and the monopolist would earn $\Pi(r^*, r^*)$, which is the maximum overall joint payoff.

[7] For example, suppose $r_1' < r_1$, and $r_2' < r_2$. Then (1) implies that $\pi_1(r_1', r_2') - \pi_1(r_1, r_2') < \pi_1(r_1', r_2) - \pi_1(r_1, r_2)$. Although both sides are positive, the gain to firm i of obtaining a lower wholesale price is less when the rival's wholesale price is r_2' than when it is r_2, for all $r_2' < r_2$.

[8] Given (r_1', r_2') and (r_1'', r_2''), where $r_1'' = r_2'$ and $r_2'' = r_1'$, then $\pi_i(\mathbf{r}') = \pi_j(\mathbf{r}'')$.

[9] Symmetry allows us to drop the subscript on π when all firms have a common wholesale price. Our assumptions imply that $\Pi(r, r)$ is concave and thus $\arg\max_{r \geq 0} \Pi(r, r)$ is unique.

The problem is that the monopolist cannot commit to a single contract, and therefore firm 1 must agree to its contract terms without knowing firm 2's offer. This creates an incentive for seller opportunism. In the absence of a commitment not to act opportunistically against firm 1, the monopolist's incentive is to choose (r_2, f_2) to shift flow profit away from firm 1 and towards firm 2.

To see this, let $\hat{r}_2(r_1; f_1)$ be the wholesale price that maximizes the joint payoff of the monopolist and firm 2 given firm 1's wholesale price and fixed fee, i.e.,

$$\hat{r}_2(r_1; f_1) \in \arg\max_{r \geq 0} u_2(r_1, r) + f_1 \tag{2}$$

subject to firm 1's participation constraint,

$$\pi_1(r_1, r) - f_1 \geq 0. \tag{3}$$

It follows from the concavity of $u_2(r_1, r)$ that $\hat{r}_2(r^*; f^*) < r^*$. In lowering firm 2's wholesale price below r^*, the monopolist shifts flow profit away from firm 1 and towards firm 2. The monopolist then captures the extra surplus created by charging firm 2 a higher fixed fee: $\hat{f}_2 > f^*$, where $\hat{f}_2 \equiv \pi_2(r^*, \hat{r}_2(r^*; f^*)) - k$.

This implies that it cannot be an equilibrium for the monopolist to offer the contract (r^*, f^*) to both downstream firms, because it can earn higher payoff by lowering firm 2's wholesale price (to shift rents) and raising its fixed fee (to extract the extra surplus created). Ultimately, however, the monopolist loses because, in equilibrium, firm 1 will anticipate the monopolist's incentive for opportunism and adjust its accept or reject decision accordingly. This yields the following proposition.

Proposition 1 *In the absence of a commitment not to act opportunistically, the seller cannot obtain the joint-payoff-maximizing outcome in equilibrium.*[10]

The monopolist's predicament arises because of its inability to commit not to discriminate against its own downstream firms. Achieving commitment in practice is

[10]McAfee and Schwartz (1994) show this for the case where $k = 0$, the fixed fees are paid at the time of the downstream firms' accept and reject decisions, and the fixed fees are not refundable. It is important to note that if the fixed fees are refundable in their model, or if $k = 0$ in our model, then there is no opportunism problem because firm 1 has no flow payoff. See our working paper.

difficult because the opportunism can take many forms. In addition to discrimination on wholesale prices and fixed fees, the opportunism can take the form of differences in delivery terms, advertising subsidies, credit terms, cases of free goods, and so on. For example, a seller may offer incentives to its downstream firms in the form of advertising promotions or other demand-enhancing programs. To the extent that the seller can discriminate in its offerings, the effect on each downstream firm's pricing behavior will vary, and thus the seller's ability to be opportunistic may be present even if it does not literally discount the wholesale price. All that is required is that there be some variable component that causes the firms' flow payoffs to move in opposite directions. Although the problem could be solved if the monopolist could commit to these various terms in all contracts at the outset, this would require complete state-contingent contracts, something that typically is not possible in actual contracts.[11]

3 Nondiscrimination game

One might think that the monopolist can eliminate the loss in overall joint payoff due to the opportunism problem by including in each contract a nondiscrimination clause that gives each firm the right to replace its initially accepted contract with any other contract offered to and accepted by the rival firm prior to competing in the product market. The implicit assumption is that firm 1 should be willing to accept the terms (r^*, f^*) and a nondiscrimination clause, because if its rival were to receive better terms, it could invoke its nondiscrimination clause and be no worse off.

However, McAfee and Schwartz (1994) show that nondiscrimination clauses may do nothing to prevent opportunism in this case. To understand where the above reasoning goes wrong, suppose firm 1 accepts the terms (r^*, f^*) and a nondiscrimination

[11] Much of the contracting literature (see Williamson, 1985) considers opportunism between two-parties, where a downstream firm fears that, having made relationship-specific investments, the upstream firm will behave opportunistically by *raising* its wholesale price. In that case, to avoid opportunism, the downstream firm can agree to a long-term contract that commits the upstream firm to its contractual terms. However, in the kind of opportunism we consider, the downstream firm would also have to receive assurances about the contract terms offered to its rivals.

clause, and the monopolist offers to firm 2 the same opportunistic wholesale price and fixed fee as before, $(\hat{r}_2(r^*; f^*), \hat{f}_2)$, where $\hat{r}_2(r^*; f^*) < r^*$ and $\hat{f}_2 > f^*$. In this case, if firm 1 does not invoke its nondiscrimination clause, its payoff is

$$\pi_1(r^*, \hat{r}_2(r^*; f^*)) - \pi_1(r^*, r^*) < 0, \tag{4}$$

and if firm 1 does invoke its nondiscrimination clause, its payoff is

$$\pi_1(\hat{r}_2(r^*; f^*), \hat{r}_2(r^*; f^*))) - \pi_1(\hat{r}_2(r^*; f^*), r^*) < 0, \tag{5}$$

where $\pi_1(\hat{r}_2(r^*; f^*), r^*) = \pi_2(r^*, \hat{r}_2(r^*; f^*))$ by symmetry. Although firm 1's payoff is negative in both cases, firm 1 will not invoke its nondiscrimination clause because its payoff in (5) is strictly lower. This follows because the cross-partial derivative of π_1 is negative. Intuitively, firm 1 will not invoke its nondiscrimination clause to obtain firm 2's lower wholesale price because it would have to pay firm 2's higher fixed fee. The incremental value to firm 1 of having the lower wholesale price $\hat{r}_2$ rather than r^* when firm 2 also has wholesale price $\hat{r}_2$ is less than the incremental fixed fee it would have to pay. This incremental fixed fee is the incremental value to a firm of having wholesale price $\hat{r}_2$ rather than r^* when its rival has wholesale price r^*.

The implication of McAfee and Schwartz' insight is that buyers do not automatically invoke their nondiscrimination clause if another buyer receives better terms,[12] and thus that nondiscrimination clauses may be ineffective in committing a seller to its initial contract. For example, the conditions in (4) and (5) imply that firm 1 will reject any contract in which it is offered (r^*, f^*) and a nondiscrimination clause.

However, McAfee and Schwartz' insight *does not* imply that the joint-payoff-maximizing outcome cannot be obtained in equilibrium. To see this, let $W_1 \equiv \{r_1 \mid r_1 \geq 0,\ \pi_1(r_1, \infty) > 0\}$ be the set of wholesale prices for firm 1 such that firm 1 would operate if it were a monopolist, and consider whether there is an equilibrium in which

[12] Let P_i be firm i's equilibrium price to consumers. If firm 1 has contract (r^*, f^*) and firm 2 has contract $(\hat{r}_2(r^*; f^*), \hat{f}_2)$, then the average price paid by firm 2 for its input is $P_2 - \frac{k}{q_2}$ and the average price paid by firm 1 for its input when (3) binds is P_1. Since $P_1 > P_2$ (firm 2 has a lower marginal cost), it follows that, in equilibrium, firm 2 pays a lower average price for its input.

the monopolist offers (r'_1, f'_1) and a nondiscrimination clause to firm 1, where $r'_1 \in W_1$ and $f'_1 = \pi_1(r'_1, \infty) - k$, and then offers the contract (r^*, f^*) to firm 2.

Given these contracts, we begin by showing that firm 1 will invoke its nondiscrimination clause. To see this, note that firm 1's continuation payoff if it does not invoke its nondiscrimination clause is $\pi_1(r'_1, r^*) - f'_1$, and its continuation payoff if it does invoke its nondiscrimination clause is k. Since $f'_1 > \pi_1(r'_1, r^*) - k$, firm 1 invokes its nondiscrimination clause. Assuming firm 2 will be offered (r^*, f^*) (this satisfies firm 2's participation constraint), firm 1's payoff is zero if it accepts its initial contract. Thus, firm 1 is willing to accept the terms (r'_1, f'_1) and a nondiscrimination clause, provided it is optimal for the monopolist to offer the contract (r^*, f^*) to firm 2.

We now show that it is optimal for the monopolist to offer the contract (r^*, f^*) to firm 2. In particular, we must show that the monopolist does not want to offer a contract to firm 2 such that firm 1 does not invoke its nondiscrimination clause. The monopolist maximizes its continuation payoff, subject to no firm's invoking its nondiscrimination clause, by choosing (r_2, f_2) such that f_2 satisfies firm 2's participation constraint with equality, i.e., $f_2 = \pi_2(r'_1, r_2) - k$, and such that r_2 solves

$$\max_{r_2 \geq 0} u_2(r'_1, r_2) + f'_1, \tag{6}$$

subject to the participation constraint for firm 1,

$$\pi_1(r'_1, r_2) - f'_1 \geq 0, \tag{7}$$

and the constraint that firm 1 does not invoke its nondiscrimination clause,

$$\pi_1(r'_1, r_2) - f'_1 \geq \pi_1(r_2, r_2) - f_2. \tag{8}$$

If there is no interior solution to (6)–(8), then the monopolist maximizes its payoff subject to firm 1's not invoking its nondiscrimination clause by not selling to firm 2. In this case, the monopolist has higher payoff with contract (r^*, f^*). If an interior solution r'_2 exists, then the maximum continuation payoff of the monopolist is

$$u_2(r'_1, r'_2) + f'_1 = \Pi(r'_1, r'_2) - (\pi_1(r'_1, r'_2) - k) + f'_1.$$

This payoff represents the best the monopolist can do if it attempts to act opportunistically against firm 1. In contrast, the maximum continuation payoff of the monopolist if it does not act opportunistically but instead offers (r^*, f^*) to firm 2 is

$$u_2(r^*, r^*) + f^* = \Pi(r^*, r^*).$$

Of these continuation payoffs, the latter payoff is greater if and only if

$$\Pi(r^*, r^*) - \Pi(r_1', r_2') > f_1' - (\pi_1(r_1', r_2') - k), \tag{9}$$

i.e., if and only if the gain in overall joint payoff if the monopolist does not act opportunistically against firm 1 is greater than the maximum rent it can shift from firm 1 if it does act opportunistically. Because there exists $r_1 \in W_1$ such that (9) is satisfied, e.g., r_1 sufficiently high, it follows that overall joint payoff is maximized in every subgame-perfect equilibrium.

Proposition 2 *Nondiscrimination clauses solve the seller's opportunism problem. The joint-payoff-maximizing outcome is obtained in every subgame-perfect equilibrium.*

Proof. See the Appendix.

Instead of offering firm 1 the terms (r^*, f^*) and a nondiscrimination clause, the monopolist obtains the joint-payoff-maximizing outcome by offering firm 1 the terms (r_1', f_1') and a nondiscrimination clause, where the terms are such that firm 1 invokes its nondiscrimination clause along the equilibrium path. Then, when the monopolist offers a contract to firm 2, it maximizes overall joint payoff because it knows that it is effectively offering the same contract to both firms.

There are two parts to the intuition. First, the role of (r_1', f_1') in the initial contract offer to firm 1 is to eliminate the monopolist's incentive to engage in opportunism by offering firm 2 a discriminatory discount that does not cause firm 1 to invoke its nondiscrimination clause. Thus, for example, a contract offer with r_1 sufficiently high eliminates the monopolist's incentive to engage in opportunism because then there is little or no rent to shift away from firm 1. A high wholesale price ensures that firm 1's flow payoff is small, and a fixed fee close to $-k$ ensures that firm 1 suffers little or no loss on its sunk investment. This implies that any deviation from the terms (r^*, f^*) to firm 2 such that firm 1 does not invoke its nondiscrimination clause results in a discrete loss in overall joint payoff with little or no compensating gain. Second, the role of the nondiscrimination clause is to eliminate the cost to the monopolist of offering terms to firm 1 that are suboptimal when both firms are active because the monopolist knows that firm 1 will switch to firm 2's contract.

This suggests a new role for nondiscrimination clauses. Previously, nondiscrimination clauses have been thought of as providing the commitment that prevents a seller from engaging in opportunism. However, our results suggest that it is the terms (r_1, f_1) of the contract offer to firm 1 that provide this commitment, and that nondiscrimination clauses make this feasible because they allow the first buyer to operate under the second buyer's terms. In other words, nondiscrimination clauses work because they allow a seller to commit to its final rather than initial sales contract.

Application to Franchising

As we have seen, one way for the monopolist to commit not to opportunize against firm 1 is to offer firm 1 a contract with a high wholesale price and low fixed fee, where the monopolist chooses the fixed fee to partially subsidize firm 1's investments.[13] However, there are two reasons why this solution may be less than ideal. First, subsidies to firm 1 that are earmarked to pay for firm 1's sunk investments may be subject to a kind of reverse opportunism, where firm 1 accepts the subsidy but then shirks on the investments. Since the investments are assumed to be non-contractible,

[13] If it were feasible for the monopolist to pay for all of firm 1's relationship-specific investments upfront, then the monopolist's fixed fee could be chosen to extract all of firm 1's flow payoff, and there would be no opportunism problem even without nondiscrimination clauses. See footnote 10.

the courts would not be able to verify whether shirking has or has not taken place. A second reason why the solution may be less than ideal is that there may be a delay before the contracting with firm 2 takes place, during which firm 1 would be operating with an artificially high wholesale price. This would reduce firm 1's short-run flow profit below the level that would be earned by a downstream monopolist.

Another way for the monopolist to commit not to act opportunistically against firm 1, and which avoids the two drawbacks mentioned above, is to offer firm 1 a contract with a low wholesale price and high fixed fee. For example, there exist environments in which an initial offer to firm 1 consisting of a nondiscrimination clause and the terms $(r_1, f_1) = (z, f^m)$, where $f^m \equiv \pi_1(z, \infty) - k$, can support the joint-payoff-maximizing outcome. We call this contract the *optimal monopoly contract* because, by eliminating any double markup, it is the contract that would maximize the joint payoff of the monopolist and firm 1 if firm 1 were the only downstream firm.

Proposition 3 *If* $\Pi(r^*, r^*) - \Pi(z, z) > k$*, then there is a subgame-perfect equilibrium in which firm* 1 *is offered the optimal monopoly contract.*

Proof. Using firm 1's participation constraint in (7), we see that a sufficient condition for (9) to hold is $\Pi(r^*, r^*) - \Pi(r_1', r_2') > k$. Since $r_2' < z$ in any interior solution to the program in (6)–(8),[14] it follows that a sufficient condition for the monopolist to offer contract (r^*, f^*) to firm 2 is $\Pi(r^*, r^*) - \Pi(z, z) > k$. Q.E.D.

The gain from acting opportunistically against firm 1 when firm 1 has the optimal monopoly contract is bounded above by k, which is the maximum rent the monopolist can shift from firm 1 and still have firm 1 participate in the product market. However, to prevent firm 1 from invoking its nondiscrimination clause, firm 2's wholesale price must be distorted below z, which causes a loss in overall joint payoff of at least

[14] We can rewrite the constraint in (8) as $\pi_1(z, r_2) - \pi_1(z, \infty) \geq \pi_1(r_2, r_2) - \pi_1(r_2, z)$. Since the left side of this expression is negative and the right side is nonnegative for all $r_2 \geq z$ such that both firms are active, it follows that $r_2 < z$ in any interior solution.

$\Pi(r^*, r^*) - \Pi(z, z)$. Because the monopolist has no incentive to act opportunistically if the loss in overall joint payoff exceeds the maximum potential gain from rent-shifting, it follows that, for k sufficiently small, opportunism is not a concern.

Even if k were equal to its maximum value of $\Pi(r^*, r^*) - \Pi(z, \infty)$,[15] opportunism would still be thwarted if the firms' products were sufficiently close substitutes. To see this, substitute this value into the sufficient condition in Proposition 3 to obtain $\Pi(z, \infty) \geq \Pi(z, z)$. As the products become closer substitutes, the left side of this inequality remains unchanged while the right side decreases, implying that for sufficiently close substitutes, the cost of opportunism exceeds the gain.

Thus, it may be possible to achieve both short-run as well as long-run efficiency (from the firms' perspective) while simultaneously eliminating the monopolist's incentive to behave opportunistically against firm 1. If k is sufficiently small or the products are sufficiently close substitutes, it is a subgame-perfect equilibrium for the monopolist to offer the contract (z, f^m) and a nondiscrimination clause to firm 1 (thereby achieving short-run efficiency for as long as firm 1 operates alone), and the contract (r^*, f^*) to firm 2 when that firm enters (thereby achieving long-run efficiency) because firm 1 will be induced to invoke its nondiscrimination clause.

In designing the contracts so that overall joint payoff is maximized both in the short run and in the long run, the monopolist can solve the problem of encroachment in franchising, where a national franchisor is alleged to act opportunistically against the sunk investment efforts of its local franchisees by opening up additional competing outlets. In particular, contracts with nondiscrimination clauses provide the right incentives for the franchisor to introduce new outlets. As soon as it is efficient to add an additional firm, the franchisor adds the firm and all existing firms switch to the new optimal contract—there is no opportunism of the type considered in McAfee and Schwartz (1994), where the number of firms is fixed, and also no opportunism in which the monopolist adds an inefficiently large number of firms. If in the future joint-

[15] For larger k, overall joint payoff is maximized with one firm in the market, and efficiency would call for an exclusive territory provision.

payoff maximization calls for two downstream firms, then nondiscrimination clauses give the upstream firm the flexibility to add the second firm without subjecting itself to charges of opportunism. In this case, firm 1 will invoke its nondiscrimination clause when firm 2 enters the market and the joint-payoff-maximizing outcome will be obtained.[16] If joint-payoff maximization calls for only one downstream firm, then nondiscrimination clauses eliminate the upstream firm's incentive to add competing franchises (since then its continuation payoff if it only sold to firm 1 would exceed its continuation payoff if it sold to multiple downstream firms). Thus, although policymakers have debated the merits of enacting legislation to protect franchisees, and some have advocated exclusive territory provisions, our results suggest that, if the sunk costs are sufficiently small or the products are sufficiently close substitutes, the problem has a natural and intuitive market solution in which the national franchisor offers a nondiscrimination clause to its flagship franchisee in each local market.[17]

The key features of the equilibrium are that (i) firm 1 is offered a nondiscrimination clause in its initial contract, and (ii) when firm 2 appears, the equilibrium fixed fee decreases. Both features can be found in franchising contracts. For example, H&R Block offers nondiscrimination clauses in its contracts, which give each franchisee the right to exchange its contract for any contract subsequently offered to another franchisee in the same district. Also, many franchisors have a policy of compensating their franchisees with a partial refund of the fixed fee if a competing franchisee is opened in the same territory, where the size of the refund is a function of the incumbent franchisee's foregone expected sales when the second firm enters.[18]

[16] See our working paper for a dynamic model in which firm 2's entry date is uncertain.

[17] Although we have illustrated our results with two downstream firms, we can show that, with linear demands in the product market, our results are robust to any number of downstream firms. For example, if firm 1 is offered (z, f^m), firm 2 is offered (r^*, f^*), and a third firm were to enter the market, the monopolist would offer a nondiscrimination clause and contract to the new firm that maximized the joint payoff of itself and all three firms. In equilibrium, the first two firms would invoke their nondiscrimination clauses and accept the contract offered to the last firm.

[18] This idea is also at the heart of the Iowa Franchise Act §6, House File 2362, which gives an incumbent franchisee a choice between receiving the right of first refusal to purchase the new outlet or receiving compensation based on the incumbent's expected market-share loss (see Grimes, 1996).

4 Robustness—Simultaneous offers

We have shown that nondiscrimination clauses can solve the seller's opportunism problem in a sequential contracting model. In this section, we show that this result continues to hold when the seller can make simultaneous offers to both buyers.

In our simultaneous contracting game, the monopolist first announces a base contract, which is observed by both firms. Then the monopolist simultaneously offers a "secret" discount and a nondiscrimination clause to each firm. Firms simultaneously accept or reject their individual offers. If a firm accepts, it spends $k > 0$ on relationship-specific assets and commits to operate under either its contract, the contract of its competitor, or the base contract. If a firm rejects, it can choose to operate under the base contract (and pay $k > 0$) or it can exit the market and earn zero. After individual contract offers are accepted or rejected, all contract offers and the decisions of the firms are observed. Firms then simultaneously choose under which contract to operate (if any) and participate in the product market game.

Because this is a game of simultaneous offers, a firm must decide whether to accept or reject its individual offer without knowing the contract offered to its competitor. In equilibrium, a firm's beliefs about the contract offered to its competitor will be correct, but we must specify out-of-equilibrium beliefs. To do this, we assume passive beliefs as in Hart and Tirole (1990). Under passive beliefs, if a firm is offered a contract other than its equilibrium offer, it continues to believe that its competitor was offered its equilibrium contract. Thus, when a firm observes a deviation by the monopolist, it believes that this was the only deviation made by the monopolist.

As in the case with sequential offers, the monopolist can obtain the joint-payoff-maximizing outcome in equilibrium by offering a base contract other than (r^*, f^*). For example, the monopolist can offer a base contract (r^b, f^b) with a low fixed fee and high wholesale price ($r^b > r^*$ and $f^b < f^*$) such that a firm operating under the base contract (r^b, f^b) has positive payoff if the other firm operates under (r^b, f^b) and zero payoff if the other firm operates under (r^*, f^*) (see Figure 1). Then the monopolist can offer (r^*, f^*) and a nondiscrimination clause individually to each downstream firm.

It is a weakly dominant strategy for each firm to accept its offer.[19] Once both firms accept the contract (r^*, f^*) and a nondiscrimination clause, it is an equilibrium of the continuation game for both to operate under the terms (r^*, f^*)—given that its competitor operates under (r^*, f^*), a firm is indifferent between operating under (r^*, f^*) and (r^b, f^b). And if its competitor operates under (r^b, f^b), a firm earns strictly higher payoff operating under (r^*, f^*).[20] In this equilibrium, the monopolist gets a payoff of Π^* and thus overall joint payoff is maximized.

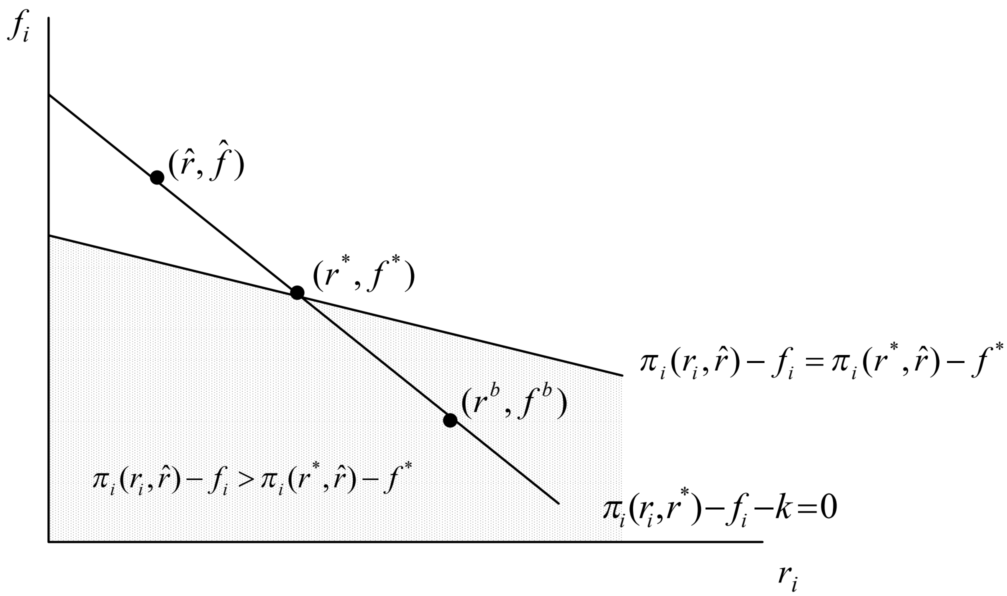

Figure 1: Illustration of the role of the base contract.

It remains to show that the monopolist cannot earn higher payoff by acting oppor-

[19]In equilibrium, firm 1 believes that firm 2 is offered the contract (r^*, f^*) and a nondiscrimination clause. Thus, firm 1 believes that if firm 2 operates, it must be under either (r^*, f^*) or (r^b, f^b). Because $\pi_1(r^b, r^*) - f^b - k = 0$, $\pi_1(r^b, r^b) - f^b - k > 0$, and $\pi_1(r^b, \infty) - f^b - k > 0$, firm 1 can obtain a nonnegative payoff by operating under the base contract, regardless of whether firm 2 operates under (r^*, f^*), (r^b, f^b), or not at all, and similarly for firm 2.

[20]To see this, note that when the rival operates under (r^b, f^b), firm 1's continuation payoff under the contract (r^e, f^e), $\pi_1(r^e, r^b) - \pi_1(r^e, r^e)$, is greater than its continuation payoff under the contract (r^b, f^b), $\pi_1(r^b, r^b) - \pi_1(r^b, r^e)$, because of the assumption on the cross-partial derivative of π_1.

tunistically. We sketch the intuition here and leave a formal proof to the appendix. Suppose the monopolist were to offer (r^*, f^*) and a nondiscrimination clause to one firm and the opportunistic contract $(\hat{r}_2, \hat{f}_2)$, where $\hat{r}_2 < r^*$ and $\hat{f}_2 > f^*$, to the other firm. In this case, we see from Figure 1 that if firm j operates at the opportunistic contract, then because (r^b, f^b) is in the shaded area denoting contracts that give firm i higher payoff than (r^*, r^*) when firm j operates under $(\hat{r}_2, \hat{f}_2)$, firm i strictly prefers to operate at the base contract (r^b, r^b) rather than at the contract (r^*, f^*). In other words, if the monopolist were to offer one firm an opportunistic contract, the rival firm on seeing this deviation would choose to operate under its base contract (the cross-partial derivative of π_i drives this result). The monopolist's opportunistic behavior is prevented by choosing a base contract that makes opportunism unprofitable.

Proposition 4 *In the simultaneous contracting game with nondiscrimination clauses, there exists an equilibrium in which overall joint payoff is maximized.*

Proof. See the Appendix.

It is well-known that in the absence of nondiscrimination clauses, the seller cannot obtain the joint-payoff-maximizing outcome in equilibrium when secret discounts are possible and offers are made simultaneously (Hart and Tirole, 1990; O'Brien and Shaffer, 1992; McAfee and Schwartz, 1994). In contrast, Proposition 4 shows that, as in the case with sequential contracting, nondiscrimination clauses can solve the seller's opportunism problem. Instead of offering a base contract of (r^*, f^*) and then using nondiscrimination clauses to guard against opportunistic discounting (which we know does not work from McAfee and Schwartz, 1994), the monopolist offers a base contract with a high wholesale price $(r^b > r^*)$ and a low fixed fee $(f^b < f^*)$ and then offers the joint-payoff-maximizing contract individually to each firm.[21] Opportunism

[21] One can show that the monopolist cannot obtain the joint-profit-maximizing outcome by offering (r^*, f^*) as the base contract.

is prevented because if the monopolist were to deviate from (r^*, f^*) with one downstream firm in a way that would increase its payoff if the rival downstream firm were to operate under (r^*, f^*), the rival firm would simply invoke its nondiscrimination clause and switch to the base contract, making the deviation unprofitable.

5 Conclusion

This paper offers an explanation for nondiscrimination clauses in intermediate goods markets where the buyers' payoffs are interrelated. This is an important contribution because most occurrences of nondiscrimination clauses are in such markets.

Previous literature suggests that nondiscrimination clauses are ineffective in this context because they cannot commit a seller to its initial sales contract (unlike in the case of final goods markets, where the buyers' payoffs are unrelated). The underlying intuition is that buyers in these markets do not automatically invoke their nondiscrimination clauses when another buyer receives more favorable terms.

However, we suggest that nondiscrimination clauses may work differently in intermediate goods markets than in final goods markets. Instead of committing a seller to its initial sales contract, nondiscrimination clauses may work by giving buyers the flexibility to switch to another buyer's contract if they so choose and that it is the terms of the buyer's initial contract in the sequential game, and the base contract in the simultaneous game, that eliminate the seller's incentive to act opportunistically. It seems that previous literature has missed this intuition either because it implicitly forced each buyer to invoke its nondiscrimination clause if a rival received better terms, or because it assumed that the nondiscrimination clause itself, and not the terms of the initial contract, would prevent opportunism. Thus, we offer a new perspective on the role of nondiscrimination clauses in intermediate goods markets.

In our franchising section, we show that our results are robust to delay in the entry of consecutive firms, and so our insights also apply to the encroachment problem.

Under claims of encroachment, a franchisor is accused of behaving opportunistically against its franchisees by adding additional outlets. In the kind of opportunism considered by McAfee and Schwartz (1994), the seller is accused of shifting rents from the first seller by lowering the second seller's wholesale price. These are different kinds of opportunism. For example, in Butz (1990) and Cooper (1986), nondiscrimination clauses work by committing a seller to its initial contract, which would solve the second kind of opportunism, but not the encroachment problem (because the optimal contract when only one buyer is in the market is different from the optimal contract when two buyers are in the market). Because we show that nondiscrimination clauses can solve both kinds of opportunism, the mechanism at work here does not follow the old insights. Thus, ours is the first paper to make the connection between the opportunism in the vertical contracting literature with a fixed number of firms and the opportunism in the franchising literature where the number of firms varies, and to show that nondiscrimination clauses can solve both kinds of opportunism.

Nondiscrimination clauses can solve the seller's opportunism problem because they enable a seller to commit to its final sales contract in the sequential game, or to its secretly offered contract in the simultaneous game, rather than to its initial or base contract. If the relationship-specific investments would have been made in the absence of nondiscrimination clauses, then it can be shown that nondiscrimination clauses lead to higher prices and are anticompetitive. On the other hand, if the relationship-specific investments would not have been made in the absence of nondiscrimination clauses, then it can be shown that nondiscrimination clauses, by making the market possible, may be procompetitive. Therefore, depending on one's perspective, solving the seller's opportunism problem can be either welfare enhancing or worsening.

A Appendix: Proofs

Proof of Proposition 2. The proof that there exists an equilibrium in which overall joint payoff is maximized and the monopolist has payoff $\Pi(r^*, r^*) - 2k$ is contained in the text. To see that overall joint payoff is maximized in every subgame-perfect equilibrium outcome, suppose that a different outcome can be achieved. If the monopolist has payoff greater than $\Pi(r^*, r^*) - 2k$, then at least one firm has negative payoff and can profitably deviate by rejecting its contract, a contradiction. If the monopolist has payoff $m < \Pi(r^*, r^*) - 2k$, then the monopolist can profitably deviate by offering contract $(r_1, f_1) = (\infty, -k - \varepsilon/2)$ with a nondiscrimination clause to firm 1 and contract $(r_2, f_2) = (r^*, f^* - \varepsilon/2)$ to firm 2, where $\varepsilon \in (0, \Pi(r^*, r^*) - 2k - m)$. Both firms have a strict incentive to participate, and firm 1 has a strict incentive to invoke its nondiscrimination clause. The monopolist's payoff is $\Pi(r^*, r^*) - 2k - \varepsilon > m$, a contradiction. Q.E.D.

Proof of Proposition 4. Let r^b be sufficiently large that $\pi_1(r^b, r_2) = 0$ for all $r_2 \leq r^*$, and let $f^b \equiv \pi_1(r^b, r^*) - k$. Suppose the monopolist offers a base contract of (r^b, f^b) and then offers each firm the contract (r^*, f^*). As discussed in the text, it is a weakly dominant strategy for each firm to accept the monopolist's offer, and it is an equilibrium of the continuation game for both to operate under contract (r^*, f^*), giving the monopolist a payoff of $\Pi(r^*, r^*) - 2k$. Taking base contract (r^b, f^b) as given, suppose the monopolist can profitably deviate by offering $(\tilde{r}_1, \tilde{f}_1)$ and $(\tilde{r}_2, \tilde{f}_2)$. Profitability of the deviation implies that at least one firm has negative payoff and that both firms operate (if only one firm operates, its payoff is bounded below by $\pi_1(r^b, \infty) - f^b - k$, which is positive).

Suppose firm 1 rejects its offer. Because firm 1 operates, it must have nonnegative payoff and operate under (r^b, f^b). Given this, firm 2's payoff is bounded below by $\pi_2(r^b, r^b) - f^b - k > 0$. Thus, both firms have nonnegative payoff, a contradiction. A similar contradiction results if firm 2 rejects its offer. Thus, both firms must accept their offers. We can focus on the case in which each firm operates under either the contract offered to it or the base contract (if firm i operates under $(\tilde{r}_j, \tilde{f}_j)$, consider instead the deviation in which firm i is offered $(\tilde{r}_j, \tilde{f}_j)$). Because the firms have positive payoff when they both operate under (r^b, f^b), at least one firm must operate under the deviation contract offered to it.

Suppose firm 1 operates under the base contract. Then firm 2 operates under $(\tilde{r}_2, \tilde{f}_2)$ rather than (r^b, f^b), so it must be that

$$\pi_2(r^b, \tilde{r}_2) - \tilde{f}_2 \geq \pi_2(r^b, r^b) - f^b = \pi_2(r^b, r^b) - \pi_2(r^*, r^b) + k. \tag{A.1}$$

In this case, the monopolist's payoff is

$$\begin{aligned} & \Pi(r^b, \tilde{r}_2) - 2k - \left(\pi_1(r^b, \tilde{r}_2) - f^b - k\right) - \left(\pi_2(r^b, \tilde{r}_2) - \tilde{f}_2 - k\right) \\ \leq\ & \Pi(r^b, \tilde{r}_2) - 2k - \pi_1(r^b, \tilde{r}_2) + \pi_1(r^b, r^*) - \pi_2(r^b, r^b) + \pi_2(r^*, r^b) \\ =\ & \Pi(\tilde{r}_1, \tilde{r}_2) - 2k - \pi_1(r^b, \tilde{r}_2) - \pi_2(r^b, r^b) \\ <\ & \Pi(r^*, r^*) - 2k, \end{aligned}$$

where the first inequality uses the definition of f^b and (A.1) and the equality uses the definition of r^b, a contradiction. A similar contradiction arises if firm 2 operates under the base contract. Thus, it must be that both firms operate under their deviation contracts. If $\min\{\tilde{r}_1, \tilde{r}_2\} \geq r^*$, then firm 1's payoff is bounded below by $\pi_1(r^b, \tilde{r}_2) - f^b - k$, which is positive, and similarly for firm 2, a contradiction. Thus, $\min\{\tilde{r}_1, \tilde{r}_2\} < r^*$. Suppose $\tilde{r}_2 < r^*$. Because firm 1 operates under $(\tilde{r}_1, \tilde{f}_1)$ rather than (r^b, f^b),

$$\pi_1(\tilde{r}_1, \tilde{r}_2) - \tilde{f}_1 \geq \pi_1(r^b, \tilde{r}_2) - f^b = \pi_1(r^b, \tilde{r}_2) - \pi_1(r^b, r^*) + k. \tag{A.2}$$

Because firm 2 operates under $(\tilde{r}_2, \tilde{f}_2)$ rather than (r^b, f^b),

$$\pi_2(\tilde{r}_1, \tilde{r}_2) - \tilde{f}_2 \geq \pi_2(\tilde{r}_1, r^b) - f^b = \pi_2(\tilde{r}_1, r^b) - \pi_2(r^*, r^b) + k. \tag{A.3}$$

In this case, the monopolist's payoff is

$$\Pi(\tilde{r}_1, \tilde{r}_2) - 2k - \left(\pi_1(\tilde{r}_1, \tilde{r}_2) - \tilde{f}_1 - k\right) - \left(\pi_2(\tilde{r}_1, \tilde{r}_2) - \tilde{f}_2 - k\right)$$

$$\leq \Pi(\tilde{r}_1, \tilde{r}_2) - 2k - \pi_1(r^b, \tilde{r}_2) + \pi_1(r^b, r^*) - \pi_2(\tilde{r}_1, r^b) + \pi_2(r^*, r^b)$$
$$= \Pi(\tilde{r}_1, \tilde{r}_2) - 2k - \pi_2(\tilde{r}_1, r^b)$$
$$< \Pi(r^*, r^*) - 2k,$$

where the first inequality uses (A.2) and (A.3) and the equality uses the definition of r^b and $\tilde{r}_2 < r^*$, a contradiction. A similar contradiction arises if $\tilde{r}_1 < r^*$. Thus, given base contract (r^b, f^b), there is no profitable deviation in the continuation game. Suppose the monopolist can increase its payoff by choosing a base contract other than (r^b, f^b). Then at least one downstream firm has negative expected payoff in the equilibrium of continuation game, which is a contradiction. Q.E.D.

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