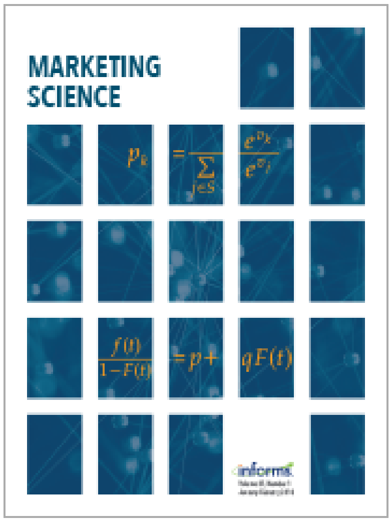


Marketing Science

Publication details, including instructions for authors and subscription information:
http://pubsonline.informs.org

"Let Me Talk to My Manager": Haggling in a Competitive Environment

Preyas S. Desai, Devavrat Purohit,

MARKETING SCIENCE
Vol. 23, No. 2, Spring 2004, pp. 219–233
ISSN 0732-2399 | EISSN 1526-548X | 04 | 2302 | 0219

DOI 10.1287/mksc.1040.0045

"Let Me Talk to My Manager": Haggling in a Competitive Environment

Preyas S. Desai, Devavrat Purohit
Fuqua School of Business, Duke University, Durham, North Carolina 27708
{desai@mail.duke.edu, purohit@duke.edu}

Although negotiating over prices with sellers is common in many markets such as automobiles, furniture, services, consumer electronics, etc., it is not clear how a haggling price policy can help a firm gain a strategic advantage or whether it is even sustainable in a competitive market. In this paper, we explore the implications of haggling and fixed prices as pricing policies in a competitive market. We develop a model in which two competing retailers choose between offering either a fixed price or haggling over prices with customers. There are two consumer segments in our analysis. One segment, the *hagglers*, has a lower opportunity cost of time and a lower haggling cost than the other segment, the *nonhagglers*. When both retailers follow the same pricing policy, then a haggling policy is more profitable than a fixed-price policy only when the proportion of nonhagglers is sufficiently high. We find two kinds of prisoners' dilemma: under some conditions, a more profitable haggling policy can be broken by a fixed-price policy, and under other conditions, a fixed-price policy can be broken by a haggling policy. Surprisingly, we show that under some conditions, an asymmetric outcome with one retailer haggling and the other offering a fixed price is also an equilibrium.

Key words: competitive strategy; marketing strategy; price discrimination; game theory
History: This paper was received August 1, 2001, and was with the authors 15 months for 2 revisions; processed by Sridhar Moorthy.

1. Introduction

> Finally, no price guessing and no games. You can shop CarMax hassle-free by browsing our lot or shopping through our computer AutoMation touch-screen inventory.
>
> *CarMax Brochure*

> "No haggle" means that every Saturn retailer should stick to whatever price it decides to sell at. The retailer should give you the same price regardless of your bargaining skills.
>
> *Saturn's Website*

Although negotiating prices with sellers is common in many product categories such as consumer electronics, white goods, services, etc., nothing piques consumers' interests quite like the process of negotiating the price of a car. Interestingly, this interest is largely negative because of the dreaded negotiation with the dealer. Indeed, this has led some firms, such as Saturn and CarMax, to eliminate the price-negotiation process and move to "no-haggle" prices. However, in an industry well known for its price-negotiation process, a priori it is not clear how committing not to negotiate can give a firm a strategic advantage. In this paper, we focus on competing retailers' strategic incentives to adopt haggling or fixed-price policies. There are two central questions in our analysis: (1) Can a retailer gain a strategic advantage either by committing not to negotiate or by giving customers the option to negotiate, and (2) how sustainable are fixed-price and negotiated-price policies in a competitive market? We answer both questions by developing a model of two competing retailers and examine how customer heterogeneity affects the two firms' equilibrium choices of pricing policies.

From a seller's perspective, haggling is useful because it potentially can serve as a price discrimination mechanism that allows the seller to charge different prices to different consumers. For example, an initial price offer can depend on the seller's beliefs about differences in consumers' reservation prices (e.g., Ayres and Siegelman 1995), their abilities to haggle (Arnold and Lippman 1998), or their cost of time. The basic idea is that the firm can bundle the good for sale with a characteristic, in this case haggling, that is costly for consumers. Chiang and Spatt (1982) show that differences across consumers in their valuation of time can allow a monopolist to imperfectly price discriminate, so that the price of the good depends on the amount of time the consumer expends at the store. Thus, a consumer who waits longer by haggling for an extended period of time may pay a lower price. However, the essential question of how haggling works in a *competitive* environment is less clear. In the automobile industry, many dealers have experimented with fixed prices, but subsequently reverted back to haggling, claiming that consumers were merely using their fixed price to get a better deal at a competing haggling dealer (J. D. Power and Associates 1992). This suggests that a commitment to a fixed price may fall apart in a competitive environment. In this paper, we look at the differences between haggling and fixed prices in a competitive environment, and study how customer heterogeneity affects the equilibrium pricing policy.

The benefits of discrimination by segmenting the market are well established—as long as consumers differ in their valuations of a product, then a firm earns higher profits if it differentiates its offering to consumers with differing valuations. For discrimination to be observed in equilibrium, not only do consumers have to be willing to buy the product at the stated price, but each type of consumer has to buy the package that is intended for him or her. We develop a model in which haggling can serve as a discrimination device. In particular, the basic structure of our model assumes that the market consists of two types of consumers: low- and high-price sensitivity. The low price-sensitivity consumers have a higher cost of haggling than the high price-sensitivity consumers. Thus, under certain conditions, a seller can use consumers' propensity to haggle as a means of identifying their sensitivity to price. Consumers in our model are distributed uniformly along a Hotelling (1929) line and they can purchase the product from either of two retailers located at opposite ends of the line. Retailers can offer either a single fixed, advertised price or they can price discriminate by advertising a price and then haggling over this price with some customers; in equilibrium, customers with high haggling costs pay the advertised price and the low haggling cost customers pay a lower, negotiated price.

When both retailers follow identical pricing policies, we find that they would both be better off with a haggling price policy only when the proportion of *nonhaggling* customers in the market is sufficiently high. Even in equilibrium, we find that only when the proportion of consumers who do not want to haggle is sufficiently high will both firms adopt a haggling policy. When this proportion is low, then a retailer can do better by unilaterally deviating from a haggling to a fixed policy. This creates a prisoners' dilemma for the retailers—although both would be better off with a haggling policy, each retailer's incentives to deviate to a fixed price policy forces both to offer fixed prices. In addition, we find the prisoners' dilemma also works in the other direction—although both would be better off with fixed-price policies, they both end up with less profitable haggling price policies. Finally, we also find that we can have an asymmetric equilibrium in which one retailer follows a fixed-price policy and the other a haggling policy. An asymmetric equilibrium is interesting in that it softens the competition between the two retailers.

Price competition between haggling retailers is also analyzed in Bester (1989, 1993). However, the primary focus of these papers is the analysis of pricing subgames and not the choice of pricing policies. In contrast, our interest is in the retailers' choice of pricing policies and the effect of consumer heterogeneity on these policies. Thus, our work is more closely related to papers addressing the choice of haggling versus fixed-price policies. Several important papers have related market characteristics to the price policy chosen by sellers. For example, Riley and Zeckhauser (1983) show that when a seller has incomplete information about buyer types, the seller always prefers to post a price than to haggle. This occurs because there is a single seller who incurs a cost as consumers arrive sequentially at the store.[1] On the other hand, Wang (1995) shows that when bargaining and posting prices entail the same costs, then the seller is better off bargaining. This suggests that overall cost considerations are what lead to posted price selling—when a seller has many objects to sell to a large number of buyers, then we are more likely to see posted prices. Finally, in some cases we see we can have markets in which hagglers and posted-price sellers coexist (Spier 1990, Bester 1994).

Our work is also related to Corts (1998), who considers the choice of price discriminating or charging a uniform price by two vertically differentiated firms. In his analysis, the two competing firms engage in all-out competition when they price discriminate, but not when they adopt uniform prices. As a result, although both firms would be better off with a fixed price policy, the prisoners' dilemma forces both firms to price discriminate. Our model differs from Corts in that we consider two horizontally differentiated firms selling identical, branded products, and price discrimination occurs as part of a bargaining process between the buyer and the seller. In addition, Corts (1998) does not have customer heterogeneity in terms of haggling costs, which is an important determinant of pricing policies in our work. Interestingly, in contrast to Corts, we find that the prisoner's dilemma can work in the opposite direction—a fixed-price policy breaks the more profitable price-discrimination policy of haggling.

In considering a variety of different selling formats, Wernerfelt (1994) shows that price advertising, seller colocation, and bargaining can all be effective when

[1] The general idea is that all bargaining power is lost from the party that incurs the search cost. Thus, in the famous "monopoly price paradox" of Diamond (1971), as long as all buyers incur a search cost, each seller charges the monopoly price.

consumers do not have full information and incur search costs in evaluating the product. He shows that under certain conditions of low search costs and a high level of competition, two sellers may choose a bargaining policy to shield themselves from Bertrand competition. Bargaining is attractive in Wernerfelt (1994) because prices are not advertised and buyers bargain down from their individual valuations. In contrast, in our model, prices are advertised and bargaining consumers always have the option of paying the advertised price. Our focus is on the case where buyers have full information about the quality of the product sold at competing retailers but differ in their cost of bargaining. Thus, our model applies to the case of many product durables, such as cars and electronics, where consumers choose between two retailers, knowing that the identical product is available at competing locations.

Our work is also related to research on the adoption of everyday low pricing (EDLP) versus promotional pricing by supermarkets (e.g., Lal and Rao 1997, Bell and Lattin 1998). Although a fixed-price policy bears some similarity to an EDLP strategy, the problem we address differs on several important dimensions. First, we focus solely on cases where a consumer has to purchase a single, big-ticket item, such as a car or a washing machine, from a single retailer. The EDLP research looks at a basket of goods that would allow some consumers to make purchases at both stores. Purchasing a basket of goods leads to the interplay among product categories and retailers that is crucial to the EDLP context. Second, we allow consumers to negotiate prices at the retailer; thus, the *same* retailer charges different prices to different consumers. In contrast, stores that use promotional pricing pull in consumers through advertised specials on selective products, but once at the store, all customers pay the same price for the good. Finally, EDLP and promotional pricing strategies arise when consumers are not fully informed about prices before they visit the store. In contrast, we consider the case where consumers have full information through advertised prices.

The outline of this paper is as follows. In the next section, we lay out our assumptions about retailers and consumers. In §3 we analyze three strategies that can be seen in the market. In §4, we present the equilibrium analysis and we conclude the paper in §5.

2. Model

In this section, we detail our assumptions about the players in our analysis.

2.1. Retailers

We consider a market in which two retailers, A and B, are located at opposite ends of a linear city of unit length (Hotelling 1929). These retailers are symmetric in all respects—they sell identical branded products that they purchase at a constant marginal cost. Without further loss of generality, we set this cost to zero. Each retailer k ($k = A, B$) chooses its pricing policy j ($j = f$ (fixed) or h (haggling)) as well as its price level: If retailer k adopts fixed prices, it does not discriminate between consumers and charges a single price, p_{fk}, to all consumers. On the other hand, if the retailer haggles, then it can potentially charge two prices: Consumers who do not haggle simply pay an advertised price, p_{hk}^N, where the superscript N denotes that this is the price paid by the nonhaggling consumers. Consumers who haggle pay a negotiated price, p_{hk}^H, where the superscript H denotes that this price is paid by consumers who haggle.

If a retailer adopts a haggling price policy, it incurs an additional marginal cost of c_R per consumer who haggles. This cost represents the additional time and effort spent by the retailer or its salespeople in dealing with the haggling customer. In addition, each retailer announces its pricing policy and then does not deviate from the stated policy; the cost of deceiving consumers is high enough to discourage retailers from being untruthful regarding their pricing policy. For example, despite of the prevalence of haggling at many automobile dealerships, Saturn and CarMax abide by their no-haggling price policies and make their advertised or posted prices readily available to consumers. Thus, consumers are fully aware of each retailer's pricing policy before they visit the store.

2.2. Consumers

Because haggling takes time, we assume that consumers' propensity to haggle is correlated with their opportunity cost of time such that consumers with a high cost of time do not like to haggle. In a Hotelling model, consumers' opportunity cost of time is captured by their transportation costs. We assume there are two types of consumers—the high transportation-cost consumers are the *nonhagglers* and the low transportation-cost consumers are the *hagglers*.[2] Note that transportation costs in the Hotelling model also represent the inverse of price sensitivity, such that lower transportation-cost customers are more sensitive to price than higher transportation-cost consumers. In terms of haggling, this structure implies that more price-sensitive consumers have lower haggling costs and less price-sensitive consumers have higher haggling costs.

More formally, consumers in our model have a valuation $V > 0$ for the product, where V captures

[2] Segmenting consumers by opportunity cost of time is similar to Lal and Rao (1997), in which consumers are either time constrained (i.e., high opportunity cost of time) or cherry pickers (i.e., low opportunity cost of time).

their gross willingness to pay. We represent transportation costs by θ_i, where i denotes hagglers ($i = H$) or nonhagglers ($i = N$), where $\theta_N > \theta_H > 0$. The proportion of nonhagglers is denoted by $\eta \in (0, 1)$ and the proportion of hagglers by $(1 - \eta)$. Both types of consumers are distributed uniformly along $[0, 1]$ line segments as in Hotelling (1929). In visiting a store, a consumer of type i located at a distance x from the store incurs a traveling cost of $x\theta_i$.

This formulation allows us to develop a model in which haggling has the potential to serve as a discrimination device. Consumers who haggle reveal themselves as having a low transportation cost and a high price sensitivity. However, keep in mind that the retailer does not know a consumer's location, x, so the retailer cannot exploit the heterogeneity within either segment. As in Desiraju and Shugan (1999), we do not claim that all markets have this structure. In markets where consumers with lower opportunity cost of time or higher price sensitivity have a higher cost of haggling than other consumers, it is easy to see that haggling would not be a useful discrimination device. Our objective is to analyze situations in which a priori we may have reasons to expect haggling to be observed, and then examine how competitive forces affect a retailer's choice of fixed versus haggled prices.

The net utility a consumer derives from a product depends not only on the transportation costs and price but also on the pricing policy chosen by the retailer. Recall that a retailer can adhere either to a fixed price that is posted or advertised, or it can advertise a price and then haggle over this price with consumers who choose to haggle. The only benefit of haggling to consumers is that they can possibly get a lower price from the retailer.[3] Whenever consumers engage in haggling, they also incur a cost of haggling. Nonhagglers have a high cost of haggling, $c_N > 0$, such that they never find it optimal to haggle; however, hagglers have a lower cost of haggling, $0 < c_H < c_N$, such that if a retailer allows haggling, they may haggle. Even if the retailer allows haggling, consumers are not forced to haggle—they will haggle only if they expect the reduction in price to compensate for their cost of haggling. To rule out uninteresting cases, we consider only those parameter values for which the nonhagglers end up paying the advertised price and, if the retailer allows it, the hagglers end up haggling.

Consider a consumer who travels a distance x to purchase the product from retailer k who allows haggling. This consumer can derive either of the following net utilities:

$$U_i = \begin{cases} V - p_{hk}^H - x\theta_i - c_i \\ \qquad \text{if the consumer haggles,} \\ V - p_{hk}^N - x\theta_i \\ \qquad \text{if the consumer does not haggle,} \end{cases} \tag{1}$$

where p_{hk}^i is the price paid by segment $i = H, N$ consumers at retailer k under a haggling (h) policy. Because nonhagglers do not haggle, they simply pay p_{hk}^N, while haggling consumers will haggle only if $p_{hk}^H + c_i < p_{hk}^N$.

The prices posted by both types of retailers are advertised and known to consumers before they visit the retail outlet. By advertising its price, the retailer makes a legal and binding commitment that its product can be purchased at that price. Thus, consumers know the product quality and the advertised price before they leave for the store. This is in contrast to models in which consumers discover the price and the quality of the product only after they incur the cost of visiting the store (e.g., Diamond 1971, Wernerfelt 1994). Our model is closer in spirit to many markets for durables—consumers are aware of the suggested retail price or advertised price before they visit the store and are also aware that they may be able to negotiate the price down. Thus, the advertised price commits the retailer to an upper bound on what it can charge its customers (e.g., Wernerfelt 1994, Bester 1993, Chen and Rosenthal 1996). What is not known is the price that the consumer and the retailer will agree upon after they engage in haggling. Below, we elaborate on the bargaining mechanism between the consumer and the retailer.

2.3. Bargaining Mechanism

The outcome of the negotiation between the consumer and the retailer depends on the bargaining mechanism employed by the two parties. As noted by Wernerfelt (1994), in any negotiation between two parties, one can argue for an infinity of different bargaining mechanisms. Following Bester (1993), we assume that the outcome of the bargaining between the consumer and the retailer is given by the generalized Nash bargaining solution (GNBS).[4] Intuitively, this bargaining mechanism gives each party

[3] Our model does not allow consumers to get any intrinsic benefit from haggling. We acknowledge that there may be certain consumers who enjoy the haggling process, but the behavior of this group is not captured by our model. Note that we are not precluding consumers from haggling—we are simply saying that consumers may haggle, but in our model they do not get any intrinsic pleasure out of the haggling process itself.

[4] See Neslin and Greenhalgh (1986) for a marketing application with a GNBS. An alternative bargaining mechanism is Rubinstein's (1982) model, in which the buyer and the seller make alternating offers until they reach agreement (see Iyer and Villas-Boas 2003 for an example in a channel setting). In an earlier version of this paper, we used an alternating-offers model and found similar results to those presented herein.

its reservation price and any remaining surplus is split depending on the relative bargaining skills of the two parties. In addition, the GNBS allows us to incorporate competition in a straightforward manner. Knowing the bargaining mechanism, haggling consumers form rational expectations about the price they will pay after they have haggled with the retailer; in equilibrium, these expectations are fulfilled and consumers are not surprised by the outcome of the haggling process (e.g., Lal and Rao 1997).

Consider a consumer who visits Retailer A and begins the bargaining process. The generalized Nash bargaining solution comes from the following problem:

$$\operatorname*{Max}_{p_{hA}^{H}}\left[V - p_{hA}^{H} - c_H - d_A^H\right]^{\beta} \times \left[p_{hA}^{H} - c_R - d_R\right]^{1-\beta}, \qquad (2)$$

by choosing an optimal p_{hA}^{H} where $\beta \in (0,1)$ is the bargaining skill/power of the haggling consumer relative to the retailer, $(1-\beta)$ represents the relative bargaining skills of the retailer, and d_A^H and d_R are the disagreement points of the consumer and the retailer, respectively. When the customer has all the skills, $\beta = 1$, and when the dealer holds the cards, $\beta = 0$. Note that in Equation (2), each party's expected net benefits are weighted by the party's relative bargaining skills.[5]

A disagreement point represents the net payoffs to the parties when negotiations break down and no transaction takes place between them. For the retailer, this simply amounts to not making the sale to a particular consumer; thus, $d_R = 0$. However, in a fully served market, consumers will make a purchase from either retailer. Thus, if haggling consumers cannot agree upon a haggling price with Retailer A, they can purchase the product by exercising their best alternative option. In this case, consumers, who are already at Retailer A, potentially have three alternative options:

(1) Purchase the product at the advertised price from Retailer A. In this case, the disagreement point is given by:

$$d_A^H = V - p_{hA}^N.$$

Note that the consumer does not incur any additional travel costs because the consumer is already at Retailer A.

(2) Go to Retailer B and purchase the product at the advertised price. In this case, the disagreement point is given by

$$d_A^H = V - p_B^N - \theta_H(1 - x_H).$$

In this case, the consumer incurs additional traveling costs of visiting Retailer B. Note that p_B^N represents Retailer B's advertised price under either a fixed or a haggling price policy.

(3) Go to Retailer B and purchase the product at a negotiated price. In this case, the disagreement point is given by

$$d_A^H = V - E[p_{hB}^H] - \theta_H(1 - x_H) - c_H.$$

Now the consumer incurs additional traveling costs as well as haggling costs. Note that this option is available only if Retailer B allows haggling—if the retailer had a fixed price policy, this would not be a viable option.

We can narrow these three potential options by noting that in a symmetric equilibrium in which both retailers have a haggling policy, the option of going to the other retailer to pay the advertised price (Option 2 above) cannot be the best outside option.[6] In an asymmetric equilibrium in which one retailer has a haggling policy and the other a fixed policy, the haggling consumer does not have the option of leaving and haggling at the alternate dealership (see Option 3). Therefore, it is clear that other than haggling at a given retailer, the consumer has at most two viable alternative options and, depending on the parameters, one will be more attractive than the other. Ultimately, the more attractive option is the one that binds and affects the price negotiated by the consumer.

In this paper, we are interested specifically on the impact that market competition has on prices. In particular, we are interested in the case where a consumer's threat of leaving for the other dealership is credible. Thus, if the dealer refuses to haggle once a haggling consumer arrives at the store or if they cannot agree upon a price, the consumer will simply leave for the other dealership. Thus, we concentrate on the case where the option that binds is the one where the haggling consumer finds it optimal to visit the alternative retailer. In subsequent sections, we establish specific conditions that ensure that the best alternative to the haggling price at a particular dealer is to visit the alternate retailer. In addition, we show how changing this assumption does not affect the main results of our analysis.

3. Analysis

The interaction between the two retailers is modeled as a two-stage game. In the first stage, the retailers simultaneously choose their pricing policies, i.e., whether to have fixed prices or haggle with consumers over price. This decision is conveyed to consumers (e.g., through advertising) and is not changed

[5] More generally, consumers can increase their bargaining power, β, by acquiring more information and becoming more knowledgeable. In the automobile market, this interpretation of β is consistent with Morton et al. (2001) finding that online consumers paid on average 2% less than their counterparts who did not use an online service.

[6] See appendix for details.

during the course of the interaction between retailers. Importantly, we assume that consumer valuations are such that the market is fully covered. Full market coverage in all segments of the market allows us to avoid local monopolies and to focus on the impact of haggling and fixed prices in the presence of competition. In the second stage of the game, retailers choose the prices to announce. We solve this model by first solving the Stage 2 subgame in which there can be three possible outcomes: Both retailers adopt a fixed-price policy, both retailers adopt a haggling price policy, and one retailer adopts a fixed price while the other adopts a haggling price. We first explore the implications of each of these possible outcomes. Following this, in the subsequent section, we determine if and when each of the above three outcomes is an equilibrium.

3.1. Both Retailers Charge Fixed Prices

Suppose both Retailers, A and B, adopt a fixed-price policy and choose a price, p_{fA} and p_{fB}, where p_{fk} is the fixed price chosen by retailer k $(k = \mathrm{A}, \mathrm{B})$. The location of the marginal H and N consumers who are indifferent between visiting either retailer is given by x_H and x_N, where

$$x_H = \frac{p_{fB} - p_{fA}}{2\theta_H} + \frac{1}{2},$$
$$x_N = \frac{p_{fB} - p_{fA}}{2\theta_N} + \frac{1}{2}.$$

Note that when both retailers offer fixed prices, then a retailer's demand in each segment is merely a function of the two prices and each segment's transportation costs.

The two retailers' profit functions are as follows:

Retailer A: $\Pi_A = \eta x_N p_{fA} + (1-\eta) x_H p_{fA}$,

Retailer B: $\Pi_B = \eta(1-x_N) p_{fB} + (1-\eta)(1-x_H) p_{fB}$.

Both retailers maximize profits by choosing their optimal prices. This yields

$$p^*_{fA} = p^*_{fB} = \frac{\theta_N \theta_H}{\theta_N(1-\eta) + \theta_H \eta},$$

where the superscript * denotes the equilibrium prices in the current case. Note that the equilibrium price is affected by the traveling cost parameter of each segment and is also weighted by the size of each segment. This price increases with increases in transportation costs and the proportion, η, of nonhaggling consumers. This occurs because a higher η allows the single, uniform price to be weighted more toward the values of the nonhagglers from whom the retailers can extract more profits.

In this symmetric equilibrium, the two retailers have equal market shares in both segments and their profits are

$$\Pi^*_{fA} = \Pi^*_{fB} = \frac{\theta_N \theta_H}{2(\theta_N(1-\eta) + \theta_H \eta)}. \tag{3}$$

3.2. Both Retailers Haggle

In this case, each retailer follows a haggling policy in which it advertises a price and allows consumers to negotiate over this price. Retailers A and B are able to distinguish nonhagglers (N) from hagglers (H) and charge the haggling price, p^H_{hk}, to the hagglers and the advertised price, p^N_{hk} to the nonhagglers, where h is the haggling policy of retailer k $(k = \mathrm{A}, \mathrm{B})$.

First consider the nonhagglers. Their choice of store is determined simply by the advertised prices offered by the retailers. Thus, the location of the marginal nonhaggler who is indifferent between visiting either retailer is given by

$$x_N = \frac{p^N_{hB} - p^N_{hA}}{2\theta_N} + \frac{1}{2}. \tag{4}$$

Now consider the hagglers. Because these consumers incur a cost of haggling regardless of which retailer they visit, their cost of haggling should not affect their choice of retailer. As in Bester (1993) and Muthoo (1999), the equilibrium haggling price will be determined by a GNBS taking into account the consumers' threat of leaving and purchasing at the alternate retailer. This price is determined by the solution to Equation (2) with the best alternative option being to haggle at the alternative retailer. For a consumer at Retailer A, this option is given by $d^H_A = V - E[p^H_{hB}] - \theta_H(1-x_H) - c_H$. This leads to the following proposition.

Proposition 1. *When both retailers have a haggling policy, the generalized Nash bargaining solution yields the following negotiated price*:

$$p^{H**}_{hA} = p^{H**}_{hB} = c_R + \frac{\theta_H(1-\beta)}{2\beta}.$$

The haggling price that results from a generalized Nash bargaining solution is the sum of the dealer's haggling cost plus a haggling premium $\theta_H(1-\beta)/(2\beta)$. Because the haggling consumer's best outside option is haggling at the alternate dealer, the consumer's haggling cost is incurred at both locations and, hence, does not appear in the equilibrium haggling price. Note that the haggling price increases with θ_H and is independent of θ_N. This occurs because an increase in θ_H makes the consumer's option of visiting the alternate dealer more expensive and the first dealer can exploit this cost. In addition, the haggling price is independent of θ_N because the price that a consumer can negotiate in a GNBS depends on valuations and bargaining skills only of the parties involved in the negotiation—nonhagglers are not part of the negotiation.

Consider the impact of β on the haggling price. As β increases, consumers' bargaining skills increase and the negotiated price decreases, $\partial p^H_{hA}/\partial\beta < 0$. It is easy to see that in the limit as the consumer gets all the power, then the dealer merely covers its costs. On the other hand, when the dealer has most of the power, then the dealer can charge its highest price. However, this price has to satisfy the incentive compatibility constraint—the net haggling price has to be such that a haggling consumer cannot be better off by simply paying the advertised price and not haggling. In addition, the haggling price is also limited by the competing haggling price at the alternate retailer.

Given the GNBS price, the problem of each retailer is stated as:

Retailer A:

$$\operatorname{Max}\Pi_A = \eta x_N(p_{hA}^N) + (1-\eta)\cdot x_H(p_{hA}^{H**} - c_R),$$

Retailer B:

$$\operatorname{Max}\Pi_B = \eta(1-x_N)(p_{hB}^N) + (1-\eta)\cdot(1-x_H)(p_{hB}^{H**} - c_R),$$

by choosing the optimal advertised prices. This yields

$$p_{hA}^{N**} = p_{hB}^{N**} = \theta_N, \tag{5}$$

where the superscript ** denotes the equilibrium prices in the present case. As in the previous fixed-price case, both retailers share both market segments equally. Note that the advertised price is simply the transportation costs of the nonhaggling consumers. Indeed, this advertised price is identical to a fixed price in a market comprised solely of nonhaggling consumers. Interestingly, both the advertised and negotiated prices are independent of η or the proportion of hagglers and nonhagglers. As we discuss later, this ability to charge a high price to the nonhagglers is an important benefit of haggling.

As discussed earlier, we have an assumption that when a customer is haggling with a retailer, the option of paying the advertised price at the same retailer is worse than the option of going to the other retailer and haggling yet again. This assumption is valid when $\theta_N - \theta_H(1+\beta)/(2\beta) - c_H - c_R > 0$. The condition is more likely to be satisfied for lower values of the haggling consumers' transportation cost, θ_H, and their haggling costs, c_H. When the haggling consumers have lower transportation costs, they are more likely to visit the other retailer, and when they have lower haggling costs, they are more likely to haggle with the other retailer. In addition, to ensure that haggling consumers' incentives are compatible, haggling consumers should be better off haggling than paying the advertised price at the same retailer. This incentive compatibility condition requires that $\theta_N - \theta_H(1-\beta)/(2\beta) - c_H - c_R > 0$. Notice that this condition is subsumed by the previous condition to ensure that haggling at the alternate dealer is the best alternative option.

3.3. Asymmetric Pricing Policies

In this section we examine the case where one retailer haggles and the other chooses a fixed price. Suppose Retailer A chooses to haggle and Retailer B chooses a fixed price policy; thus, haggling consumers incur the haggling cost if they go to Retailer A, but not if they go to Retailer B.

First consider the case of nonhagglers who simply decide which retailer to visit based on the advertised prices at the two dealerships. As in the earlier cases, the marginal nonhaggling consumer's location, x_N, is given by

$$x_N = \frac{p_{fB} - p_{hA}^N}{2\theta_N} + \frac{1}{2}.$$

Now consider the case of hagglers who face the option of haggling at Retailer A or paying the fixed price at Retailer B. The marginal haggling consumer who is indifferent between visiting the two retailers has the following utilities from haggling at Retailer A and paying the fixed price at Retailer B:

$$V - p_{hA}^{H\circ} - x_H\theta_H - c_H = V - p_{fB} - (1-x_H)\theta_H.$$

The location of this marginal haggling consumer who is indifferent between visiting the two retailers is given by

$$x_H = \frac{p_{fB} - p_{hA}^{H\circ} - c_H}{2\theta_H} + \frac{1}{2}.$$

Thus, all else being equal, haggling reduces the demand of Retailer A when the other retailer does not haggle. It is easy to see that this effect becomes stronger when consumers' haggling cost increases or the transportation cost, θ_H, decreases.

Because a consumer can haggle only at Retailer A, we need to solve for the GNBS only at one location. This is obtained by choosing a haggling price, p_{hA}^H, to solve the problem laid out in Equation (2) under the assumption that the best alternative to haggling at Retailer A is to pay the fixed price at Retailer B; i.e., $d_A = V - p_{fB} - \theta_H(1-x_H)$.

This leads to the following proposition.

Proposition 2. *When one of the retailers has a haggling policy and the other a fixed policy, then the negotiated price from a GNBS at the haggling dealer is given by*

$$p_{hA}^{H\circ} = \frac{(1-\beta)(p_{fB} + \theta_H - c_H) + 2\beta c_R}{1+\beta}.$$

In this case, the superscript ° denotes the equilibrium values. Note that the negotiated price depends upon the fixed price offered by the alternate dealer and it increases as the fixed price increases, $\partial p_{hA}^{H\circ}/\partial p_{fB} > 0$. Similarly, $\partial p_{hA}^{H\circ}/\theta_H > 0$, because any increase in θ_H makes the outside option of going to the other retailer less attractive.

Given the optimal haggling price at Retailer A, we can now solve for the optimal advertised prices at both retailers. The retailers' profit functions are as follows:

Retailer A:

$$\text{Max}\,\Pi_A = \eta x_N(p_{hA}^N) + (1-\eta)\cdot x_H(p_{hA}^H - c_H),$$

Retailer B:

$$\text{Max}\,\Pi_B = \eta(1-x_N)(p_{fB}) + (1-\eta)\cdot(1-x_H)(p_{fB}).$$

Both retailers simultaneously maximize profits by choosing the optimal advertised prices. This yields

$$p_{hA}^{N\circ} = \frac{\theta_N[2\beta(\eta-1)(c_H+c_R+2\theta_N) - \theta_H(2+\eta+3\eta\beta)]}{8\beta\theta_N(\eta-1) - 3\eta\theta_H(1+\beta)}, \tag{6}$$

$$p_{fB}^{\circ} = \frac{\theta_N[4\beta(\eta-1)(c_H+c_R) - \theta_H(4+3\eta\beta-\eta)]}{8\beta\theta_N(\eta-1) - 3\eta\theta_H(1+\beta)}, \tag{7}$$

While the fixed-price dealer has one price, p_{fB}°, for all consumers, the haggling retailer discriminates among the two types of consumers and charges different prices—$p_{hA}^{N\circ}$ to the nonhagglers and $p_{hA}^{H\circ}$ to the hagglers.

As discussed earlier, in the asymmetric case, we assume that the haggling consumer's best alternative option is to visit the fixed-price dealer and pay the advertised price. This assumption is valid when

$$\frac{2(1-\eta)\theta_N((2\theta_N - c_H - c_R)\beta - \theta_H)}{[8\theta_N\beta(1-\eta) + 3\theta_H(1+\beta)\eta]^2} > \theta_H.$$

It can be shown that this condition is more likely to hold when the haggling consumers' haggling costs and transportation cost are low. The above condition is also sufficient to ensure that haggling consumers prefer haggling with Retailer A to paying Retailer A's advertised price.

4. Equilibrium Pricing Policies

In this section, we determine the equilibrium pricing policy chosen by the retailers. We begin by comparing the relative profitability of the two pricing policies when both retailers follow identical pricing policies. Subsequently, we analyze the impact of unilateral deviations from both these pricing policies, explore the prisoners' dilemma nature of these policies, and show the existence of an asymmetric equilibrium.

4.1. Symmetric Pricing Policies

Consider the case where both retailers follow identical—either haggling or fixed—pricing policies. As one might expect, the relative profitability of haggling versus a fixed-price policy depends to a large extent on consumers' bargaining power, β. When β is low, then the retailer can extract more surplus than when β is high. More formally, when $\beta < \beta^* \in [0,1]$, then each retailer earns higher profits through a haggling rather than a fixed-price policy, where

$$\beta^* = \frac{\theta_H(\theta_N - \eta\theta_N + \eta\theta_H)}{3\theta_H\theta_N + \eta(\theta_H\theta_N + \theta_H^2 - 2\theta_N^2)}.$$

Thus, a haggling policy is more profitable only when the bargaining skills of hagglers are below a threshold, β^*. If consumers' bargaining skills are above β^*, then the retailers are better off charging a single fixed price, because haggling means giving up too much on price to this segment of the market. If parameters are such that $\beta^* < 0$, then a haggling policy is more profitable.

From the expression for β^*, it is clear that this cutoff level also depends on the level of η. In particular, $\partial\beta^*/\partial\eta > 0$ showing that as the proportion of nonhagglers (η) increases, then holding all else constant, it may become more profitable for the retailers to follow a haggling rather than a fixed price policy. To understand this result, note that when the dealers have a haggling policy, then (1) all prices are independent of η because haggling allows the dealers to separate the two segments and price discriminate, and (2) the extent to which the dealer can extract profits from the nonhagglers is independent of β but the level of profits it can extract from the hagglers decreases with β. Therefore, as η increases, it increases the number of high-margin sales to the nonhagglers without any reduction in price. This increased profitability from the nonhaggling segment allows the firm to tolerate a higher cutoff β^*.

From this discussion, it should be clear that the relative profitability of haggling versus fixed prices depends not only on the negotiating skills of the hagglers, but also on the number of hagglers in the market. This leads to the following proposition:

Proposition 3. *When $\eta > \eta^*$, then each retailer earns higher profits with symmetric haggling policies than with symmetric fixed-price policies, where*

$$\eta^* = \frac{\theta_H\theta_N(3\beta - 1)}{(\theta_N - \theta_H)(\theta_H(\beta-1) + 2\beta\theta_N)}.$$

This proposition shows that a policy of price discrimination through haggling is better than charging a single, uniform price only under certain conditions—when η is low, both firms would be better off charging fixed prices, and when η is high, then they would be better off with a haggling price. Thus, our analysis suggests that it is only when the proportion of *nonhagglers* is high enough does it make sense for firms to offer a haggling policy.

To understand this result, note that symmetric retailers, as long as they both adopt the same pricing policy, will share the market equally. Therefore, the relative profitability of haggling is based on the prices that prevail in the Stage 2 subgame. Allowing haggling enables the retailer to price discriminate and charge higher prices to the nonhagglers and lower prices to the hagglers. Thus, if haggling is to be more profitable than a fixed-price policy, it can only be because of the higher profits earned from the nonhagglers—indeed, profits increase with η. However, a potential disadvantage of haggling is that it also results in charging a lower price to the hagglers. Depending on the bargaining power and price sensitivity of the haggling consumers, a haggling strategy's disadvantages in the haggling segment may be offset by the benefits in the nonhaggling segment.

4.2. Prisoners' Dilemma in Pricing Policies

In the section above, we analyzed the relative profitability of the pricing policies when both retailers followed identical policies. Although Proposition 3 provides insights into when haggling is more profitable in a market where both firms follow the same strategy, it does not address the issue of whether fixed or haggling pricing policies would be observed in equilibrium. In particular, an equilibrium in which both retailers choose a haggling policy or both choose a fixed-price policy is possible only when neither retailer gains by unilaterally deviating to the alternate policy. We now discuss the benefits of unilateral deviations and the conditions under which different equilibria arise.

Consider a situation in which both retailers have haggling policies and Retailer B unilaterally deviates to a fixed-price policy. Because Retailer A discriminates between the two segments and Retailer B does not, Retailer B's advertised price is lower than Retailer A's advertised price. In addition, because nonhaggling consumers do not haggle and simply pay the advertised price, then, holding all else fixed, nonhaggling consumers would prefer Retailer B to Retailer A. Thus, by unilaterally deviating to the fixed-price policy, Retailer B lowers its price and gains market share in the nonhaggling segment. However, as shown in the appendix, this gain in market share results in lower profits from the nonhaggling segment. Furthermore, as η increases, the fixed price charged by Retailer B, p°_{fB}, is based more on the characteristics of the nonhaggling consumers; i.e., it is closer to $p^{H\circ}_{hA}$. Thus, increases in η increase the fixed price and stem the loss in profits from the nonhaggling segment.

Now consider Retailer B's situation with the haggling segment of the market. By deviating to a fixed price, Retailer B's advertised price is higher than its haggled price before deviation. Therefore, by deviating to the fixed-price policy, Retailer B increases its margins from the haggling segment. However, Retailer B's fixed price is now higher than Retailer A's negotiated price. Therefore, when haggling consumers choose a dealer to visit, they will incur haggling costs but pay a lower price when they choose Retailer A, and incur zero haggling costs but pay a higher price at Retailer B. Therefore, depending on the value of consumers' bargaining power, β, and their haggling costs, c_H, Retailer B may or may not lose market share or profits in the haggling segment as a result of the deviation.

A unilateral deviation by a retailer from the fixed to haggling pricing policy can also be seen in an analogous way. Consider a situation in which both retailers have fixed-price policies and Retailer A moves to the haggling policy. As explained above, Retailer A earns higher margins from the nonhaggling segment, but the gains from deviation from the haggling segment are more ambiguous and depend on the consumers' bargaining power β and haggling costs c_H.

Given the costs and benefits of unilaterally deviating either from a fixed or a haggling policy, we can now determine the policy that would emerge in an equilibrium. We highlight these results below.

Proposition 4. *When $\eta > \eta^*$, then even though symmetric haggling policies result in higher retailer profits than symmetric fixed-price policies, the equilibrium outcome can be one in which one or both firms end up with fixed price policies. Such a prisoners' dilemma equilibrium is more likely for lower values of $\eta > \eta^*$.*

This proposition establishes that when η is sufficiently high but not too high, then even though both retailers would be better off with a haggling policy, they are forced into a fixed-price equilibrium. This occurs because of the gains of unilaterally deviating to a fixed-price policy when the other dealer is following a haggling policy. However, because these gains decrease with η, it is interesting to note that both retailers adopting a haggling policy is more likely to be an equilibrium when the fraction of nonhaggling consumers (η) is sufficiently high. Although this finding may look surprising at first, recall that the benefit of unilateral deviation decreases as the fraction of nonhaggling consumers increases. Therefore, both retailers lose the incentive to deviate from a haggling policy, thus sustaining an equilibrium in which both retailers choose a haggling policy.

In Proposition 4, we show that the prisoners' dilemma forces the retailers away from a policy that price discriminates. However, we also see that the prisoners' dilemma works in the other direction.

Proposition 5. *When $\eta < \eta^*$, then even though symmetric fixed-price policies lead to higher retailer profits than symmetric haggling policies, the equilibrium outcome can be one in which one or both firms end up with haggling policies. Such a prisoners' dilemma equilibrium is more likely for higher values of $\eta < \eta^*$.*

When $\eta < \eta^*$, then both retailers following fixed prices is better than both following haggling prices. As shown earlier, the gains from deviating to a haggling policy when both dealers start with a fixed-price policy arise principally because of the gain in profits from the nonhaggling segment. As the proportion of nonhagglers, η, decreases, the potential gains from this segment also decrease.

Finally, note that although we have focused our attention on competitive effects and prisoners' dilemma outcomes, symmetric equilibria in which either both retailers choose haggling policies or both retailers choose fixed-price policies are also possible. That is, we cannot rule out conditions under which both symmetric equilibria are possible. In these cases, note that a unilateral deviation from both (haggling and fixed) symmetric cases, results in a loss in profits, thus sustaining two symmetric equilibria. We highlight this result in a subsequent example in §4.4.

4.3. Asymmetric Equilibrium

The above discussion shows that we can have two types of prisoners' dilemma, each leading to either fixed or haggling policies. This further raises the possibility that there exist other equilibria in the game that we have described. This leads to the following proposition.

Proposition 6. *Even with two symmetric retailers, we can have an asymmetric equilibrium in which one retailer adopts a fixed-price policy and the other adopts a haggling policy.*

Thus, we have an interesting situation in which two symmetric retailers end up in an asymmetric equilibrium. The asymmetric equilibrium shows an interesting trade-off between discrimination and differentiation incentives. Choosing the haggling policy provides benefits of discrimination between two segments. However, if both firms choose the haggling policy, then the competition between the two firms may become very intense. In such a case, the other firm may be better off choosing the fixed-price policy, and thus differentiating from the haggling firm. To see this more clearly, suppose both retailers initially start off with haggling price policies and Retailer B switches to a fixed-price policy. As shown earlier, by offering a single fixed price, Dealer B lowers its price to nonhagglers and raises it for hagglers. However, consider the impact on Dealer A, who still continues to follow a haggling policy. Because Dealer A stands to lose a large portion of the nonhagglers who would prefer to pay a low fixed price, Dealer A lowers its advertised price to keep some of the nonhagglers. However, a single fixed price offered by Retailer B can soften the competition in the haggling segment because haggling consumers have a less attractive outside option (compared to the case where both retailers have haggling policies). A less competitive outside option allows the haggling dealer to raise its negotiated price for the haggling segment. Thus, an asymmetric equilibrium is likely to emerge in situations where the competition between the dealers is intensified by both following the same pricing policy.

4.4. Alternative Options in the Bargaining Model

The prices negotiated by the hagglers in our model are determined, in part, by the best alternative option available to consumers. Thus far in our analysis, we have assumed that haggling consumers' best alternative option is to go to the other retailer. As a consequence, negotiated prices are affected directly by the *external* competition between the two retailers—that is, consumers play off haggling prices at each retailer. As noted earlier, this assumption is valid when the haggling consumers have relatively low transportation costs. In other words, our model is more applicable for high-value consumer durable products for which consumers' costs of visiting another store are relatively low in comparison to the utility that the product provides and any potential price differences among the stores.

For completeness, we briefly discuss how our results are affected by a model in which we relax our assumption that the best alternative option is to visit the alternate retailer. For example, when the haggling consumers have relatively high transportation costs, the inside option of staying at a retailer may be more attractive than going to the other retailer. In this case, the haggling consumers' options are limited to haggling at a given store or paying the advertised price at the same store. In such a case, the negotiated price is directly affected by the advertised price at the same store, and the external competitor's negotiated price has no direct impact on the haggling outcome. Assuming the consumer is at Retailer A, the price negotiated between the retailer and the consumer is given by the GNBS which is the outcome of the problem laid out in Equation (2). The only difference from the earlier model is that the consumers' best alternative option is the advertised price at the same store. That is, $d_A^H = V - p_{hA}^N$.

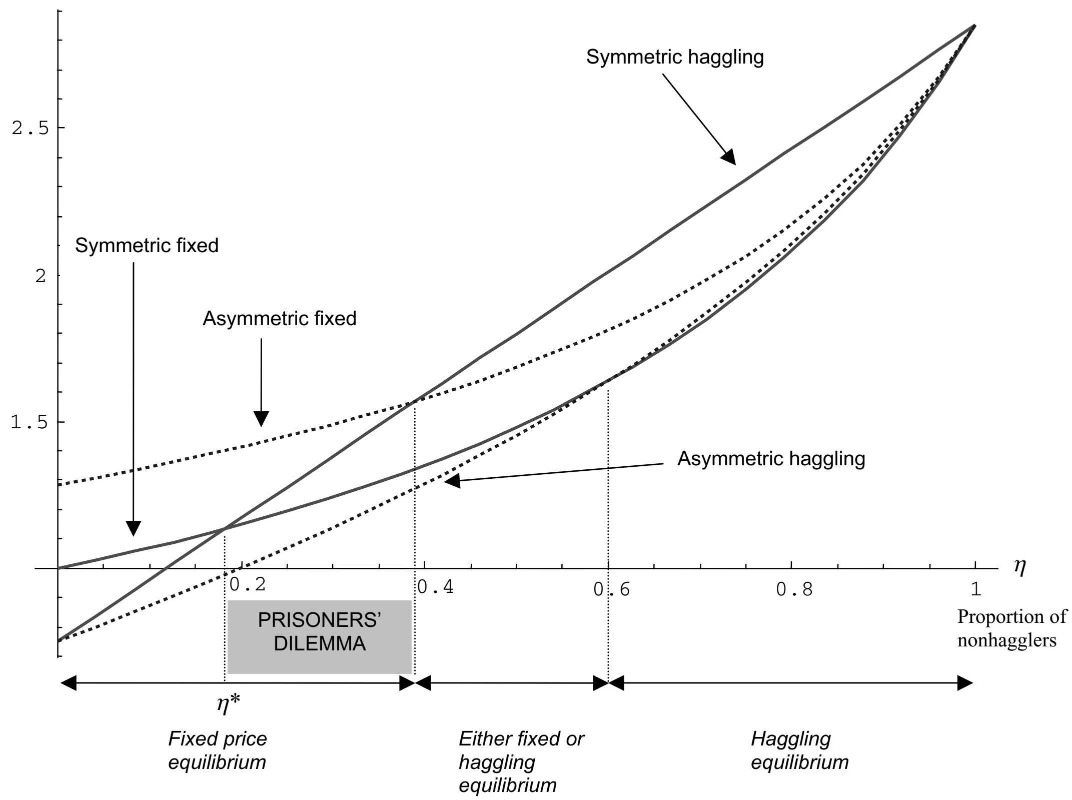
Under this scenario, the negotiated price is given by the following:

$$p_{hA}^H = (p_{hA}^N - c_H)(1-\beta) + c_R\beta. \tag{8}$$

In the equation above, the negotiated price, p_{hA}^H, is a discount off the advertised price, p_{hA}^N. Note that this does not mean that competition has no impact on the negotiated price. In particular, the competition between the retailers affects the advertised price which, in turn, influences the negotiated price. Note that Equation (8) is applicable to both the symmetric case when both retailers have a haggling policy and the asymmetric case where only one has a haggling policy. In both cases, the negotiated discount is similar; what is different is the advertised price.

One might intuit that in a model where the competition between the two retailers is relatively less intense, a prisoners' dilemma situation may not arise.

Figure 1 **Retailer Profits and Equilibrium Strategies**



In this alternative formulation with the inside option binding, we still find that both kinds of prisoners' dilemma can arise. Of course, a limitation of such a model in which the best alternative option is the advertised price at the same retailer is that the negotiated prices always move in lockstep with advertised prices—that is, the consumers' threat of walking out of the store and going to the other store has no impact on any negotiated price.[7]

Another interesting formulation can arise when the haggling consumers may find that visiting the alternate retailer is the best alternative option when the other retailer follows a haggling policy, but not when it follows a fixed-price policy. In other words, a haggling price at the alternate retailer is low enough to induce consumers to leave the current retailer, but a fixed price offered by the alternate retailer is not low enough to induce them to leave the haggling retailer. Even in this hybrid case, we find that the main results of our analysis continue to hold. To highlight these results, we present a numerical example. In Figure 1, we choose $\beta = 0.4$, $c_H = 0.5$, $c_R = 0.3$, $\theta_H = 2$, $\theta_N = 5.7$, and plot a dealer's profits as a function of η. The solid lines represent a dealer's profits under the case where both dealers follow symmetric price policies and the binding option for hagglers is to visit the alternate retailer. The dashed lines represent dealer profits when each follows an asymmetric pricing policy and the binding option for haggling consumers is to pay the advertised price at the haggling retailer.

Figure 1 mirrors the results from our main analysis and highlights a range where we have two symmetric equilibria. First consider the extreme case where the entire market is made up almost entirely of hagglers (i.e., $\eta \to 0$). In this case, even though there is almost no differentiation, consumers pay different prices at different types of retailers. In particular, the haggling dealer's price is based on consumers' abilities to haggle, while the fixed price is based simply on the transportation costs. This accounts for the differences in profits in the extreme case when $\eta \to 0$. Now consider the other extreme, when the market is made up almost entirely of nonhagglers (i.e., $\eta \to 1$). As $\eta \to 1$, no consumer is willing to haggle, and all consumers simply pay the same advertised price. Thus, as $\eta \to 1$, all price policies (fixed and haggling) lead to identical advertised prices and, therefore, identical profits.

5. Conclusion

The conventional wisdom in setting prices is that a firm generally is better off if it price discriminates

[7] The authors thank the AE and an anonymous reviewer for making this observation.

across consumers. In particular, as long as the firm's cost of identifying a customer's type is not too high, then a firm can earn higher profits by charging different prices to different customers. Another way of thinking about price discrimination is that although it helps the firm, it does not necessarily help all customers—some customers may pay a lower price and others may pay a higher price. This suggests that in a competitive environment, another firm can potentially offer some customers better value by simply promising not to price discriminate. In order to understand the impact of haggling in a competitive environment, our paper develops a parsimonious model that yields a whole range of counterintuitive pure-strategy equilibria. In particular, depending on the parameters, we can have equilibria in which both firms choose fixed prices, both firms haggle, or where one firm haggles and the other charges fixed prices. Importantly, our paper shows that the conventional wisdom of the benefits of price discrimination in a monopoly setting do not necessarily transfer over to a competitive environment.

If both retailers choose the same pricing policy, then haggling leads to higher profits than fixed prices only when the proportion of nonhagglers is sufficiently high. Said differently, nonhaggling consumers exert a positive externality on the haggling consumers—when there are a sufficient number of nonhagglers, then the hagglers can get a better deal. This is interesting because it is the presence of the time-sensitive, nonhaggling segment that allows the firms to provide a discount to the haggling segment. Our finding is in stark contrast to Arnold and Lippman (1998), who show that better bargainers exert a positive externality on all consumers. In particular, Arnold and Lippman have a model in which a seller has one unit to sell of a good, and buyers arrive at the store according to a specific process. Therefore, as buyers become better bargainers, it becomes less advantageous for the seller to reject the buyer and hope a better one comes along; hence, better bargainers help worse bargainers. In our model, because the retailer has multiple units to sell, it passes some of its costs to those consumers it identifies as being bad bargainers, with the result that bad bargainers help better bargainers and do worse themselves.

We find that the prisoners' dilemma in choosing prices and pricing policies goes both ways: Depending on the parameters, (1) the more profitable strategy of having uniform prices can lose out to price discrimination, and (2) the more profitable price discrimination strategy can lose out to a less profitable uniform-pricing policy. Corts (1998) finds a prisoners' dilemma that goes only one way—both firms would be better off with a fixed-price policy, but the prisoners' dilemma forces both firms to price discriminate. The all-out competition that leads to lower profits in Corts' case is eliminated in our model because of the friction of bargaining and traveling costs. Corts (1998) is more appropriate for situations where retailers sell vertically differentiated products, such as branded, high-quality goods at one store versus unbranded, lower-quality goods at the other store. Our model is appropriate for situations where the product under consideration is the same at both retailers, but retailers discriminate across consumers by haggling, e.g., choosing between Ford dealers in neighboring towns.

Our results show that both retailers will choose a haggling price policy only when the proportion of nonhaggling customers is sufficiently high. In other words, a haggling policy will be an equilibrium strategy only when a sufficient number of customers do *not* want to haggle. Because a haggling policy allows the retailer to charge high prices to the nonhagglers, by moving to a fixed price when the proportion of nonhagglers is high means that the firm is losing margins on a majority of its market. Similarly, when most of the customers want to haggle, then a fixed-price policy is the optimal strategy for the firms—compared to a negotiated price, a fixed price leads to higher margins from the majority of the market. At first blush, our finding may appear to be diametrically opposed to the marketing edict of serving customer needs—even though most consumers do not want to haggle, we are recommending that firms haggle over prices. However, we are completely consistent with the marketing edict. To see this, note that even if most consumers do not want to haggle, they do not have to haggle; they can always pay the advertised price. It is only when the most of the customers want to haggle that we deviate from serving the needs of both segments. In this case, the firms charge fixed prices and do not meet the haggling wants of the larger segment.

We began this paper by noting the prevalence of haggling over fixed prices in the automobile industry. Although there have been a number of attempts to move to fixed prices, the industry has largely stayed with a haggling policy. Our model offers the following explanation: According to J. D. Power & Associates (1992), 68% of consumers dread the negotiation process. This suggests that most consumers would prefer not to haggle or that they have a very high cost of haggling. In such a scenario, where a large proportion of consumers do not want to haggle, our model would argue that the equilibrium outcome will be one where the market follows a haggling policy. The related question raised is how Saturn is able to sustain a fixed-price policy in an environment in which we argue that haggling is the likely outcome.

We note that even though Saturn cannot force its dealers to charge a particular price, it can force its dealers to adhere to a fixed-price policy. In addition, Saturn has allowed its franchisees to own multiple dealerships in the same market area, thus decreasing any incentives to deviate from a fixed-price policy. Finally, consumer self-selection may draw only nonhagglers to Saturn, thus making moot the choice of a haggling policy.

Some auto industry observers have argued that because consumers do not like the price-negotiation process, firms that do away with this procedure will offer better value to customers. We agree with this proposition, but emphasize that by moving to a fixed price, the firm will offer better value only to those consumers who choose to patronize it—in choosing a retailer, consumers will always make a cost-benefit trade-off and, as long as the stores are differentiated spatially, the fixed-price store will not draw *all* the consumers that do not like to haggle. It is important to note that the policy that emerges in equilibrium depends on the proportion of customers who prefer not to negotiate. Counterintuitively, when this proportion is high, then we would observe a haggling, not a fixed-price equilibrium. When commenting on the failure of previous attempts at fixed prices, industry observers argue that a haggling retailer can always lower price to just below the fixed-price dealership. Thus, consumers can use the fixed price as a starting point to get a better deal at a competing dealership, and the fixed-price dealership would not be able to match it. Interestingly, our analysis suggests that it is often the fixed price that breaks the haggling dealer's strategy.

Acknowledgments

The authors are grateful for comments from seminar participants at Columbia, Duke, Kellogg, Wharton, UCLA, and the Summer Institute in Competitive Strategy at U.C. Berkeley. In addition, they thank Anne Coughlan, Jim Dana, Ram Rao, Brian Ratchford, Steve Shugan, Kathy Spier, Rick Staelin, Miklos Sarvary, the AE, and two anonymous reviewers for their helpful suggestions.

Appendix

Ruling Out an Outside Option

In a subgame in which both retailers are haggling, one of the outside options for a haggling consumer is to visit the other retailer and pay the advertised price at the other retailer. Here we show that in such a subgame, haggling with the other retailer is better for the consumer than paying that retailer's advertised price.

First note that in this subgame, haggling consumers at Retailer A are better off haggling than paying the advertised price; i.e., $V - p_{hA}^H - c_H > V - p_{hA}^N$. By a similar logic, the equivalent condition for Retailer B is $V - p_{hB}^H - c_H > V - p_{hB}^N$ or $[V - p_{hB}^H - c_H] - [V - p_{hB}^N] > 0$.

Now, consider a haggling consumer who is at Retailer A. If she goes to Retailer B and haggles with the retailer, her utility will be $V - p_{hB}^H - \theta_H(1-x) - c_H$. If she simply pays the advertised price at Retailer B, her utility will be $V - p_{hB}^N - \theta_H(1-x)$. It can be seen that the utility of haggling with Retailer B is more than the utility of paying Retailer B's advertised price because $[V - p_{hB}^H - \theta_H(1-x) - c_H] - [V - p_{hB}^N - \theta_H(1-x)] = [V - p_{hB}^H - c_H] - [V - p_{hB}^N] > 0$ from the above haggling condition.

Proof of Proposition 1. For Retailers A and B, the GNBS comes from choosing a haggling price to maximize their respective problems:

$$[V - p_{hA}^H - c_H - d_A]^\beta \times [p_{hA}^H - c_R]^{1-\beta},$$
$$[V - p_{hB}^H - c_H - d_B]^\beta \times [p_{hB}^H - c_R]^{1-\beta},$$

where

$$d_A = V - E[p_{hB}^H] - \theta_H(1 - x_H) - c_H,$$
$$d_B = V - E[p_{hA}^H] - \theta_H x_H - c_H.$$

This yields

$$p_{hA}^H = p_{hB}^H(1-\beta) + \theta_H(\beta - 1)(x_H - 1) + \beta c_R,$$

and

$$p_{hB}^H = p_{hA}^H(1-\beta) + \theta_H x_H(1-\beta) + \beta c_R.$$

Once consumers are at a particular retailer, the consumer with the best outside option is the one who lives closest to the alternate retailer. To ensure that no consumer has an incentive to deviate from the putative equilibrium, we set $x_H = 1/2$. Note that the consumer located at $x_H = 1/2$ is indifferent between visiting either retailer and also has the best outside option when he or she is at the retail location. Simultaneously solving the equations above yields

$$p_{hA}^{H**} = p_{hB}^{H**} = c_R + \theta_H \frac{(1-\beta)}{2\beta}.$$

It may be argued that once a consumer is at a specific retailer (say Retailer A), the retailer may be better off by a negotiated price other than p_{hA}^{H**}. Note that because bargained prices are not advertised, Retailer A cannot get any additional consumers by a lower price. To investigate whether Retailer A can gain from a higher negotiated price, we consider a situation in which Retailer B charges $p_{hB}^{H**} = c_R + \theta_H(1-\beta)/\beta$, and haggling consumers in the interval $x \in [0, 1/2)$ arrive at Retailer A. Restricting ourselves to prices determined by a GNBS, we examine if Retailer A would be better off with a higher bargaining price.

Note that for a consumer with location x, the outside option is $V - p_{hB}^{H**} - \theta_H(1-x) - c_H$, and the corresponding GNBS is given by $p_{hA}^H = p_{hB}^{H**}(1-\beta) + \theta_H(\beta-1)(x-1) + \beta c_R$. From this equation, we define a consumer location

$$\hat{x} = \frac{\theta_H + \beta(2c_R - 2\hat{p} - \theta_H\beta)}{2\theta_H\beta(1-\beta)} < \frac{1}{2}$$

such that at a GNBS price $\hat{p} > p_{hA}^H$, only consumers with $x < \hat{x} < 1/2$ would stay with Retailer A. Retailer A's profits from the haggling consumers is

$$(1-\eta)(\hat{p} - c_R)\left(\frac{\theta_H + \beta(2c_R - 2\hat{p} - \theta_H\beta)}{2\theta_H\beta(1-\beta)}\right).$$

The partial derivative of this profit with respect to $\hat{p}$ is

$$(1-\eta)\left[\frac{\theta_H+\beta(4c_R-4\hat{p}-\theta_H\beta)}{2\theta_H\beta(1-\beta)}\right],$$

which at $\hat{p}=p_{hA}^{H*}$ is $-(1-\eta)(1-\beta)/(2\beta)<0$. Therefore, holding Retailer B's price at p_{hB}^{H**}, Retailer A does not gain by a GNBS price greater than p_{hA}^{H**} with haggling consumers at its store. □

Proof of Proposition 2. In this case, Retailer A has a haggling policy and Retailer B has a fixed-price policy. The location of the marginal consumer in each segment is as given in the text. Because Retailer A is the only one with a haggling policy, its haggling price maximizes

$$[V-p_{hA}^H-d_A-c_H]^\beta[p_{hA}^H-c_R]^{1-\beta},$$

where $d_A=V-p_{fB}-\theta_H(1-x_H)$. This yields

$$p_{hA}^{H\circ}=\frac{(1-\beta)(p_{fB}+\theta_H-c_H)+2\beta c_R}{1+\beta}. \quad \square$$

Proof of Proposition 3. The difference in profits between fixed and haggling prices in the symmetric case is given by

$$\frac{(1-\eta)[\eta\theta_H^2(1-\beta)+2\eta\beta\theta_N^2-\theta_H\theta_N(\eta\beta+\eta+3\beta-1)]}{4\beta(\theta_N(\eta-1)-\eta\theta_H)}. \tag{A.1}$$

From this it is clear that fixed and haggling profits are equal when $\eta=1$. In addition, Equation (A.1) can be positive for low values of η and negative for high values of η. Therefore, each retailer earns higher profits through a haggling policy than through fixed prices when $\eta>\eta^*$, where

$$\eta^*=\frac{\theta_H\theta_N(3\beta-1)}{(\theta_N-\theta_H)(\theta_H(\beta-1)+2\beta\theta_N)}. \quad \square$$

Proofs of Propositions 4–6. For Propositions 4–6, consider an individual retailer's profit associated with the symmetric and asymmetric cases. In particular, let

- Π_f^* be the profits of a fixed (f)-price retailer in a symmetric equilibrium,
- Π_h^{**} the profits of a haggling (h) retailer in symmetric equilibrium,
- Π_f° be the profits of a fixed (f)-price retailer in an asymmetric equilibrium,
- Π_h° the profits of a haggling (h) retailer in an asymmetric equilibrium.

To find the equilibrium, we need to establish the conditions under which one of the retailers would unilaterally deviate from a symmetric haggling or fixed-price equilibrium. In particular, let $\Pi_1=\Pi_f^\circ-\Pi_h^{**}$ represent the difference in profits from unilaterally deviating to a fixed-price strategy when the other retailer follows a haggling strategy, and let $\Pi_2=\Pi_h^\circ-\Pi_f^*$, represent the difference in profits from unilaterally deviating to a haggling price strategy when the other retailer follows a fixed-price strategy. If $\Pi_1>0$, then the retailer will deviate to a fixed-price strategy when the other retailer follows a haggling strategy, and if $\Pi_2>0$, then the retailer will deviate to a haggling price strategy when the other retailer follows a fixed-price strategy.

Proof of Proposition 4. The numerical example in the text shows the existence of prisoners' dilemma. To prove the second half of the proposition, we compare Π_f° and Π_h^{**} by comparing profits from the two segments separately. When both retailers are haggling, each retailer gets $(1/2)p_{hA}^{H**}$ from the haggling segment and $(1/2)p_{hA}^{N**}$ from the nonhaggling segment. In the asymmetric pricing case, the fixed-price retailer (Retailer B) gets $(1-x_H)p_{hB}^{H\circ}$ from the haggling segment and $(1-x_N)p_{hB}^{N\circ}$ from the nonhaggling segment.

Thus, the difference in profits from the nonhaggling segment of the market is given by $(1/2)p_{hA}^{N**}-(1-x_N)p_{hB}^{N\circ}$ or

$$\begin{aligned}&(1-\eta)\theta_N\big[-\theta_H-(c_H+c_R-2\theta_N)\beta\big]\\&\quad\cdot\big[4(1-\eta)(c_H+c_R-4\theta_N)\beta)+\theta_H(4-\eta(7+3\beta))\big]\\&\quad\cdot\frac{1}{[8\theta_N\beta(1-\eta)+3\theta_H(1+\beta)\eta]^2}\\&\qquad=\frac{\theta_N y_1(y_2+y_3)}{[8\theta_N\beta(1-\eta)+3\theta_H(1+\beta)\eta]^2},\end{aligned}$$

where $y_1=(-1+\eta)[\theta_H+(c_H+c_R-2\theta_N)\beta]$, $y_2=4(-1+\eta)\cdot[\theta_H+(c_H+c_R-2\theta_N)\beta]$, and $y_3=8\theta_N\beta(1-\eta)+3\theta_H(1+\beta)\eta$. It is easy to see that $y_3>0$. We have assumed that in all cases involving haggling, the haggling consumers at a given store get higher utility from haggling at the competing store than from paying the advertised price at the store they are visiting. When both retailers are haggling, this assumption requires that $\theta_H+(c_H+c_R-2\theta_N)\beta<0$. Therefore, $y_1>0$ and $y_2>0$, resulting in $(1/2)p_{hA}^{N**}-(1-x_N)p_{hB}^{N\circ}>0$. Thus, deviating from a haggling to a fixed-price policy results in a loss from the nonhaggling segment for the deviating retailer when the other retailer is haggling. Therefore, such a deviation can be profitable only when it results in a higher profit from the haggling segment. The gains from this deviation are $(1/2)p_{hB}^{H**}-(1-x_H)p_{hB}^{H\circ}$, which can be positive or negative. However, it can be shown that

$$\begin{aligned}&\frac{\partial[(1/2)p_{hB}^{H**}-(1-x_H)p_{hB}^{H\circ}]}{\partial\eta}\\&\qquad=-\frac{36\eta\theta_N\theta_H(1+\beta)(\theta_H+(c_H+c_R-2\theta_N)\beta)^2}{[8\theta_N(1-\beta)+3\theta_H(1+\beta)]^3}<0.\end{aligned}$$

Therefore, a unilateral deviation from haggling to fixed-pricing policy when the other retailer is haggling is likely to be more profitable for low values of $\eta\in(\eta^*,1)$. Proposition 4 can also be proved with a strategy similar to the one used to prove Proposition 5. □

Proof of Proposition 5. The existence of a prisoner's dilemma in which a fixed-price equilibrium is broken by haggling can be verified with the following example: $\theta_N=10$, $\theta_H=3$, $c_H=0.1$, $c_R=0$, $\beta=0.5$. When $\eta=0.05$, then we have a symmetric fixed-price equilibrium. However, when $\eta=0.25$, then we have a symmetric haggling price equilibrium even though a symmetric fixed-price equilibrium would lead to higher profits. In this example, $\eta^*=0.252$ such that $\Pi_h^*>\Pi_f^*$ for any $\eta>\eta^*$.

Next, we show that if $\Pi_h^\circ > \Pi_f^*$ for any value of $\eta = \bar{\eta} < \eta^* < 1$, then $\Pi_h^\circ > \Pi_f^*$ for $\eta > \bar{\eta}$, so that a prisoner's dilemma is more likely for relatively higher values of $\eta \in (0, \eta^*)$.

It is easy to see that

$$\Pi_h^{**} = \frac{2\eta\beta\theta_N + (1-\eta)(1-\beta)\theta_H}{4\beta}$$

is linear in η. Furthermore,

$$\Pi_f^* = \frac{\theta_N\theta_H}{2[(1-\eta)\theta_N + \eta\theta_H]}$$

is increasing and convex in η:

$$\frac{\partial\Pi_f^*}{\partial\eta} = \frac{\theta_N\theta_H(\theta_N - \theta_H)}{2[(1-\eta)\theta_N + \eta\theta_H]^2} > 0$$

and

$$\frac{\partial^2\Pi_f^*}{\partial\eta^2} = \frac{\theta_N\theta_H(\theta_N - \theta_H)^2}{[(1-\eta)\theta_N + \eta\theta_H]^3} > 0.$$

Similarly, $\Pi_h^\circ = \eta p_{hA}^{N\circ} x_N + (1-\eta) p_{hA}^{H\circ} x_H$ and $p_{hA}^{N\circ}$, x_N, $p_{hA}^{H\circ}$, and x_H are all increasing in η:

$$\frac{\partial p_{hA}^{N\circ}}{\partial\eta} = -\frac{6\theta_N\theta_H(1+\beta)(\theta_H + (c_H + c_R - 2\theta_N)\beta)}{[8\theta_N\beta(1-\eta) + 3\theta_H(1+\beta)\eta]^2} > 0,$$

$$\frac{\partial x_N}{\partial\eta} = -\frac{3\theta_H(1+\beta)(\theta_H + (c_H + c_R - 2\theta_N)\beta)}{[8\theta_N\beta(1-\eta) + 3\theta_H(1+\beta)\eta]^2} > 0,$$

$$\frac{\partial p_{hA}^{H\circ}}{\partial\eta} = -\frac{12\theta_N\theta_H(1-\beta)(\theta_H + (c_H + c_R - 2\theta_N)\beta)}{[8\theta_N\beta(1-\eta) + 3\theta_H(1+\beta)\eta]^2} > 0,$$

$$\frac{\partial x_H}{\partial\eta} = -\frac{12\theta_N\beta(\theta_H + (c_H + c_R - 2\theta_N)\beta)}{[8\theta_N\beta(1-\eta) + 3\theta_H(1+\beta)\eta]^2} > 0.$$

From the above partials and the fact that $p_{hA}^{N\circ} x_N > p_{hA}^{H\circ} x_H$, $\partial\Pi_h^\circ/\partial\eta > 0$. However, $\partial^2\Pi_h^\circ/\partial\eta^2$ can either be positive or negative, depending on the value of the parameters.

We know that Π_h^{**} and Π_f^* intersect at $\eta = \eta^*$ and $\eta = 1$. It can also be shown that Π_h^{**}, Π_f^*, and Π_h° all intersect at $\eta = 1$. Consider the case in which Π_h° is concave in η. Further, consider a value of $\eta = \bar{\eta} < \eta^*$, at which $\Pi_h^\circ > \Pi_f^* > \Pi_h^{**}$. Because Π_h° is concave in η and Π_f^* is convex in η, $\Pi_h^\circ > \Pi_f^*$ for $1 > \eta^* > \bar{\eta} > \eta$.

Similarly, when Π_h° is convex in η, it can cut Π_h^{**}, which is linear in η, at most twice. Because $\Pi_h^\circ = \Pi_h^{**}$ at $\eta = 1$, Π_h° and Π_h^* can intersect at most once for any value of $\eta < 1$. If $\Pi_h^\circ > \Pi_f^* > \Pi_h^{**}$ for $\eta = \bar{\eta} < \eta^* < 1$, then Π_h° can intersect Π_h^{**} only after Π_f^* intersects Π_h^{**} at $\eta = \eta^*$. Therefore, $\Pi_h^\circ > \Pi_f^*$ for $1 > \eta^* > \bar{\eta} > \eta$. □

Proof of Proposition 6. When $\Pi_1 > 0$ and $\Pi_2 > 0$, we have an *asymmetric* equilibrium. To see that this is not a null set, it can be verified that $\beta = 0.5$, $c_H = 2.81$, $c_R = 2$, $\theta_H = 2$, $\theta_N = 10$, and $\eta = 0.5$ result in the outcome described in Proposition 6. □

References

Arnold, M., S. Lippman. 1998. Posted prices versus bargaining in markets with asymmetric information. *Econom. Inquiry* **37**(July) 450–457.

Ayres, I., P. Siegelman. 1995. Race and gender discrimination in bargaining for a new car. *Amer. Econom. Rev.* **85**(3) 304–321.

Bell, D., J. Lattin. 1998. Shopping behavior and consumer preference for store price format: Why "large basket" shoppers prefer EDLP. *Marketing Sci.* **17**(1) 66–88.

Bester, H. 1989. Noncooperative bargaining and spatial competition. *Econometrica* **57**(1) 97–113.

Bester, H. 1993. Bargaining versus price competition in markets with quality uncertainty. *Amer. Econom. Rev.* **83**(1) 278–288.

Bester, H. 1994. Price commitment in search markets. *J. Econom. Behavior Organ.* **25**(1) 109–120.

Chen, Y., R. Rosenthal. 1996. Asking prices as commitment devices. *Internat. Econom. Rev.* **37**(1) 129–155.

Chiang, R., C. Spatt. 1982. Imperfect price discrimination and welfare. *Rev. Econom. Stud.* **59** 153–181.

Corts, K. 1998. Third degree price discrimination in oligopoly: All-out competition and strategic commitment. *RAND J. Econom.* **29**(2) 306–323.

Desiraju, R., S. Shugan. 1999. Strategic service pricing and yield management. *J. Marketing* **63** 44–56.

Diamond, P. 1971. A model of price adjustment. *J. Econom. Theory* **3** 156–168.

Hotelling, H. 1929. Stability in competition. *Econom. J.* **39** 41–57.

Iyer, G., M. Villas-Boas. 2003. A bargaining theory of distribution channels. *J. Marketing Res.* **40** 80–100.

J. D. Power and Associates. 1992. The Saturn way. September. J. D. Power and Associates, Los Angeles, CA.

Lal, R., R. Rao. 1997. Supermarket competition: The case of everyday low pricing. *Marketing Sci.* **16**(1) 60–80.

Morton, F., F. Zettelmeyer, J. Silva-Risso. 2001. Internet car retailing. *J. Indust. Econom.* **49**(4) 501–519.

Muthoo, A. 1999. *Bargaining Theory with Applications*. Cambridge University Press, Cambridge, U.K.

Narasimhan, C. 1984. A price discrimination theory of coupons. *Marketing Sci.* **3**(2) 128–147.

Neslin, S. A., L. Greenhalgh. 1986. Nash's theory of cooperative games as a predictor of the outcomes of buyer-seller negotiations: An experiment in media purchasing. *J. Marketing Res.* **20** 368–379.

Riley, J., R. Zeckhauser. 1983. Optimal selling strategies: When to haggle, when to hold firm. *Quart. J. Econom.* **98**(2) 267–289.

Rubinstein, A. 1982. Perfect equilibrium in a bargaining model. *Econometrica* **50**(1) 97–109.

Spier, K. 1990. Hagglers and posters: The coexistence of flexible and fixed prices. Working paper, Kellogg Graduate School of Management, Northwestern University, Evanston, IL.

Wang, R. 1995. Bargaining versus posted price selling. *Eur. Econom. Rev.* **39** 1747–1764.

Wernerfelt, B. 1994. Selling formats for search goods. *Marketing Sci.* **13**(3) 298–309.