"HAGGLING VS. QUOTING A FIXED PRICE"

by

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HAGGLING VS. QUOTING A FIXED PRICE[1] [2]

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Abstract:

One of the problems faced by a seller when pricing his products is to choose between haggling and quoting a fixed price. This paper shows that the optimal strategy for the seller may involve a positive probability of haggling. Traditional analyses of this problem have been based on a search model. This paper derives similar results using a static model which involves fewer assumptions about the seller's informational needs.

JEL Classification Number: D40, D44

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[2] I would like to thank Olivier Cadot, Kevin Kaiser, Lars Tyge Nielsen, Pedro Santa-Clara and Luc Wathieu for their useful comments. Special thanks are due to Bernard Sinclair-Desgagné, whose comments have substantially improved all previous versions of this paper. The usual disclaimers apply.

Introduction

Haggling is quite a common phenomenon, especially in Arabic and Asian countries. In more developed Western countries, while posted fixed prices are the norm, haggling may be observed in the form of either price or quantity flexibility (the latter in the form of extras thrown in). There are advantages to haggling in the sense that it strengthens the seller's ability to extract the consumer surplus. However, posted prices also have advantages including reductions in information and negotiation costs.

Traditional analyses of the seller's choice of strategy - whether to quote a fixed price or haggle with the buyer have been framed in the context of search models. The earliest analyses generally made three major assumptions to derive their results - first, the seller could commit to any strategy he wished; second, all buyers were homogenous and third, the seller incurred some kind of costs - either search or storage costs - in hunting for new buyers.

In this framework, the usual results have shown that selling at a fixed price is *always* optimal for the seller. Riley and Zeckhauser (1983) for example, examine a situation where a single seller is faced by risk-neutral buyers one at a time. The seller has two options - he can haggle or quote a fixed price. They find that haggling offers advantages in terms of price discrimination but these gains are more than offset by losses when the habit of haggling encourages buyers to refuse to purchase at high prices. This result was generalized later by Samuelson (1984), who found that the best strategy for the uninformed player, whether buyer or seller, was to quote a fixed price. Similarly, McAfee and McMillan (1988) show that the optimal strategy for a monopsonist who incurs search costs and is able to commit to a buying policy, is a mechanism where the buyer offers a fixed price and approaches sellers sequentially.

Given the assumption about the necessity of commitment, what is not clear then is why haggling should exist in situations where commitments are possible. A classic example of such a case is the personal computer market in the United States where it is possible for dealers to quote fixed prices justifying these with "brand-name" claims for example, but where in practice, haggling over "extras" is the norm. One possible explanation for such practices is that in contrast to the Riley-Zeckhauser analysis, which focuses on a single seller (or the McAfee-McMillan analysis, which focuses on a single buyer) haggling may be optimal in situations involving a great deal of competition. In such cases, it may be better for the seller to sell at a lower price than lose the buyer to another seller.

Recent explanations for the existence of haggling strategies even with the existence of commitment, have involved the relaxation of the second assumption - that buyers are homogeneous. Arnold and Lippman (1992), for example, differentiate buyers into two types - those perfectly informed about the seller's reservation price (and who can consequently extract all the surplus) and those who are imperfectly informed (and can extract little or none of the surplus). The monopolist seller faces a stream of buyers over time arriving according to a Poisson process, incurs search costs per unit time to solicit buyers and chooses between a fixed price and a bargaining strategy depending on the number of perfectly informed buyers in the population. If the number of perfectly informed buyers exceeds a certain critical value, the seller will use a fixed-price strategy, otherwise he will use a haggling strategy. Similarly, Wang (1993) compares auctions to posted price selling and concludes that in the absence of auctioning costs, auctions are always better than selling at a fixed price. The assumptions Wang makes to drive his results are that buyers have valuations that are independently and privately distributed, buyers arrive according to a Poisson process and the seller incurs either auctioning or storage costs.

All the explanations offered so far, however, model the seller's situation in the context of dynamic search models. Generally, the models make strong assumptions about the amount of information possessed by the seller. For example, he knows the buyers' distribution of reservation values, knows the process which governs the rate at which buyers arrive, and so on.

The objective of this paper is to show that many of the same results can be derived in a static one-period framework, wherein a seller faces a single buyer at any one time and is choosing whether to haggle or quote a fixed price. The only assumption we make is that buyers are not homogenous. The informational requirements imposed on the seller are minimal - he needs only to know the distribution of reservation values for the different types of buyers.

Basically, we assume that the seller can differentiate buyers into either haggling and non-haggling types depending on their valuations for the object. This may be either because the two groups have very different opportunity costs of haggling or because they value the object differently on average. Then for some distributions of reservation values, the seller may find that whatever price he charges, one group is consistently more likely to buy than the other. If this group is the non-haggling group, the seller may find it worth his while to discriminate between the two groups of buyers in terms of selling strategy, rather than charge a fixed price which amounts to refusing to discriminate among buyers. Intuitively, if the seller can rip off the non-hagglers, he can use the excess surplus earned on the non-hagglers to more than compensate him for the losses he suffers while dealing with the hagglers.

The next section of the paper outlines a model wherein two different classes of buyers are present, one class willing to haggle and the other not. It is then shown that the choice of a seller being willing to haggle or not crucially depends on the proportion of non-hagglers to hagglers in the buyer population. As this exogenously-determined proportion (in the sense that it is exogenously determined to the seller) goes up or down, the optimal strategy for the seller may shift between quoting a fixed price to haggling or vice versa[3]. The section also illustrates the analysis with some simple examples. The paper concludes with a discussion of possible extensions and generalizations of this approach.

THE MODEL

As in the Riley-Zeckhauser paper, we postulate a single risk-neutral seller, whose objective is to maximize expected profit. We assume that there are two basic categories of buyers, non-hagglers N or hagglers H, with the proportion of non-hagglers in the population given by γ. It might help to think of these as non-haggling "foreigners" (who may not have a tradition of haggling especially if they come from a developed country) and "locals", who are accustomed to haggling.

We denote reservation prices of the seller, the hagglers and the non-hagglers by u, v_H and v_N respectively. Assume that the reservation values of the buyers are distributed according to continuously differentiable distributions, $F_i(v)$, $i = N,H$. These are known to the seller.

The situation modelled is as follows: The seller is faced with a buyer. He has a choice of two strategies: he can quote a fixed price and refuse to bargain under any circumstances or

[3] This result is consistent with the Arnold-Lippman analysis.

he can quote a (high) starting price. In the latter case, if the buyer is a non-haggler, she will compare the price to her reservation value and either accept or turn down the sale depending on the relative magnitudes of the two values. If the buyer is a haggler however, she will quote a (lower) price to the seller, who in turn decides whether to continue to haggle or decline the sale.

A. <u>Seller consenting to haggle</u>:

(i) When faced with a non-haggler, the seller solves

$$\max_{p} \ (p-u)(1-F_N(p))$$

Denote the price that maximizes the objective by p_N .

(ii) When faced with a haggler, we assume that the seller's ability to commit to a fixed price is lost the moment he consents to haggle. Two cases are possible: either the reservation price of the seller, $u > v_H$, in which case no sale will take place, or $u < v_H$, in which case, the most general assumption is that the haggler bargains the price down to a price between the seller's reservation price and his own. In other words, $p = u + k(v_H - u)$, $k \in [0,1]$ where k is a factor representing the bargaining strength of the seller.

For simplicity, we assume that $u < v_H$ always and $k = 0$ ie. that the hagglers can bargain the price down to the reservation price of the seller. To make it worthwhile for the seller to deal with a haggler, we assume that u is high enough that it covers any costs the seller may realize from being forced to haggle. Then, the seller's expected (excess) profits from dealing with a haggler are always zero[4].

So the total expected profit here will be

$$E[\pi] = \gamma (p_N - u)(1 - F_N(p_N))$$

B. **Seller refusing to haggle:**

Here, the seller uses a single combined distribution F_T (calculated as $\gamma F_N + (1-\gamma)F_H$) to describe the reservation values of the entire population without distinguishing between the buyer types. He solves

$$\max_p E[\pi_T] \equiv (p - u)(1 - F_T(p))$$

Denote the price that maximizes the objective by p_T.

Then haggling will occur in the form described above iff

$$\gamma (p_N - u)(1 - F_N(p_N)) \geq (p_T - u)(1 - F_T(p_T))$$

ie. iff

$$\gamma \geq \frac{(p_T - u)[1 - F_T(p_T)]}{(p_N - u)[1 - F_N(p_N)]}$$

and at a certain optimal proportion γ^*, the seller will be indifferent between selling at a fixed price and being willing to haggle ie.

[4] We have assumed that the non-hagglers do not bargain at all and the hagglers are perfect bargainers. These assumptions are extreme and can be made more general by assuming that both hagglers and non-hagglers bargain the price down but the bargaining power of the non-haggler 1- k_N is lower than the bargaining power of the haggler 1- k_H.

$$\gamma^* = \frac{(p_T - u)[1 - F_T(p_T)]}{(p_N - u)[1 - F_N(p_N)]}$$

The idea is that if the proportion of non-hagglers in the buyer population is above the critical value γ^*, the seller is better off being willing to haggle. He can charge a higher price maximizing his profit only with respect to the non-haggler's distribution function and be willing to bring this price down while dealing with a haggler. Given that the proportion of non-haggler's in the population is above γ^*, the expected profit the seller earns this way is larger than the expected profit he can earn by assuming that the buyers come from a homogenous population and charging a profit-maximizing price based on the common distribution. This factor γ^* and its interpretation is exactly analogous to the factor (1-α) of imperfectly informed buyers in the Arnold-Lippman analysis.

It is difficult to say more about γ^* without specifying functional forms for the distributions of reservation values. For example, a common assumption could be to assume that F_N first-order stochastically dominates F_H (intuitively that non-hagglers are more willing to buy than hagglers). Then F_N first-order stochastically dominates F_T and with $p_N > p_T$, without specifying a distribution for the reservation values, the comparative magnitudes of $F_T(p_T)$ and $F_N(p_N)$ are impossible to ascertain. Thus the comparative statics of γ become complicated. We can only say that a necessary and sufficient condition for $\gamma^* < 1$ is

$$(p_T - u)[1 - F_T(p_T)] < (p_N - u)[1 - F_N(p_N)]$$

Suppose we specify uniform distributions for the two reservation values. Then if F_N first-order stochastically dominates F_H and therefore F_T, then with $p_N > p_T$, haggling can be shown to be an optimal strategy for higher values of γ. For example, with supports [0,0.25] and

[.75,1] for F_H and F_N respectively, haggling dominates quoting a fixed price for $\gamma \in$ [.11,1.0]. This is illustrated in Figure 1 below.

Insert Figure 1 here

On the other hand, with F_H and therefore F_T, first-order stochastically dominating F_N (intuitively that non-hagglers are less willing to buy than hagglers), then with $p_T > p_N$, haggling will *never* be optimal for the seller. For example, with supports [0.5,1.0] and [0,0.5] for F_H and F_N respectively, haggling is never optimal for the seller. This is illustrated in figure 2 below.

Insert Figure 2 here

If neither distribution dominates the other in the first-order, then either both distributions are identical or the supports are different. In the former case, for *any* distribution, $\gamma^* = 1$ and the seller will always quote a fixed price - a result consistent with the Riley-Zeckhauser analysis. If the supports are different, results depend on the specific values. For example, with supports [0,0.4] and [0,1] for F_H and F_N respectively, haggling dominates quoting a fixed price for $\gamma \in$ [.67,1.0]. This is illustrated in Figure 3 below.

Insert Figure 3 here

DISCUSSION

The exogenously determined value of γ gives some theoretical justification to situations where markets shift between haggling and non-haggling. Such situations are quite common. A recent example is in the automobile market in the United States where Ford recently announced that it would discontinue its policy of allowing its dealers to give discounts off the fixed price and instead stay with a policy of quoting fixed sticker prices with no discounts allowed[5]. Given that the auto market remains as competitive as ever, such a policy change is a puzzle under the "competition" hypothesis.

Possible extensions to this paper could involve endogenizing γ and seeking the long-run equilibrium proportion of non-hagglers. There seem to be two possible approaches. Here, an implicit assumption is that the seller is in a competitive market. Hence, for the seller, the parameter γ is exogenous and he cannot control it explicitly. Therefore, one extension would be to consider the strategic interaction between a *finite* number of sellers. In such a case, modelling a selection mechanism would show the evolution of γ for each seller as buyers gravitate to one seller or another depending on their type.

A second approach would be to model the haggling market as a simultaneous game where the sellers choose whether to haggle or to quote a fixed price and simultaneously, the buyers choose whether to haggle or not, depending for example on some realization of their haggling

[5] See "Car Prices Start Turning Around as Firms Cut Rebates", Wall Street Journal, February 14, 1992, Business Section, 1 and "Ford Expands 'One-Price' Plan for its Escorts", Wall Street Journal, March 12, 1992, Business Section, 1.

costs. Then an evolutionary game showing the evolution of haggling or fixed prices as an long-run equilibrium could be constructed.

REFERENCES

Arnold, M. A. and Lippman, S. A. (1992). "Posted Prices Versus Reservation Prices with Imperfectly Informed Buyers." Western Management Science Institute Working Paper No. 396, University of California, Los Angeles.

McAfee, R. P. and McMillan, J. (1988). "Search Mechanisms." *Journal of Economic Theory* **44**: 99-123.

Riley, J. and Zeckhauser, R. (1983). "Optimal Selling Strategies: When To Haggle, When To Hold Firm." *Quarterly Journal of Economics* **98**(2): 267-289.

Samuelson, W. (1984). "Bargaining under Asymmetric Information." *Econometrica* **52**(4): 995-1005.

Wang, R. (1993). "Auctions versus Posted Price Selling." *American Economic Review* **83**(4): 838-851.

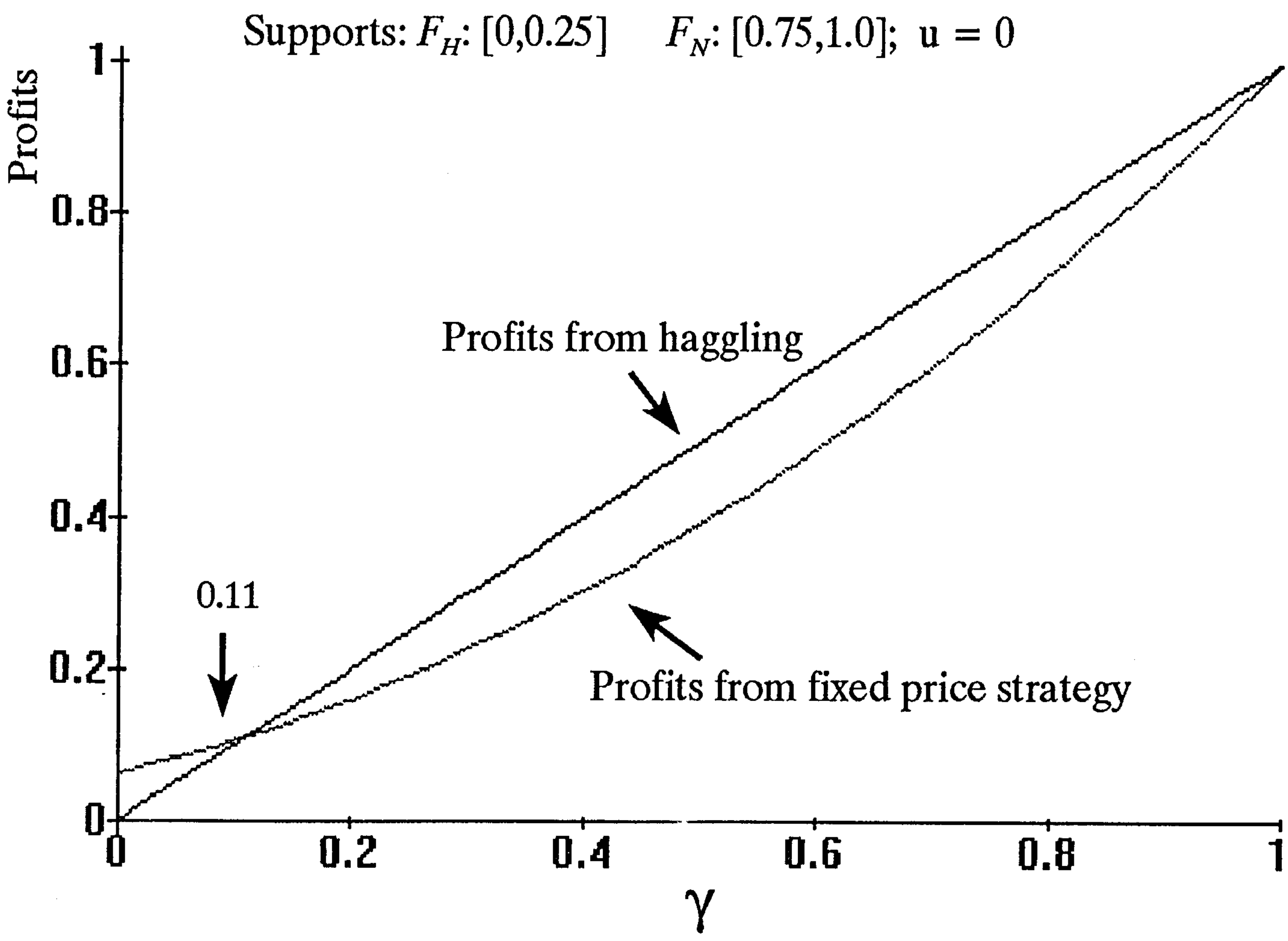

Figure 1: Non-hagglers are more eager to buy than hagglers

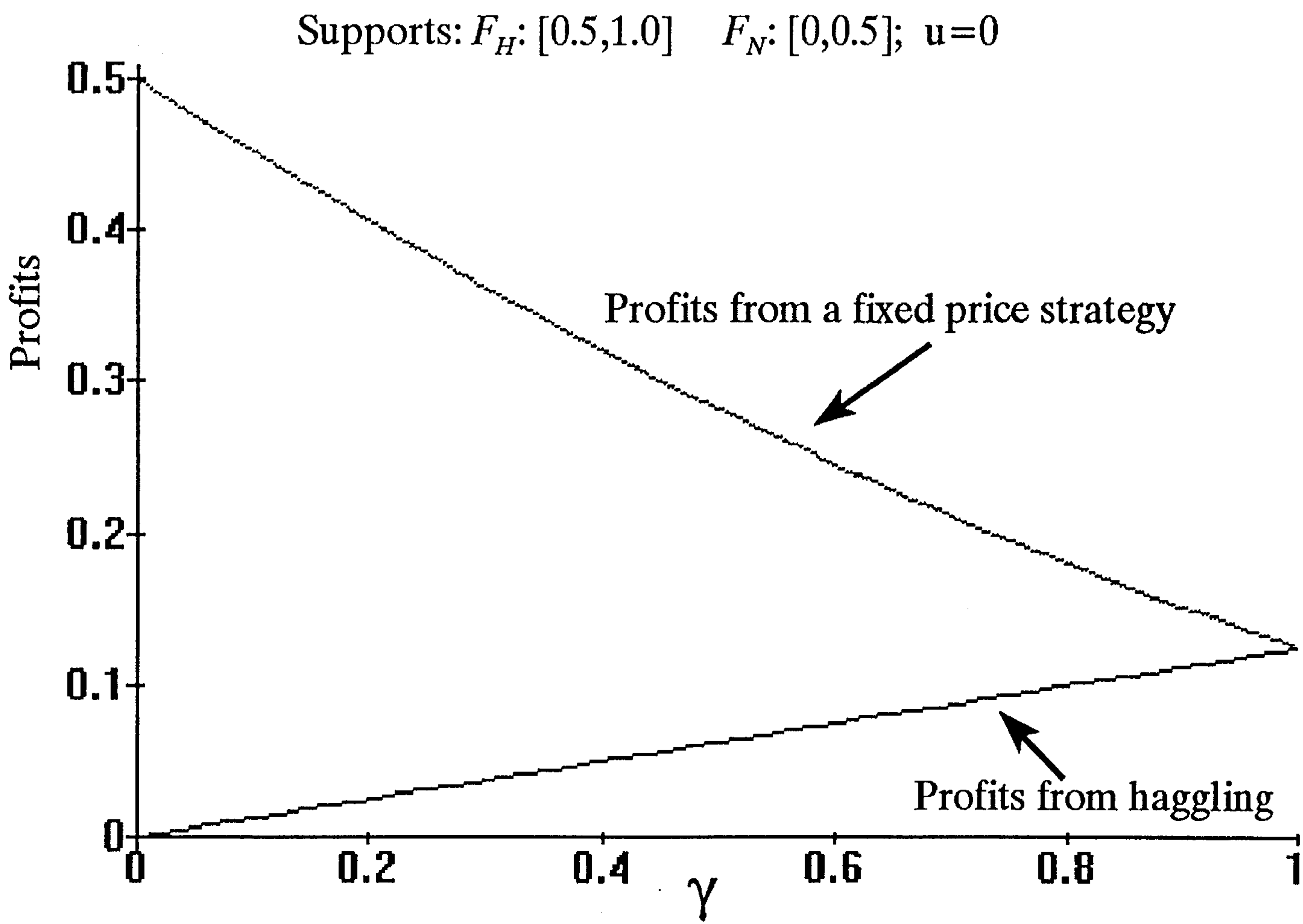

Figure 2: Hagglers more eager to buy than non-hagglers

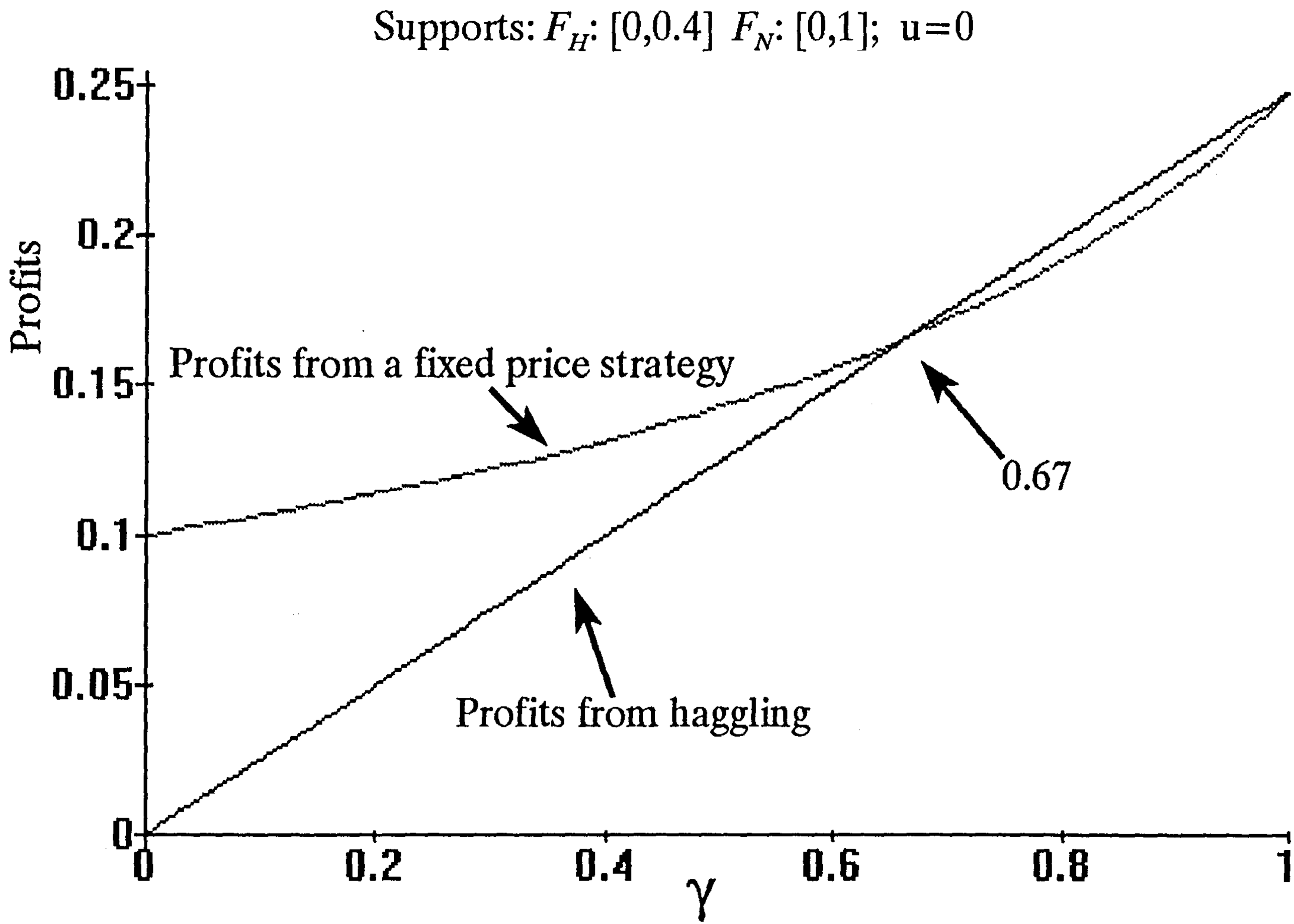

Figure 3: Neither distribution dominates the other