Prices, Product Qualities and Asymmetric Information: The Competitive Case

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Recent developments in the economics of information emphasize the informational content of prices. We examine the degree to which prices convey information on product quality to uninformed agents. Under perfect competition, we show that a rational expectations equilibrium may not exist. When an equilibrium does exist, the information on quality conveyed by prices depends on the shape of the average cost curves and the relative numbers of informed and uninformed agents.

1. INTRODUCTION

Most amateur oenologists have experienced the dilemma of making a wine purchase without the benefit of full information on the quality of the available goods. Though the difference between whites and reds is easy enough to grasp, even within a given variety one must choose between a number of alternative wines. Many consumers use prices as indicators of quality in making this decision. In doing so they must be reasoning that the wine prices convey information on quality. This phenomenon is not, of course, restricted to the purchasing of wine but is present in the decisions of imperfectly informed agents in a variety of circumstances.

This paper examines the degree to which prices convey information about product quality from informed to uninformed buyers. The role of prices in conveying information in environments of asymmetric information was first explored by Grossman-Stiglitz (1976) and Kihlstrom–Mirman (1975). These are models of financial markets in which demands of informed agents influence asset prices. Uninformed agents extract this signal from the price in formulating their own asset demands. Generically, rational expectations equilibria will reveal the information of the informed agents.¹

In the Grossman–Stiglitz and Kihlstrom–Mirman models, suppliers of the asset cannot respond to the behaviour of the uninformed agents. To investigate the role of prices in conveying information on product quality, we must extend the earlier models to allow strategic behaviour on the part of firms. Once uninformed agents use prices as a signal of quality, profitable opportunities may arise for the entry of firms selling low quality goods at high prices to the uninformed buyers. That is, dishonest firms may enter and
"rip off" uninformed buyers. This entry distorts the information conveyed by product prices.

The degree to which prices convey information on product quality is therefore directly related to the entry of dishonest firms. Factors which limit the entry of these firms—such as steeply shaped average cost schedules and a relative abundance of informed buyers—should improve the revelation property of prices in a competitive environment. These results are presented in Section 3 of the paper following a presentation of the basic model in Section 2. Finally, Section 4 summarizes our results and discusses some extensions of this analysis.

In terms of related literature, Dybvig–Spatt (1980) and Shapiro (1982) use reputation effects as an incentive for firms not to provide low quality goods. Klein and Leffler (1981) show that these "reputations" need be nothing more than large sunk costs, the returns from which may quickly go to zero if quality is seen to deteriorate. Here however, we choose to focus on a static model in order to make the toughest case possible for the ability of price to signal quality. Our analysis is similar in some respects to that in Chan and Leland (1982) and in recent unpublished work by Farrell (1982); we shall discuss the differences and similarities between these and our paper as the analysis proceeds. In terms of its overall structure, our model has more in common with the "bargains and ripoffs" approach in Salop and Stiglitz (1977), with quality as the unknown variable rather than price.

2. OVERVIEW OF THE MODEL

In this model, we consider the market for a good which can be produced with varying quality. We view quality, for example, as a measure of the durability or reliability of a product. Quality is different from variety in that every agent's utility is monotonically increasing in quality while in variety models agents can have different preferred brands. We refer to the quality varying good as the q-commodity.

We consider an economy in which agents have income, y, which they can spend on one unit of the q-commodity and on a composite good, z, which serves as the numéraire. We denote the quality level bought by q—an index which is increasing in quality. Using a function p(q) to represent prices for each quality level, the budget constraint for an individual implies that \( z = y - p(q) \).

We represent the consumer choice problem as one of maximizing utility over the available \((p, q)\) offerings. Substituting the budget constraint into the direct utility function \( U(z, q) \) we get a partially indirect utility function that we label \( W(\cdot) \):

\[
U(z, q) = U(y - p, q) = W(p, q).
\]

We assume that \( U(\cdot) \) is increasing and concave in both arguments, so that we have \( W_p < 0, W_q > 0, W_{pp} < 0 \) and \( W_{qq} < 0 \). Agents can always choose not to buy a unit of the commodity and receive utility \( \bar{U} \)—i.e. their reservation utility. Here, \( q = 0 \) is defined to be the greatest level of quality that gives no utility to the consumer (i.e. for which he would be willing to pay nothing). Therefore we have \( \bar{U} = U(y, 0) \).

We further simplify our analysis by assuming that there is a single type of consumer in terms of tastes. This allows us to separate the issue of the informational role of prices from the self-selection problem that arises in a model of many taste-types. As we describe in Section 4, the analysis can be extended to the more general case of many types with little difficulty.
In general, we are investigating the properties of an equilibrium when there are some uninformed consumers. These uninformed agents choose randomly over firms selling goods at a given price. They choose at which price to purchase by calculating expected utility at each of the market prices. As contrasted with the analysis in Chan and Leland, here uninformed consumers do not become aware of the quality of the good they have purchased until after they have purchased it and taken it home. That is, borrowing Nelson’s (1970) terms, we model quality as an “experience” attribute, while Chan and Leland treat it as a “search” good. In this model, we consider rational expectations equilibria in which the conditional frequency distribution of quality given price that uninformed consumers use to calculate expected utility is consistent, in equilibrium, with the relative numbers of honest and dishonest firms in the market. This is, of course, the essence of the proposition that agents will attempt to infer product quality from price.

Of course, firms take this behaviour into account and will try to “rip off” the uninformed agents by providing low quality goods at high prices. In many of the cases we examine, equilibrium is characterized by a probability of ripoff strictly between zero and one. Hence product prices will provide imperfect information on quality.

3. THE COMPETITIVE EQUILIBRIUM

In this section we consider the nature of competitive equilibrium under different assumptions regarding costs and the amount of information on quality available to buyers. In particular, we ask whether the equilibrium we observe under full information can ever be preserved when some consuming agents are ignorant of product quality. If it is not preserved, does there exist an equilibrium with ripoffs such that uninformed consumers still purchase, fully aware of the gamble they are taking?

We consider two alternative firm cost structures, both of which are compatible with perfect competition in the industry. Let $AC(x, q)$ represent the average cost of producing $x$ units of a brand with quality $q$. In the first case we assume that $AC(x)$ is independent of $x$, that is, we have constant average costs of production. In the second case we allow average costs to be $U$-shaped (in terms of quantity). Additionally, we assume that if $q_1 > q_2$ then $AC(x, q_1) > AC(x, q_2)$ for all $x$. We define $C(q)$ to be the minimum average cost at which a brand of quality $q$ can be produced i.e.

$$C(q) = \min_x AC(x, q).$$

Finally, we assume that $C(q)$ is increasing and convex in $q$ (i.e. $C' > 0$, $C'' > 0$).

We first consider equilibrium when all agents are informed about product quality. The following proposition, due to Rosen (1974) characterizes equilibrium in the constant cost case, and will not be proved here.

**Proposition 1.** In a full information competitive equilibrium with constant costs the only brands sold will be of quality $q^*$ and will sell at price $p^*$ where $(p^*, q^*)$ is defined by,

(i) $p^* = C(q^*)$

and

(ii) $-W_q(p^*, q^*)/W_p(p^*, q^*) = C'(q^*)$.

Intuitively, competition guarantees that any $(p, q)$ pair transacted in equilibrium must lie on the $C(q)$ locus (i.e. earn zero profits). Competitive forces will also imply that $(p^*, q^*)$ is the utility maximizing point on the $C(q)$ locus as in (ii).
This equilibrium is illustrated in Figure 1 where \( W_1 \) represents the maximized consumer utility. The convexity of \( C(q) \) and the curvature of \( W(p, q) \) guarantee that the tangency (point \( A \)) will be unique and that the appropriate second order conditions for a constrained maximum will be satisfied. We shall simply assume that an interior solution exists, ignoring the (uninteresting) possibilities that consumer welfare is maximized at zero or at infinite quality.

This solution will only change slightly when we consider \( U \)-shaped average costs. Ignoring integer problems,\(^2\) equilibrium will still be characterized by conditions (i) and (ii) of the previous proposition. Moreover, with non-constant costs the number of firms becomes determinate since firms will produce at the minima of their average cost schedules. In this case then, we have

\[
n^* = \frac{I}{\bar{x}(q^*)}
\]

where \( n^* \) is the equilibrium number of firms, \( I \) is the number of consumers and \( \bar{x}(q^*) \) is the efficient scale of production for quality \( q^* \).

We turn now to the case in which some agents are uninformed about the qualities inherent in the brands offered. Will the equilibrium described in Proposition 1 continue to hold or will there be opportunities for firms to take advantage of the ignorance of some agents? What are the roles of the informed consumers and of non-constant average costs in limiting the number of these ripoffs?

We assume that an exogenous proportion, \( \theta \), of buyers are informed about product quality and price. These informed agents choose randomly among the firms offering their preferred price-quality pair. The remaining proportion of agents, \( 1-\theta \), are essentially uninformed about product quality. These uninformed agents can only determine whether or not quality exceeds some minimum, \( q^* \).\(^3\) Otherwise, these agents rely solely on the information provided through product prices in making their decisions.
Further, we assume that there is no remunerative price at which a buyer would consider purchasing a brand with quality \( q \). That is, buyers would strictly prefer not buying at all to buying \((p, q)\) where \( p = C(q) \) or,

\[
W(p, q) < \bar{U}.
\]

(2)

This last assumption will simplify the exposition somewhat although it is not important to the analysis. The consequences of relaxing (2) will be discussed later.

Since uninformed agents can observe only prices, they form rational expectations of quality given information on the number of firms offering each quality at each price. Agents buy at the price yielding maximal expected utility subject to a constraint that \( E_q[W(p, q)] \geq \bar{U} \). Firms are referred to as either honest or dishonest; honest firms sell at prices commensurate with quality and therefore are able to attract informed buyers while dishonest firms exist solely to take advantage of the uninformed agents' ignorance by selling low quality at a high price (i.e. by ripping off customers).

We assume that there are enough firms in this competitive market that each believes that its offering has no effect on the customers' expectations of quality given price. Specifically, no dishonest firm will worry that its entry will, by increasing the probability of their being ripped off, cause the uninformed to drop out of the market.

As in all rational expectations models, part of the definition of equilibrium entails a characterization of conjectures when behaviour "out of equilibrium" is observed (see, for example, Milgrom–Roberts (1982)). In our model, we demonstrate below that informed agents will purchase \( q^* \) at price \( p^* \) from honest firms as in Proposition 1. It is therefore reasonable for uninformed agents to view any firm charging \( p \) not equal to \( p^* \) as dishonest. Furthermore, we specify that the only quality available at \( p \) not equal to \( p^* \) will be \( q \). We show that, in equilibrium, these conjectures are fulfilled. As discussed by Chan–Leland as well, firms cannot "convince" consumers that they will offer any quality other than \( q \). From these conjectures and our assumption that firms take consumer expectations as given, Lemma 1 demonstrates that if an equilibrium exists, there will be a single price with dishonest firms always offering \( q \). Propositions 2 and 3 address the question of the existence of an equilibrium.

**Lemma 1.** In a perfectly competitive market equilibrium, dishonest firms can only sell at prices that honest firms charge \( (p^*) \) and their quality will always be just \( q \).

**Proof.** First we show that there is never any incentive for a dishonest firm to offer a quality different than \( q \) at \( p^* \). Offering \( q \) less than \( q \) will not be profitable since sales will be zero. Increasing quality above \( q \) will not attract additional consumers since the informed do not purchase from dishonest firms and the uninformed choose randomly over all firms regardless, by assumption, of the quality they offer.

To see that there must be a single-price equilibrium, assume to the contrary that only dishonest firms offer goods at some price \( \hat{p} \) distinct from the equilibrium price, \( p^* \). Given consumers' conjectures, they will expect to get \( q \) at this price. Since there is no remunerative price at which consumers will buy \( q, \hat{p} \) would have to be below \( C(q) \) to attract buyers. This is clearly not profitable for the firm. \( \|

In equilibrium, the informed consumers will clearly continue to receive \( (p^*, q^*) \) as defined in Proposition 1: there is no asymmetry in their relationship with sellers. Using the lemma, uninformed consumers’ expectations can be completely characterized by the probability of their obtaining \( q^* \) at \( p^* \). We denote this probability by \( \pi \). Since uninformed
consumers choose randomly among firms offering commodities at \( p^* \),

\[
\pi = n^h/(n^h + n^d)
\]  

where \( n^h \) and \( n^d \) are, respectively, the number of honest and dishonest firms selling at \( p^* \). As noted above, \( \pi = 0 \) for \( p \neq p^* \) represents consumers’ conjectures. In what follows it will be useful to define a critical probability, \( \pi^c \), at which uninformed consumers are indifferent between dropping out and staying in the market, i.e.

\[
\pi^c W(p^*, q^*) + (1 - \pi^c) W(p^*, q) = \bar{U}.
\]  

Equilibrium then occurs when consumer conjectures about \( \pi \) are reproduced by the behaviour of the firms taking those conjectures as given. We denote by \( \pi^* \) the equilibrium level of \( \pi \).

**Proposition 2.** There exists no competitive equilibrium in the constant cost case with asymmetric information.

**Proof.** The key to this result is that the expected profits \( (ER) \) of the dishonest firms will be strictly positive for all finite values of \( n^d \). With \( (1 - \theta)I \) uninformed consumers choosing firms randomly,

\[
ER = [p^* - C(q^*)](1 - \theta)I/(n^h + n^d) > 0 \text{ for all } n^h, n^d.
\]  

Suppose then that \( \pi^* > \pi^c \), so that the uninformed consumers remain in the market. From (5) dishonest firms will enter which will, in turn, reduce \( \pi \) below \( \pi^* \) thereby invalidating the conjectures of the consumers. Alternatively, if \( \pi^* \equiv \pi^c \), only informed consumers will remain in the market; dishonest firms will therefore drop out, raising \( \pi \) to \( \pi = 1 \). Hence, there is no value for \( \pi \) that can serve as an equilibrium.

Other examples of the nonexistence of rational expectations equilibria can be found in the literature; see, for example, Grossman–Stiglitz (1980) and Kreps (1977). In this case two particular elements of our model combine to prevent the attainment of equilibrium. First, the decision of the uninformed (to stay in or drop out) is a discontinuous function of \( \pi \) with the discontinuity at \( \pi = \pi^c \). Second, the unrestricted entry and constant costs assumptions guarantee that there will always be enough entry to drive \( \pi \) below \( \pi^c \).

It would seem then that nonconstant costs might be able to help, as shrinking output leads to higher average costs. The following proposition spells this out more clearly.

**Proposition 3.** In the asymmetric information case with non-constant costs, if there exists a competitive equilibrium, it will be characterized by:

(i) \( (p^*, q^*) \) from Proposition 1 offered by honest firms.

(ii) \( (p^*, q) \) offered by dishonest firms.

(iii) The expected sales for each dishonest firm are \( x^o \) where

\[
AC(x^o, q) = p^*.
\]

(iv) The expected sales for each honest firm are just its efficient scale, \( \bar{x}(q^*) \).

(v) The equilibrium numbers of each type of firm \( n^{h*}, n^{d*} \) are determined by

\[
\theta I/n^{h*} + (1 - \theta) I/(n^{h*} + n^{d*}) = \bar{x}(q^*)
\]

and

\[
(1 - \theta) I/(n^{h*} + n^{d*}) = x^o.
\]
Proof. That (i) and (ii) must be true in any equilibrium has already been shown so we start with (iii). Unless expected profits taking $\pi$ as constant are zero, we can expect dishonest firms to continue to enter. Therefore in any equilibrium the average costs for the dishonest firms must have risen up to the level of their average revenues. This means that expected sales must fall to level $x^o$ defined in (iii).

Since the honest firms are competing for the business of knowledgeable consumers they can be expected to be forced toward efficient scale. This is condition (iv). The fifth condition merely tells us how many firms of each type there must be in order to satisfy the third and fourth conditions. Since the expected sales of an honest firm equal its expected sales to informed customers, $\theta I/n^h$, plus its expected sales to the uninformed (which the honest firms share with the dishonest), $(1-\theta)I/(n^h+n^d)$, these two quantities must sum to the firm's efficient scale, $x(q^*)$. Similarly the total number of firms must be such that the expected sales of a dishonest firm, $(1-\theta)I/(n^h+n^d)$, just equal the zero profit level in (iii) (i.e. $x^o$).

If the two equations in (v) give us values for $n^{h*}$ and $n^{d*}$ such that $\pi^* > \pi^c$ (where $\pi^* = n^{h*}/(n^{h*}+n^{d*})$) then equilibrium exists since the uninformed will choose to stay in the market and the entry of dishonest firms has stopped. If, however, $n^{h*}$ and $n^{d*}$ satisfying (iii)–(v) imply that $\pi^* < \pi^c$ then no equilibrium will exist. Essentially, if average costs rise fast enough as expected sales fall, expected profits may be driven to zero before $\pi$ has fallen below $\pi^c$. Otherwise, we cannot have an equilibrium.5

The quantities that honest ($x(q^*)$) and dishonest ($x^o$) firms can expect to sell are illustrated in Figure 2. There we have average cost curves for the two different qualities drawn in such a way that $C(q^*) > C(q)$ as we have assumed.

Some simple comparative statics will illustrate the effect of changes in two key exogenous elements on the number of dishonest firms in the market.

![Figure 2](image-url)
**Proposition 4.** In a competitive equilibrium (if it exists) the relative number of dishonest firms (and hence the probability of being ripped off) will be negatively related to the economies of scale in sub-efficient production of \( q \) and to the proportion of customers that are informed, \( \theta \).

**Proof.** The equilibrium number of firms of each type, \( n^h* \) and \( n^d* \), are determined by the equations

\[
(i) \quad \theta I/n^h* + (1 - \theta) I/(n^h* + n^d*) = \bar{x}(q^*)
\]

and

\[
(ii) \quad (1 - \theta) I/(n^h* + n^d*) = x^o.
\]

Substituting the second into the first, we have

\[
(iii) \quad \theta I/n^h* = \bar{x}(q^*) - x^o.
\]

Recall that \( \bar{x}(q^*) \) and \( x^o \) are determined solely by tastes and cost functions as in Figure 2.

It would seem intuitive that if the dishonest firms had average cost curves that were very steep at less than efficient scale there would be room for very few of them in equilibrium. In this model we can simulate \( AC \) curves getting steeper by increasing \( x^o \) relative to \( \bar{x}(q^*) \). From (iii) this will lead to larger \( n^h* \) and thus from (ii) we must have a lower \( n^d* \). Therefore the probability of being ripped off \( (1 - \pi) \) must have fallen. Indeed, in the extreme case, it is possible that there would not even be room for one dishonest firm and there would therefore be no ripoffs at all.

Increasing the proportion of buyers that are informed, \( \theta \), must increase \( n^h* \) from (iii) and then (ii) implies that \( n^d* \) must fall again. \( \| \)

Thus we have proved the intuitive proposition that there will be more ripoffs in markets in which there are fewer informed buyers and the cost disadvantages of sub-efficient production are not too great.

As suggested earlier, relaxing assumption (2) to allow \( W(p, q) > \bar{U} \) will not substantially affect these results. In this case, disenchanted uninformed consumers dropping out of the \( p^* \) market will buy \( q \) at \( p \) rather than not buy at all. However, the effect on dishonest firms is no different; they are out of business. The only real change is that for the equilibrium of Proposition 3 to exist now requires \( E_q W(p^*, q) \) to be greater than \( W(p, q) \) and not just greater than \( \bar{U} \).

Amending the model slightly, there are a couple of ways in which an equilibrium could be achieved when that in Proposition 3 does not exist. First, if we allowed firms to be somewhat farsighted, adopting Stackleberg strategies vis-a-vis consumers, we could obtain an equilibrium of the sort described by Salop and Stiglitz (1977) and by Chan and Leland (1982). That is, if we assumed that firms understood the effect their entry had on \( \pi \) then no dishonest firm would enter if its entry were to drive \( \pi \) below \( \pi^c \). In this case we would always be able to find an equilibrium, although it may involve positive profits for the dishonest firms. For this equilibrium to be sensible, however, we must be, in some sense, moving away from perfect competition.

A second way of finding equilibrium in this case involves randomizing the uninformed consumers' strategies regarding staying or dropping out when they are indifferent between the two options. That is, when \( \pi = \pi^c \) let only a proportion, \( \sigma \), of the uninformed drop out. This removes the discontinuity in consumers' actions that we described earlier.
There will be some critical proportion, $\sigma^*$, such that dishonest firms sales have just fallen to the level where their average costs equal $p^*$. There will therefore be no further entry and equilibrium will be preserved.

In both of these cases, price is a very poor signal of quality, as the uninformed are no better off taking the gamble than they would be by dropping out of the market entirely. While these two modifications may be theoretically interesting, neither is very intuitively pleasing. We expect then that nonexistence problems will be resolved by the market in other ways, such as through the use of reputations and warranties.

As a final matter here we would like to briefly consider the effect of endogenizing the amount of information availability to consumers. What would happen if we allowed our uninformed agents to become informed at some cost, $c^*$? It is possible that nothing will change. This will be the case if $c$ is so large that the information can never be worth buying i.e.

$$\hat{U} > W(p^* + c, q^*).$$

If this inequality is reversed, however, a tighter lower bound is placed on how low the expected utility of the uninformed can go before they stop trying the lottery. If the gamble gets bad enough they will simply buy the information they need to guarantee a purchase of $q^*$ at $p^*$. Now they do not drop right out of the market but the effect on the dishonest firms is the same as if they had.$^9$

4. CONCLUSIONS

The results presented here suggest that non-constant costs can play an important role in determining the degree to which prices convey information about product quality. In competitive (i.e. free entry) situations average costs that rise as expected sales fall can limit the proportion of ripoffs in the market, improving the information on quality provided by prices. Indeed, if these costs rise fast enough there may be no profitable ripoff opportunities at all. If average costs are constant we have seen that we can only get a competitive equilibrium if firms are farsighted enough to stop entering when further entry would cause mass defections by the uninformed consumers. Thus we see that in equilibrium (if it exists) prices will in general convey some, but not all, information on product qualities.

In Cooper–Ross (1983) we investigated a number of extensions of the basic model. If consumers differ in tastes as well as in information possessed, then the general structure of the equilibrium of Proposition 3 will continue to hold. That is, in equilibrium, at each price, $p^*$, there will be a quality level provided by honest firms ($q^*_i$) and some dishonest firms providing the lowest quality ($q_i$). Here $(p^*, q^*_i)$ refers to the bundle offered to taste-type $i$ in a market with only informed agents (see Rosen (1974)). As in the one-type model, equilibrium will involve some probability of ripoff in each market. As before, existence of equilibrium is not assured.

The other extension we explored concerned a monopolized market. If consumers know the conditional probability distribution of quality (given price) chosen by the monopolist, then when consumers have identical tastes, randomization of quality (i.e. ripoffs) will not occur in our model. When consumers’ tastes differ, quality can be randomized as a sorting mechanism if the more quality-loving agents are also more risk averse.

Throughout the entire paper we avoided considerations of firms’ reputations and the possibilities of warranties guaranteeing quality. This was deliberate and was intended to
allow us to determine whether prices alone could convey information on quality in equilibrium. We consider this to be an important first question since we would expect to see reputations (of manufacturers or retailers) and warranties become important in markets in which price, by itself, is a poor indicator of quality.

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NOTES
1. See, for example, the discussion in Radner (1979) and Allen (1981).
2. Some of the consequences of the integer problem are discussed briefly in footnote five.
3. Another interpretation of q is as a minimum legal quality standard but this interpretation would change none of the analysis. It does however suggest questions regarding some of the impacts of changing such legal standards. Notice that by increasing (decreasing) q we can effectively improve (reduce) the amount of information the “uninformed” have. For an interesting related treatment of minimum quality standards see Leland (1979).
4. We follow Salop and Stiglitz and invoke the law of large numbers to assume that each dishonest firm gets exactly its equal share of the uninformed buyers.
5. Integer problems are another, perhaps more obvious source of nonexistence of equilibrium. Even if all consumers are informed and all firms therefore honest, the fact that the number of firms must be an integer may mean that profits cannot go right to zero. The first K firms may be making small positive profits which turn negative as firm K + 1 enters. We can get nonexistence then if firms are not able to predict correctly their sales after entry. In this paper we follow the tradition of assuming these problems away. For our model this is equivalent to assuming that firms can correctly predict their post-entry sales (given that the uninformed do not drop out) but that they do not correctly perceive their effect on consumers’ decisions regarding whether or not to stay in the market.
6. It can also involve the offering of another quality level intermediate to q and q*. A more complete description of this equilibrium is included in an earlier version of this paper, available upon request of the authors. It is clearly related to the “reactive” equilibria of Wilson (1977) and Riley (1979). It is interesting that, because of their somewhat different assumption regarding the ability of the uninformed to determine quality upon inspection, Chan and Leland’s model never has a positive profits equilibrium.
7. We are indebted to Joseph Farrell for suggesting this possibility to us.
9. If we assumed that there was a continuous distribution of consumer types with respect to their costs of acquiring information, we might be able to get an equilibrium in the constant costs case. As π fell, consumers would now stream out continuously to buy information and the sharp discontinuity at π* would be eliminated.

REFERENCES


