



It's good to be bad: The low quality advantage in consumer search markets

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ABSTRACT

The management and marketing literature has found that consumers generally expect high-quality sellers to post high prices. We show that low-quality firms can exploit this in search markets to generate a low price perception. This price perception can lead to low-quality firms dominating search markets while producing a vertically inferior good at equal cost to high-quality firms.

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1. Introduction

A crucial aspect of firm competition in search markets is getting consumers to visit a firm rather than visiting rivals. When consumers make this choice, two of the most important factors considered are their perceptions of the qualities and the prices of the goods offered by each firm. Ideally, a firm would like to have a reputation as offering high value and hence it wants its price to be perceived as being low relative to the quality of its goods. This can be difficult in search markets where prices are not generally known before consumers arrive at the firm. Variety and department stores are examples where consumers may know the quality generally offered, but not the price of the particular item sought.² However, when consumers have a perception of the quality of goods that a firm provides, this perception can be used to inform price expectations. We investigate how firms can

lean on this association to create a price perception through their quality positioning in the market.

The effect of quality perceptions on price expectations has not been extensively studied in the economics literature.³ In addition, while the marketing literature suggests that consumers expect high-quality firms to post high prices and may avoid them as a result (Brown, 1969; Hamilton and Chernev, 2013), this has not to our knowledge been modeled in a consumer search setting. We develop a model of consumers inferring price from quality in such a setting. We show the novel result that where consumers infer price from quality in a market with search frictions, there exists an unraveling effect that leads to low-quality firms dominating the market. Consider there exists a high-quality firm and a low-quality firm and these qualities are known to consumers. Consumers have heterogeneous marginal utility from quality (that we call “taste”) and can choose what firm to go to upon entering the market. Considering a putative equilibrium where high-taste consumers go to the high-quality firm and low-taste consumers go to the low-quality firm, the high-quality firm will price to make one of the consumers approaching it indifferent to buying and searching at the low-quality firm. The Diamond (1971) paradox applies to this marginal consumer, and they make no surplus. However when a consumer can anticipate that they will be this marginal consumer then that consumer would be

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² Another example is the market for professional services such as accountants and lawyers where a consumer might have an impression of quality from firm reputation but not the fee that will be charged in their case. For brevity this paper will refer to “goods” but similar logic may be applicable to markets for “services”.

³ The closest paper is Rhodes (2014) who examines the impact of multiproduct retailing (rather than vertical quality differences) on price expectations in search markets.

better off (by the extent of the search cost) going to the low-quality firm in the first instance, where there will be some lower taste consumer who will be made indifferent to buying and taking their outside option. This results in fewer and higher taste consumers visiting the high-quality firm which leads to a higher price as a higher taste consumer is made indifferent to buying and searching at the low-quality firm. Through this mechanism we get an unraveling result where the sole refined equilibrium is one where all consumers go to the low-quality firm and no consumers will visit the high-quality firm.

We will first demonstrate this novel search-based mechanism in a simple search model in Section 2 before we discuss the implications of the effect and conclude in Section 3.

2. The model

There are two firms in a market, one sells a good of quality H (the “high firm”) and another sells a good with a lower quality of L (the “low firm”). Both firms produce their goods costlessly and there is a unit measure of consumers. Consumers have heterogeneous marginal utility from quality described by a “taste” parameter which is uniformly distributed on the $[0, 1]$ domain.⁴ A consumer with a taste parameter of a_i gets a utility of $a_i Q - P$ from the purchase of a good with a quality, Q , and a price, P .

All consumers know the quality offered by the two firms and uncertainty is restricted to prices (until they search at the firm to see the price). The timing is as follows. Both firms simultaneously choose a price that they will offer to all consumers that will approach them with no price discrimination possible. Consumers then proceed to approach one of the two firms. Consumers can then decide to buy, search at the other firm incurring a search cost of s or leave the market to get an exogenous outside option of value 0. Costly recall is allowed by paying the search cost and revisiting the firm. We assume $L > 0$ and thus the low-quality firm still offers positive surplus to consumers with sufficiently high taste. We adopt the indifference rule that where $a_i Q - P_Q^E < 0$ (where the E superscript represents consumer expectations) for both firms for a consumer with taste a_i , then that consumer will approach the firm with a higher value of $a_i Q - P_Q^E$.

Similarly to standard search models we assume that consumers enter the market costlessly and that the search cost for traveling between firms is small but strictly positive. The possible search paths open to consumers are summarized in Fig. 1. We use perfect Bayesian equilibrium as our equilibrium concept which is defined as a pricing strategy for firms, a search strategy for consumers and firm pricing beliefs of consumers such that no consumers or firms have a profitable deviation, and all beliefs are supported by Bayes rule in equilibrium.⁵ We use trembling hand equilibrium refinement (Selten, 1975), with the decision on what firm to visit being “trembled”, to reach a unique refined equilibrium.

We start our analysis with a lemma that rules out equilibria other than those where there is an indifferent taste level with higher/lower taste consumers visiting the high/low firm respectively.

Lemma 1. For $H > L$ and for any $\hat{a} > a_*$ there will not exist any equilibrium where a taste a_* consumer goes to the firm with quality H whilst a taste \hat{a} consumer goes to a firm with quality L .

⁴ This linear utility function and the uniform distribution of taste parameters is used for tractability reasons, however the central unraveling mechanism (Proposition 1) extends to other taste distributions and utility functions, u , exhibiting $\frac{\partial u}{\partial a} > 0$, $\frac{\partial u}{\partial Q} > 0$, $\frac{\partial^2 u}{\partial a \partial Q} > 0$.

⁵ We assume consumers have passive beliefs: out of equilibrium prices from one firm do not alter consumer beliefs regarding the other firm.

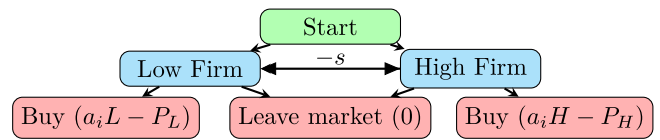


Fig. 1. Consumer search paths for a consumer with taste a_i .

Proof. In the a space the utility from each good is linear and given by $aL - P_L$ and $aH - P_H$. This implies a single crossing condition that ensures that all consumers with a taste above the intercept point will approach the high firm and all consumers with a lower taste will approach the low firm. \square

As with similar search models, firms have a unique optimal price and hence do not follow mixed strategy pricing.⁶ We present our first main result which rules out equilibria where both the high-quality and low-quality firms encounter searching consumers.

Proposition 1. No equilibrium exists where both the low-quality and the high-quality firms are visited by a positive measure of consumers and both firms sell to some of the consumers visiting them.

Proof. Suppose the contrary that there is a consumer with a taste of $0 < a_A < 1$ that is ex-ante indifferent to visiting each firm. This indifference taste level must be such that $a_A L - P_L^E = a_A H - P_H^E$. Consider the ex-post indifferent consumer (with taste denoted a_p) at the high firm. The best outside option for this consumer is shopping at the low firm.⁷ This indifference condition is $a_p H - P_H = a_p L - P_L^E - s$. Rearranging expressions for both of these indifference conditions yields:

$$a_A = \frac{P_H^E - P_L^E}{H - L} \quad a_p = \frac{P_H - P_L^E - s}{H - L} \quad (1)$$

In equilibrium, we must have $a_p \geq a_A$. If $a_p < a_A$, then the high firm could raise P_H slightly and all consumers who visit it would still buy. However, if $a_p \geq a_A$ then Eq. (1) implies that we must have $P_H \geq P_H^E + s$ which is incompatible with $P_H = P_H^E$, which itself must hold in any PBE. \square

We now have two remaining putative equilibria: all consumers visit the high-quality firm; or all visit the low-quality firm. With suitable out of equilibrium beliefs on the price that the firm receiving no consumers⁸ would charge, both of these are possible equilibria. The direction of the above unraveling result is important, however, as it implies that any given putatively indifferent consumer should not be indifferent but should instead prefer to shop at the low firm. Therefore, the equilibrium where all consumers visit the high firm may not be stable as even a small measure of consumers visiting the low firm may induce it to offer reasonable prices and lead to unraveling. This is indeed the case:

Proposition 2. The only stable equilibrium is one where all consumers visit the low-quality firm.

⁶ This can be seen in the online appendix.

⁷ This is because the low firm is making a positive measure of sales to lower taste consumers. Hence positive utility must be available to higher taste consumers.

⁸ Two possible beliefs are that the firm could see the taste of a deviating consumer (and hence extract all surplus) or that the firm would assume a high taste and choose a high price as a result.

Sketch of Proof. In the formal proof (contained in the online appendix) we supplement the model with a fraction (orthogonal to taste) $0 < \psi < 1$ of “undirected consumers” that approach each firm with equal probabilities. This ensures both firms will always make a positive measure of sales and a split equilibrium, can occur. This split equilibrium happens as a_p is set, by the high firm, to make an undirected consumer indifferent and hence the marginal “directed” consumer does not regret their initial search choice.

We find however that as $\psi \rightarrow 0$ we obtain the result $a_A \rightarrow 1$ and therefore in the limit there are few directed consumers visiting the high firm. To see this, consider the firm’s profit is given by an expression $PQ(P)$. Taking the first order conditions with respect to price results in the optimal price $P = \frac{Q(P)}{-Q'(P)}$. As the a_p consumer is undirected in equilibrium, the marginal loss in sales quantity from a price increase ($-Q'(P)$) scales with the amount of undirected consumers. Therefore as the amount of undirected consumers decreases, the high firm increases their prices, a_A increases and fewer directed consumers visit the high firm. In the limit as $\psi \rightarrow 0$ all consumers visit the low firm. \square

3. Discussion and conclusion

Our model makes three departures from a standard consumer search model: firms are differentiated by vertical quality; consumers have heterogeneous marginal utility from quality; and consumers can choose where to begin searching upon entering the market.

These simple changes induce an interesting result: search frictions benefit low firms to the extent they overtake the market. There are two intuitive interpretations of this result. The first is that consumers prefer to shop amongst lower taste consumers than themselves. This is because the price is set to extract all surplus from a lower taste marginal consumer so a higher taste consumer can make some consumer surplus. A second interpretation is that search models suffer from a lack of ability to commit to prices before consumers visit the firm (and see the price). For instance, it is not generally possible for a supermarket to commit to prices for the entire shopping lists of consumers. A firm having a large mass of low taste consumers visiting them is an indirect way to commit to offering low prices.

This paper is the first to show that firms can use quality perceptions to influence price perceptions in a search market and that this can be a profitable strategy. There are some interesting implications of our model. The first is that a firm may be advantaged by presenting a low-quality image to consumers. While this may reduce the margin they can charge, it also means that they may be visited by more consumers in equilibrium. Second, if firms endogenously choose their quality level, the unraveling effect can lead firms to try to undercut their rival firms on quality. As consumers believe a lower quality good will be offered at a lower price, a firm will attempt to ensure they are positioned as the lower quality firm in the market. Given that search frictions disadvantage high-quality firms, the third implication is whether they can avert this equilibrium by offering both high and low-quality goods. For these firms there is a monopoly screening effect which leads them to always price the low good higher than the firm that only sells that product (to avoid cannibalizing sales of their higher margin high-quality product). As a result they cannot avert the unraveling effect with this strategy.⁹ Fourth, a high firm may be able to avert the equilibrium by giving free gifts or experiences to consumers or otherwise off-setting search costs. This may explain why Waitrose, an upmarket UK supermarket, has free coffee machines for consumers in their stores. Finally the model implies large welfare losses from the market dominance of low-quality firms, that produce an inferior good at equal cost to high-quality firms.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.econlet.2022.110518>.

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⁹ While this intuition is simple, the proof is lengthy and hence is deferred for the online appendix.