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BRAND LOYALTY AND USER SKILLS*

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The paper develops the idea that brand loyalty is a rational thing for a consumer to have. The reason is that a consumer's experience with a brand creates user skills which make that brand more useful to the consumer than other brands, even though these, given the same experience, would be equally useful. In a brand switching model this implies that the consumer will switch brands only if there is an adequately large price differential and that the required price differential increases with user skills. The theory is related to standard search theory and it is shown that user skills and search costs have similar effects in the sense that either can support price dispersion in a market.

1. Introduction

We will model an explanation, suggested by Stigler and Becker (1977), of why a consumer might remain loyal to his current brand even if he knows of another brand of equal quality selling at a lower price. The idea is that a consumer's experience with a brand creates user skills which make the brand more useful to him than some other brand, even though, given the same experience with other brand, it would be equally useful. The supposition that a consumer doesn't necessarily choose the lowest price brand to begin with is based on the assumption that he is imperfectly informed about prices. To handle the imperfect information, the user skill idea is embedded in a price-search context. While a consumer gains experience with his current brand, he may also search for a brand with a price low enough to justify a switch. The purpose is to derive an explicit model in which brand loyalty is 'rational' in the usual economist's sense, and derive properties of the model. In particular, we show that the price differential necessary to induce brand switching increases as user skills grow, and that search, even if it is costless, stops at a reservation price above the lowest in the market.

2. Model

We will develop the simplest model which conveys these ideas. There is a

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continuum of brands with prices distributed according to the time-invariant distribution function $F(p)$ with discrete support. The consumer knows $F(\cdot)$ and can, if he chooses, in each period receive one (and only one) random offer from this distribution at a cost $c \geqq 0$. The offer arrives at the end of the period; the consumer then decides whether to take the offer for the next period or to continue with his current brand. In any case, the consumer buys one unit of the product at the start of each period. The utility in period t depends on three variables T_t, p_t, and N_t. T_t is the number of periods the current brand has been used; p_t is the price paid for it; and N_t is a zero–one variable describing whether or not the consumer searches in the period. Specifically, the per period utility is of the form $U(T_t)-p_t-cN_t$, where $U(\cdot)$ is non-decreasing but satiating in finite time, reflecting the accumulation of user skills. The objective is to maximize the expectation of the net present value

$$\sum_{t=0}^{\infty} b^t[U(T_t)-p_t-cN_t],$$

where the discount factor b is strictly less than one. The consumer must decide, in each period, whether to search and whether to switch brands.

Given the above problem definition, it can be shown that an optimal policy exists and we can easily establish some of its elementary properties. First, since the utility function exhibits impatience, we would prefer to take any given favorable gamble earlier rather than later. Further, the expected net rewards to searching are, without brand change, non-decreasing over time, because user skills accumulate on the current brand. Hence, once search stops, it never restarts. Secondly, note that for a given T_t, and any given offer, the difference between that and the current price is increasing in the current price. One risk profile therefore dominates the other even before we decide whether or not to take the offer. The negative can be argued analogously, so for a given value of T_t, if it is (not) optimal to search in cases where the current price is p^0, it is also (not) optimal to search at any price above (below) p^0. Thirdly, the consumer can, with probability one, find the lowest priced brand in finite time if he wishes to pay the associated search costs.

There properties imply

Proposition 1. There exists a non-increasing price function $\bar{p}(T)$, such that search takes place if and only if the current price p_t and the current skill level T_t, obey $p_t > \bar{p}(T_t)$. With probability one, search ceases in finite time.

The reservation price property of Proposition 1 is like that of standard price-search theory, though complicated by the dependence of $\bar{p}(T)$ on T. Proposition 2 will concern the decision on whether or not to switch brands.

The latter decision is more complicated. The consumer might wish to make an initially disadvantageous switch if he expected experience with the new brand ultimately to make up for the initial disadvantage. However, even if the present value of the stream of initial disadvantages and later advantages is positive, the consumer might refuse to switch in the expectation that a better switch will soon be forthcoming.

On the issue of brand switching note first that for any fixed continuation of the process, the consumer is better off the lower a price he is at. So for given values, of T_t and p_t, if it is optimal to take an offer at some price, it is also optimal to take an offer at a lower price (and conversely). Secondly, if user skills accrue already in the first period, then the consumer is worse off (for any fixed continuation of the process), if he switches to a higher priced brand.

These properties imply

Proposition 2. There exists a switching function $r(p, T)$, *such that an offer is taken if and only if its price is below* $r(p, T)$. *If* $U(1) > U(0)$, *then* $r(p_t, T_t) < p_t$.

In standard search theory the switching function is given by the trivial decision rule that you take any offer lower than your current price. In contrast one of the complications in this model is that the price differential has to justify the loss of user skills accumulated on the current brand.

Because of this difficulty and those described earlier, it is not easy to characterize the optimal strategy beyond Propositions 1 and 2.

We will therefore concentrate on the special case where all learning takes place in the first period of use. So we can write

$$U(0) < U(1) = \cdots = U(T) = \cdots, \tag{A}$$

where $a \equiv U(1) - U(0)$ denotes the size of the user skills. Since our model is set up such that any brand bought is used for at least one period, this means that the functions $\bar{p}(T)$, $r(p, T)$ degenerate to $\bar{p}$ and $r(p)$.

In this model the user skills essentially function as switching costs. We can use this insight to put bounds on $p - r$, the price differential necessary to induce brand switching. First, note that we will always switch if the switching costs can be made up in one period, this gives $p - r(p) \leqq a$. From the fact that we will never switch if the costs cannot be made up even if this is the last switch ever, we find that $a(1-b) \leqq p - r(p)$. Consequently, given condition (A) we have $a(1-b) \leqq p - r(p) \leqq a$.

The logic underlying the finding is essentially that alluded to earlier. Once the consumer pays a low price he is willing to take smaller improvements, since he expects to have a long period in which to recoup the switching

costs. On the other hand, if he expects to swtich soon again it is not worth it to pay for a shortlived marginal advantage.

While it is still very cumbersome to completely solve the model, we can use dynamic programming to characterize the reservation price $\bar{p}$ in some detail. If $\phi(\cdot,\cdot)$ is the value function, the dynamic programming conditions for the model are

$$\phi(p', T') = \max\{M_0(p', T'), M_1(p', T')\},$$

$$M_0(p', T') = U(p', T') - p + b\phi(p', T' + 1),$$

$$M_1(p', T') = U(p', T') - p' - c + bF[r(p', T')]\mathrm{E}[\phi(p, 0) \mid p < r(p', T')]$$

$$+ b[1 - F[r(p', T')]]\phi(p', T' + 1),$$

where $M_0(\cdot,\cdot)$ and $M_1(\cdot,\cdot)$ represent the strategies of no search and search, respectively. At the reservation price $M_0(\cdot,\cdot) = M_1(\cdot,\cdot)$. Using this and (A) we get

$$0 = c\frac{1-b}{b} - \sum_{p=0}^{r(p)} (\bar{p} - p) f(p),$$

where $f(\cdot)$ is the density derived from $F(\cdot)$. Furthermore, we can reason as above to see that $r(\bar{p}) = \bar{p} - a(1-b)$. Denoting the right-hand side above by R, we can find that $\partial R/\partial c > 0$, $\partial R/\partial a \geqq 0$ and $\partial R/\partial \bar{p} \leqq 0$. By the Implicit Function Theorem we thus have $\mathrm{d}\bar{p}/\mathrm{d}c > 0$, $\mathrm{d}\bar{p}/\mathrm{d}a \geqq 0$ (with equality only at the lowest price). To summarize, we can state that, given (A); the reservation price is higher for higher search costs and bigger user skills. In fact, $\bar{p}$ is above the lowest price in the market if either c or a is positive.

So either user skills or search costs can support long lived price differences in markets with rational consumers, and such price differences are bigger for bigger user skills and higher search costs. The consumer accumulates user skills as he works his way down the price distribution, these make other brands less rewarding and thus decrease the incentives to swtich and search, even if search is free. The lost user skills work as a switching cost which depresses the rewards from search, much like any other idiosyncratic investments retard changes and support apparent disequilibrium behavior.

3. Conclusion

Following Stigler and Becker (1977), we have tried to use the concept of non-transferable user skills to develop a view of brand loyalty as rational behavior on the part of consumers. We find that the consumer will switch

brands only if there is an adequately large price differential, that this differential increases with the size of the user skills, that search eventually stops and that some consumers may continue to buy at above-minimum price. User skills thus have much the same effect as search costs. It is our hope that the model can help clarify the mechanisms involved in the formation and ingraining of consumption habits. In addition, it applies directly to on-the-job wage search, if salaries follow a seniority system.

Direct generalization of the present model, to allow $U(\cdot)$'s from a richer class of functions, will not be easy for the reasons identified in section 2. Still, several other extensions would be desirable. First, we do not have an equilibrium model [a la Wilde and Schwartz (1979)] in the sense that prices (or beliefs about prices) are exogenous and not supported by actions of profit maximizing firms. Secondly, we do not allow experimentation and learning [a la Rothschild (1974)] about prices on the part of the consumer. Thirdly, it should, at least in some markets, be possible for the consumer to accumulate user skills from sources other than actual consumption (e.g., word of mouth).

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