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Incentives through consumer learning about tastes ☆

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ABSTRACT

We consider a long-lived firm that faces an infinite sequence of finitely-lived consumers. In each period, the firm can exert either high or low effort, which is the firm's private information. When consumers learn about the firm's talent from the outcomes of previous transactions, there exists no equilibrium in which the firm always exerts high effort. However, when consumers learn about their own tastes, such an equilibrium can exist. Consumer learning about tastes therefore is an alternative to reputational concerns that produces stable incentives. We discuss the implications of this mechanism for advertising, advertising content, and consumer education.

1. Introduction

Since the work of Klein and Leffler (1981), it is well known that the repeat-purchase mechanism can guarantee market efficiency when third-party enforcement is absent. The fear of losing the reputation for quality can discipline firms to act in the interest of consumers. Much of the literature on reputation uses incomplete information to generate incentives.[1] Consumers learn about a firm's type (competent/inept, commitment/opportunistic) from the outcomes of past transactions. Firms choose actions in order to shift consumers' beliefs in a favorable direction and to reap the rewards of high effort. This solution to the moral hazard problem is very elegant. As the market provides implicit incentives, it neither requires explicit, nor implicit contracts between firms and consumers.

Unfortunately, reputational concerns create dynamic incentives only as long as consumers are sufficiently uncertain about a firm's type. The literature therefore has suggested several modeling assumptions that constantly replenish uncertainty: a changing environment, so that skills that once were useful become obsolete (Benabou and Laroque, 1992; Holmström, 1999; Mailath and Samuelson, 2001), hidden changes in the ownership of the firm (Tadelis, 1999, 2002), or consumers with finite memory, so that they are never really sure about the firm's type (Liu, 2011; Monte, 2013). Hörner (2002) shows that the threat of losing consumers to rivals may sustain effort incentives even if uncertainty vanishes. However, the consumers' strategy then forces good firms out of the market and requires continuous entry of new firms.

In this paper, we suggest an alternative to reputational concerns that produces stable incentives. Instead of learning about a firm's type, consumers learn about their own tastes from the outcomes of their previous transactions. To motivate uncertainty about tastes, consider the following two examples:

1. A consumer with little gastronomic experience dines in a French restaurant. If she is disappointed by the food, this may have two different reasons: either she does not like French cuisine in general, or the chef exerted low effort.
2. The manager of a company hires a consulting firm to improve its marketing mix. If the realized increase in sales is low after the consultants' recommendation has been implemented, this may be due to a mismatch between the company's challenges in its market and the consultants' expertise, or due to low effort.

To analyze the repeat-purchase mechanism with learning about tastes, we consider a long-lived firm that faces an infinite sequence of consumers who live for two periods. In each period, the firm can exert either high or low effort. Consumers' monitoring technology is imperfect.

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[1] See Mailath and Samuelson (2006) and Bar-Isaac and Tadelis (2008) for in-depth reviews.

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A consumer's taste (or match value) is defined as the probability of observing a good outcome when the firm exerts high effort. A good outcome then indicates a high valuation for the firm's good, while a bad outcome indicates a low match value (provided that the firm exerted high effort). Hence, it may be rational for a consumer who observed a bad outcome to stop trading even if she is convinced that the firm always exerts high effort. The firm then exerts high effort in order to reduce the loss of consumers. As long as there is a constant influx of young consumers, incentives for high effort remain stable.

The critical difference between the reputation approach and consumer learning about tastes is the informational content of the outcomes experienced by previous consumer generations. In the reputation approach, these outcomes are informative about the firm's type. As consumers accumulate more and more observations, their behavior becomes inflexible to outcomes. In contrast, when consumers are uncertain about their own tastes, the experiences of other consumers are uninformative, given that the firm always exerts high effort.

The model generates a number of implications for industrial organization. First, advertising in our model can play both a functional (information or persuasion) and an informational role (as in Milgrom and Roberts, 1986): it informs consumers about the existence of a product and thereby increases the mass of young consumers who become repeat customers when they observe a good outcome. A large advertising campaign then credibly signals commitment to high quality. Second, advertising content or consumer education that informs consumers about their match value can have a negative impact on quality since it may reduce the mass of consumers who rationally exert a punishment for bad outcomes.

The idea that the principal (consumers) could benefit from having less information about why an agent (the firm) produced a bad outcome was first proposed by Crémer (1995). In his model, the principal hires an agent of uncertain ability to produce output in two periods. After observing the outcome in the first period, she may continue with the same agent or hire another one. Firing high ability workers is costly. By choosing an inefficient monitoring technology that precludes learning about the agent's ability, she credibly commits herself to fire the agent after a bad outcome in the first period. This reduces the need for high-powered incentives. In our model, consumers cannot choose between different monitoring technologies, but as in Crémer (1995), a lack of experience serves as consumers' commitment to react to bad outcomes. We show that this commitment is also valuable in infinitely repeated games.

An increasing literature highlights the adverse effects of consumer inexperience on market outcomes. Gabaix and Laibson (2006) show that when many consumers do not consider hidden add-on prices when purchasing the base good (such as hotel accommodations), this motivates firms to shroud information, which creates an inefficiency. Prices may be too high in search markets if some consumers are imperfectly informed about product quality or have to incur costs in order to become informed (e.g., Armstrong and Chen, 2009; Armstrong et al., 2009). Inexperienced consumers may also be exploited if they do not anticipate their future preferences (Spiegler, 2011, Part 1) or if they do not know exactly their demand type when trading with firms (Courty and Li, 2000; Matthews and Persico, 2007; Inderst and Peitz, 2012). When seeking financial advice, they may be unaware of the conflict of interest that sellers of financial products face, which in many cases results in the exploitation of consumers (Inderst and Ottaviani, 2012). In this paper, we argue that consumer inexperience can–in the form of uncertainty about their match value–also play an important role for promoting market efficiency when there is a moral hazard problem between a firm and its customers.

A somewhat similar idea is considered in Shelegia (2012). In his (static) model, firms invest into quality to increase consumers' valuation for the good before they actually purchase it. In the present model, the firm invests into quality in order to reduce the loss of repeat-customers.

The rest of the paper is organized as follows: the next section outlines the framework of the model. The model is flexible enough so that it nests both reputational concerns and learning about tastes. In Section 3, we examine the reputation version of the model and show that a high-effort equilibrium does not exist. In Section 4, we consider consumer learning about tastes and establish a necessary and sufficient condition for the existence of a high-effort equilibrium. Section 5 discusses the implications of our mechanism for advertising, advertising content, and consumer education. All proofs are relegated to the Appendix A.

2. The model

2.1. Basic framework

Time is discrete and indexed by $t \in \{1, 2, \ldots\}$. In each period, a new cohort of consumers of mass 1 is born. Each consumer is identified by her identity $i \in [0, 1]$ and the period t in which she is born. Consumers live for two periods in which they may trade with an infinitely lived, monopolistic firm S. If consumer i, t trades with S in period t ($b_{i,t} = 1$), she pays up front the price $p^t \in [0, 1]$ and observes either a good ($y_{i,t} = 1$) or a bad outcome ($y_{i,t} = 0$), depending on S's effort. The next paragraph explains how effort translates into outcomes. The payoffs for a consumer associated with a good and a bad outcome are 1 and 0, respectively. If consumer i, t does not trade with S in period t ($b_{i,t} = 0$), her payoff in this period is 0 (for convenience, we assume that $y_{i,t} = 0$ in this case). Let e^t be S's effort in period t, which can be either high ($e^t = 1$) or low ($e^t = 0$) and is not observed by consumers. The cost of high effort is $c > 0$, and that of low effort is 0. S's payoff in period t is $s^t p^t - ce^t$, where s^t is the mass of consumers who trade with S in period t. S maximizes the expected discounted sum of payoffs. Its discount factor is $\delta_S \in (0, 1)$. The discount factor of consumers is $\delta_C = 0$.[2]

2.2. Production technology

Whether S's effort results in a good outcome or does not depend on a parameter $r_x \in [0, 1]$. This parameter will capture either S's type (talent), or a consumer's type (tastes). In the first case, the firm's type will be denoted by r_S. In the second case, consumer i, t's type will be denoted by $r_{i,t}$. In both cases, the probability of observing a good outcome is $(1 - \lambda)r_x$ if S exerts effort, and 0 if it does not.[3] The parameter $\lambda > 0$ is the probability of a shock that ruins the outcome, regardless of effort, talent, or tastes. It ensures that the game we consider is a game with imperfect monitoring, regardless of the distribution of types. The outcomes a consumer observes in the two periods of her life are independent from each other conditional on her type.

2.3. Strategies and equilibrium

At the beginning of the game, nature draws the type r_x (for S or for each consumer i, t) according to some commonly known distribution function. Draws for different consumers are independent from each other. Neither S nor consumers have any information about types. The sequence of events in each period t is as follows: (i) young consumers i, t are born; (ii) S chooses p^t; (iii) each consumer decides whether to trade with S or not, S observes s^t; (iv) S chooses e^t; (v) outcomes

[2] This assumption is made for convenience. It prevents consumers from experimentation as analyzed, for example, in Bergemann and Välimäki (1997). If $\delta_C = 0$, a consumer trades with S only if her expected period-payoff from trade is non-negative. If $\delta_C > 0$ a young consumer may also trade with S if the expected period-payoff from trade is slightly negative. In the Appendix A, we show that when consumers learn about tastes, the range of parameters for which a high-effort equilibrium exists increases in δ_C.

[3] If r_x denotes S's type, each consumer has type 1; if r_x denotes a consumer's type, S has type 1.