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Investment in customer recognition and information exchange

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ABSTRACT

We investigate how costly acquisition and exchange of customer-specific information affects industry profit and consumer welfare. Consumers differ in their preferences for competing brands and in their switching costs between brands. Brand-producing firms use their acquired knowledge of customer-specific preferences to differentiate prices. We show that consumers are worse off when firms acquire information about their preferences and that information sharing between firms further reduces consumer welfare. Non-sharing of information supports a subgame perfect equilibrium that is also efficient. Finally, equilibrium investments in customer recognition may be excessive if firms bear low costs of acquiring customer-specific information.

1. Introduction

The progress of information technology has made it feasible for firms in many industries to collect and process information about their customers. In such industries, an established customer relationship makes it possible for the firm to learn the individual characteristics of its customers, thereby facilitating individualized pricing. This may be particularly true in service industries, with banking and insurance as prominent examples. In industries like these, firms often design institutions to facilitate the exchange of such customer-specific information. In other industries, such as private health care, universities and travel industries, firms or institutions often cooperate with respect to data acquisition regarding individual consumers in ways which facilitate information exchange.[1] In this study we analyze the effects of the exchange of customer-specific information between rival firms on industry profits and consumer welfare, as well as firms' incentives to invest in learning their customers' preferences.

Consumers may benefit from information exchange among firms because it facilitates the design of aggressive poaching offers (price cuts intended to lure a consumer to switch brands). For example, a consumer originally mismatched with a brand in the sense of having a higher preference for a rival brand would benefit from a poaching offer that is sufficiently competitive to compensate for the switching costs. On the other hand, within the framework

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[1] *The Economist* (June 30, 2012) discusses contemporary online applications of price-customization in, for example, the retailing industry. According to this article, such price customizations are often implemented by independent specialist firms. Note that these firms may end up selling customer-specific information to competing rivals, thereby facilitating information exchange.

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of an established customer relationship, an incumbent firm facing competition from type-contingent poaching offers can also adjust its own type-contingent prices to existing customers so as to maximize the extraction of consumer surplus. Thus, general economic intuition is insufficient to evaluate the effects of the exchange of customer-specific information on industry profits and consumer surplus, and therefore an analytical study is needed.

In practice, even though a firm might be able to distinguish its own inherited customers from those of its rival at a relatively low or even negligible cost, the cost of acquiring information about the preferences of its customers is significantly higher. Therefore, the firm faces the optimization problem whether to acquire customer-specific information to facilitate individualized prices, or whether to set prices contingent only on whether it has an established customer relationship with the consumer. In addition, the incentives for the acquisition of customer-specific information depend crucially on whether the firms have committed themselves to a system of information exchange. Our model is constructed to investigate this relationship.

We design a duopoly model with consumers differentiated by their switching costs. Each consumer holds an individual valuation (high or low) for the two competing brands. We begin by characterizing firms' incentives to invest in learning the idiosyncratic valuations of their customers regarding their own and the competing brand and investigate how these incentives are affected by the costs of information acquisition. We establish that both firms invest in information acquisition when the costs of information gathering are sufficiently low, whereas neither firm invests when the information gathering costs are sufficiently high. When investment costs are in an intermediate range, both firms invest in learning their customers' preferences only if this information is *not* exchanged between the firms. We show that the exchange of acquired customer-specific information is harmful for industry profits. The following crucial and novel mechanism explains this result. The acquisition of customer-specific information does not affect the average of the incumbency and poaching prices in equilibrium, but it increases the dispersion between these prices. But, this dispersion is decreased by information exchange, meaning that firms have stronger incentives to acquire information without information sharing.

Most importantly, we characterize the welfare consequences of the exchange of customer-specific information. Our first conclusion in this respect is that the acquisition and use of information regarding customer-specific preferences as a basis for type-contingent pricing always hurt consumers. We show that information sharing between firms magnifies the loss in consumer welfare even further. Intuitively, the mechanism can be characterized as follows: Consumers benefit from refined poaching offers facilitated by information exchange, but this effect is outweighed by unfavorable adjustments of incumbency prices together with excessive switching between brands. We also conduct an equilibrium analysis of a three-stage game with the following sequence of decisions: (1) each firm decides whether or not to share customer-related information, (2) each firm decides whether or not to invest in information acquisition, and (3) firms engage in price competition. We establish that non-sharing of information supports a subgame perfect equilibrium for this three-stage game. Furthermore, we demonstrate that the equilibrium with no information sharing is efficient when considering total welfare. Finally, we demonstrate that the market equilibrium supports excessive investments in information acquisition for a low investment cost of information acquisition.

Other research on the effects of information exchange in oligopolies, for example Shapiro (1986) or (Gal-Or, 1985; Gal-Or, 1986), typically focuses on the consequences of sharing exogenous information regarding production costs or demand conditions. The effects of information exchange typically depend on the type of uncertainty (demand or cost uncertainty, industrywide or firm-specific) as well as on the mode of competition (Bertrand or Cournot competition). In contrast to this literature, we evaluate the effects of information exchange with respect to customer-specific information under circumstances where the acquisition of costly information is endogenized. In models where firms endogenously determine the precision of the acquired information, Kirby (2004), Jansen (2008), and Ganuza and Jansen (forthcoming) explore the effects of exchanging information regarding demand or cost conditions, predominantly under Cournot competition. However, these studies do not analyze the effects of information exchange with customer-specific information. With a focus on credit markets and with an emphasis on industry-specific features, Pagano and Jappelli (1993), Padilla and Pagano (1997), and Gehrig and Stenbacka (2007) study the incentives of banks to exchange information regarding the creditworthiness of individual clients. However, these studies do not consider banks that optimize the precision of the credit tests based on investments in information acquisition.

Perhaps the studies closest to our paper are Liu and Serfes (2006) and Jentzsch et al. (2013) who focus on evaluating the effects of the exchange of information regarding consumer-specific information. The novelty of our study is that we evaluate the effect of information exchange on the incentives to acquire information. In addition, the particular information exchanged is different in our study compared to Liu and Serfes (2006) and Jentzsch et al. (2013). Liu and Serfes (2006) studies a two-period Hotelling model, where firms can engage in perfect price discrimination in the second period and where the information exchange concerns the location of customers. Jentzsch et al. (2013) pays particular attention to an evaluation of the effects of information sharing concerning the transportation cost parameter in a Hotelling model.[2]

[2] The different ways of modeling the information exchanged make the models suitable for evaluating the effects of information exchange regarding consumer-specific information in different types of industries. For example, models focusing on information exchange regarding transportation cost parameters may be particularly relevant in industries where consumers make repeated purchase decisions so that switching costs are particularly important. Our model focuses on the evaluation of information exchange when consumers are differentiated by their relative preferences for the competing products in a fairly general way.