Decision Support Systems 54 (2012) 681–690

Contents lists available at SciVerse ScienceDirect

Decision Support Systems

journal homepage: www.elsevier.com/locate/dss

Negative price premium effect in online market—The impact of competition and buyer informativeness on the pricing strategies of sellers with different reputation levels

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ARTICLE INFO

Article history:
Received 25 July 2011
Received in revised form 24 June 2012
Accepted 17 August 2012
Available online 31 August 2012

Keywords:
Negative price premium effect
Seller reputation
Buyer informativeness
Competition
Pricing strategy

ABSTRACT

Motivated by the contradictory findings in literature regarding whether high-reputation sellers enjoy a price premium over low-reputation sellers, this paper examines the pricing strategies of sellers with different reputation levels. We find that a negative price premium effect (i.e., a high-reputation seller charges a lower price than a low-reputation seller) exists due to: (1) the presence of both informed and uninformed buyers, which makes sellers follow mixed pricing strategies. It is then possible for a high-reputation seller setting a lower price than a low-reputation seller. Moreover, when the proportion of informed buyers exceeds a certain threshold, the expected price of a high-reputation seller is even lower than that of a low-reputation seller; (2) the competition among the sellers, which reduces the high-reputation sellers' prices but increases the low-reputation sellers' prices. Consequently, a high-reputation seller is more likely to charge a lower price than a low-reputation seller when the competition intensifies. Our empirical findings also support our theoretical results on the negative price premium effect.

1. Introduction

Online markets attract a lot of sellers due to the low entry and operational costs [38]. For example, in the "Electronics" category of BizRate.com, a famous price comparison shopping website, there are 3830 retailers, and more than 50 distinct retailers offering "Canon PowerShot SX210 IS 14.1 Megapixel Digital Camera — Black".[3] However, it is not easy to inspect seller identity as well as product quality in online markets. The sellers are often hidden under the masks of meaningless electronic IDs [19]. At the same time, payment and delivery for the products are also separated [2]. These online market characteristics create chances for opportunistic behaviors, such as non-delivery, identity theft, and miscellaneous fraud [15,18]. In the year 2009 alone, the Internet Crime Complaint Center (IC3)[4] website received 336,655 complaint submissions, corresponding to a $559.7 million dollar loss [18].

Fortunately, current information technologies help reduce these risks and facilitate buyers to infer seller quality through various reputation mechanisms, such as buyer ratings and reviews, feedback systems, online discussion forums, etc. [3,22,35,39]. It is commonly believed that buyers are likely to pay price premiums to high-reputation sellers, so the high-reputation sellers should charge relatively high prices [3,22,25,38,39]. However, some studies find the reverse. For example, Ba et al. [4–6] identify the "adverse price effect," which shows a seller may decrease her price when her recognition level increases. Baylis and Perloff [10] show that "good" internet retailers of digital cameras and scanners charge relatively low prices and provide superior services, while "bad" internet retailers charge relatively high prices and provide poor services.

Motivated by these contradictory findings in literature, this study aims to understand the pricing strategies of sellers with different reputation levels, and examine whether, and under what conditions, does a "negative price premium effect" occur (i.e., a high-reputation seller charges a lower price than a low-reputation seller). Note that this is different from the "adverse price effect" studied in Ba et al. [4–6], which refers to the phenomenon that when the low-recognition seller's recognition increases, both the low- and high-recognition sellers cut their prices [6]. In this paper, we first build a theoretical model to study the effect of competition. We extend Varian's sales model [36] in two ways: to allow sellers to have different reputation levels (the benchmark model); and to allow more than one seller with the same reputation level (the competition model). We find that the negative price premium effect exists due to: (1) the co-existence of informed and uninformed buyers, which makes it impossible for sellers to set their prices following pure strategies.

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[3] The data were collected on 18 Jan 2011.
[4] IC3 (http://www.ic3.gov/default.aspx) is a partnership between the Federal Bureau of Investigation (FBI), the National White Collar Crime Center (NW3C), and the Bureau of Justice Assistance (BJA).

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http://dx.doi.org/10.1016/j.dss.2012.08.013

When the proportion of informed buyers exceeds a certain threshold, a high-reputation seller even sets a lower price than a low-reputation seller on average; (2) the competition among the sellers, which makes a high-reputation seller reduce the prices while a low-reputation seller increase the prices. So the negative price premium effect is more likely to occur when the competition intensifies. We also collect field data from BizRate.com. Our empirical testing supports our theoretical findings on the negative price premium effect.

To the best of our knowledge, this is one of the first few papers which study the negative price premium effect. It theoretically explains the negative price premium effect from the perspective of buyer informativeness, which is an extremely important factor in the economics of information [21,27]. Specifically, we show that sellers may play mixed strategies, so there is no simple and fixed relationship between seller reputation and pricing. Our study offers an explanation to the contradictory findings in the literature.

The rest of this paper is organized as follows: we review relevant literature in Section 2, and present the main theoretical model in Section 3. To better understand the impact of competition, we present a benchmark model in Section 3.1 in which there is only one seller for each reputation level, and relax this assumption in Section 3.2. We present the empirical study in Section 4 and conclude in Section 5.

2. Literature review

2.1. Price dispersion in online market

The online market features fierce competitions due to the increased number of sellers [23], reduced search costs [7,33] and price transparency, and it is claimed to be a frictionless market [12]. According to the classical Bertrand model, buyers may purchase from the lowest priced seller in an ideal frictionless market [13], so all sellers should set the same price—the "law of one price" (LOP) [8,12]. However, contrary to the theoretical prediction, researchers find substantial price dispersion in online markets [8,12,29]. For example, Brynjolfsson et al. [12] find that the internet retailer prices differ by an average of 33% for books and 25% for CDs. Baye et al. [9] find persistent price dispersion for 36 homogeneous consumer electronic products. The prices do not converge even after an 18 month period. The causes for price dispersion of homogenous goods may be the differences among sellers [13,25,30,37], or the differences among buyers [1,31,36].

2.2. Seller reputation

When facing competition, sellers usually differentiate themselves from each other [14], and one most important differentiation is seller reputation [16,17,35]. The seller reputation in online markets is commonly calculated by buyer ratings and reviews (e.g., the seller reputation in BizRate and eBay). A high reputation may indicate a high level of seller trustworthiness [3,11], accurate product descriptions [26], and better services [26]. Therefore, buyers may intend to pay price premiums to high-reputation sellers for low risks and better services [3]. Some studies find that service quality has a positive effect on price levels [30,37], especially for high value products [25]. However, some other studies find the reverse [10,23]. For example, Liu et al. [23] find that high-reputation sellers charge relatively low prices in online retailing marketplace of homogeneous goods.

Moreover, even after controlling for seller differences, there are still a large percent of price dispersion unexplained [9,29]. For example, based on an empirical analysis of 6,739 price observations for 581 items in eight product categories, Pan et al. [29] find that online price dispersion is persistent after controlling for seller heterogeneity, thus they conclude that the price dispersion explained by seller differences is limited.

2.3. Buyer informativeness

Another cause of price dispersion is the differences in buyers' search costs. In online market, search cost still exists, even though greatly reduced [10,12]. Buyers may incur different search costs in online markets, due to their online shopping experiences, skills of using shop-bots and search engines [23,34], and wealth levels [1]. According to search costs, buyers can be classified as informed buyers (who can search and compare different products and purchase the one offering the highest utility) and uninformed buyers (who perform limited search and purchase as long as the product offers positive utility) [e.g., 10,32,36]. Sellers may play mixed pricing strategies to discriminate the informed and uninformed buyers [1,31].

We define buyer informativeness as the proportion of informed buyers. This proportion may be influenced by factors such as product value and the development of new technologies [3,28]. Online buyers are less likely to invest time and energy in searching for inexpensive products than for expensive ones [3,25]. Therefore, the proportion of informed buyers in a high-value product category should be higher than that in a low-value product category. Furthermore, the use of shop-bots may turn an uninformed buyer to an informed buyer. Tang et al. [34] find that a 1% increase in shopbot use is correlated with a $0.41 decrease in price levels and a 1.1% decrease in price dispersion.

2.4. Pricing strategy

In literature, the effects of seller reputation and buyer informativeness are studied separately. The studies on seller reputation draw mixed findings about the effect of seller reputation on prices [3,10,23]. The studies on buyer informativeness usually ignore the seller differentiation and find symmetric pricing strategy for all the sellers [e.g., 36]. Little research combines both.

3. Model

3.1. Benchmark model: one low- and one high-reputation sellers

Consider two sellers (denoted by i, $i\in\{L,H\}$) selling one homogeneous product to m ($m\in N$) buyers in a market. The product costs c for the sellers, and offers utility u for the buyers [36]. Let r_i denote the reputation of seller$i$, where $0\le r_L<r_H\le 1$, so that $1-r_L$ and $1-r_H$ represent the risk in transacting with the low- and high-reputation sellers, respectively [3,20]. Seller i charges a price p_i for the product, and will sell the product only when the profit is non-negative ($p_i-c\ge 0$). The buyers consist of a proportion of k ($0<k<1$) informed buyers and $1-k$ uninformed buyers [32,36]. Similar to Varian's sales model [36], a buyer's expected utility in a transaction with seller i can be specified as r_iu-p_i and the buyer will purchase the product only when the expected utility is non-negative. Moreover, following Salop and Stiglitz [32] and Varian [36], we assume that an informed buyer will compare the products offered by each seller and purchase from the seller who offers the highest expected utility; while an uninformed buyer will randomly visit one seller and make the purchase if the expected utility is non-negative. By straightforward calculation, we can obtain that the low-reputation seller L's price domain is $p_L\in\left[c+\frac{1-k}{1+k}(r_Lu-c), r_Lu\right]$, and the high-reputation seller H's price domain is $p_H\in\left[c+\frac{1-k}{1+k}(r_Lu-c)+(r_H-r_L)u, r_Hu\right]$.[5] Define $p_H=c+\frac{1-k}{1+k}(r_Lu-c)+(r_H-r_L)u$, $\overline{p_H}=r_Hu$, $p_L=c+\frac{1-k}{1+k}(r_Lu-c)$, and $\overline{p_L}=r_Lu$.

[5] The proofs of the claims, propositions, and corollaries in this paper can be found in Appendix A.