THE EFFECTS OF REFERENCE PRICES ON BIDDING BEHAVIOR IN INTERACTIVE PRICING MECHANISMS

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Abstract

We examine the effect of reference prices on consumer bidding behavior in interactive pricing mechanisms used in online retailing, e.g., auctions and name-your-own-price. We find significant influences of different reference price concepts on bid values. However, after controlling for internal and external reference prices, sellers only have a moderate ability to affect bid values via the provision of an advertised reference price. An exaggerated advertised reference price increases the bid value among consumers, who consider it to be believable. However, its effect is reverse in the presence of an external reference price if consumers consider it unbelievable, decreasing bid values.

Key words: Reference price, interactive pricing mechanisms, name-your-own-price, online retailing

INTRODUCTION

The Internet has led to the emergence of a set of interactive pricing mechanisms, such as eBay auctions (e.g. eBay.com) or name-your-own-price auctions (e.g. priceline.com, expedia.com, germanwings.com), which are constantly gaining popularity among consumers and retailers (Bapna, Jank, & Shmueli, 2005; Heyman, Orhun, & Ariely, 2004). The distinctive characteristic of these mechanisms is that they give consumers more control over the pricing process and the final price to pay (Chandran & Morwitz, 2005). In doing so, these mechanisms require consumers to determine the value of their bid for the product, which is quite different from their either accepting or rejecting a seller's price in the traditional, posted-price scenario (Spann & Tellis, 2006). This flexibility is, however, related to considerable uncertainty about the product value (Chernev, 2003), which consequently increases the effect of various forms of price information, especially reference prices, on consumer behavior. Hence, reference prices can influence consumers' bid values in interactive pricing mechanisms, because they are an important benchmark for product value estimation (Chernev, 2003) and can signal the value that the seller places on the product (Kamins, Dreze, & Folkes, 2004).

For retailers, it is thus of high importance to understand the process of how consumers determine their bid values and the role that reference prices play in this process. The knowledge of this process may enable retailers to influence (increase) bid values and consequently their profits if they can manipulate the reference price information available to consumers. Advertised reference prices (ARP) are an easy to implement option for online retails to provide and control such reference price information. Advertised reference prices (ARP) are common in the form of a seller-provided regular price or suggested retail price presented in price advertisements (e.g., Chandrashekaran, Viswanathan, & Monroe, 2002) or on online retailers' websites (e.g.,

Priceline.com provides information on the "median retail price" for the specific star level and city related to bidding for a hotel room on its website).

Previous research has found that the use of ARPs – and even exaggerated ARPs – is often very effective in influencing consumer behavior in offline retailing (Biswas, 1992; Biswas & Blair, 1991). However, the effectiveness of this strategy depends on additional price cues available to consumers because they are likely to use multiple price information in their purchase decision (Mayhew & Winer, 1992): An internal reference price (IRP) based on prices that consumers have seen in the past or consider as fair is likely to play an important role. Additionally, consumers may want to conduct an external price search and use these encountered price cues such as current prices for other products in the same category or prices in competing stores (i.e., an external reference price, ERP) for their purchase decision (Yadav & Seiders, 1997).

Further, the effect of an ARP in interactive pricing mechanisms may be different than the one found in the offline studies because of the differences between online and offline environments (Jensen, Kees, Burton, & Turnipseed, 2003). Since on the Internet consumers have an easy access to abundant price information and can easily compare prices of the same product at different retailers, they may not be easily influenced by an ARP. Therefore, an ARP may be less effective in online as in offline stores. In contrast, attempts to influence consumers by providing an exaggerated ARP may lead to adverse effects when the price claim is perceived as unbelievable. Such a situation may not only have no influence on the bid value as desired by the retailer, but also discourage consumers from submitting a bid and thus conducting a purchase.

The possibility to positively influence consumers' behavior via ARPs in interactive pricing mechanisms remains under-researched in the current literature. Although existing studies have extensively researched the role of reference prices in the offline posted-price environment,

interactive pricing mechanisms applicable in the online environment have been rather neglected. Chernev (2003) analyzes the effect of an internal and an external reference price on the ease of bidding and the perceived likelihood of success in the name-your-own-price auction. However, the study omits effects on the bid value and purchase intentions. Kamins, Dreze, and Folkes (2004) investigate the effect of seller-supplied reference prices in the form of the minimum bid and the reservation bid, but do not account for the price information from different sources, thereby likely overestimating the role of the seller-supplied reference prices. Dholakia and Simonson (2005) in contrast analyze the effect of external reference prices in the form of prices fetched in adjacent auctions in the context of eBay auctions but do not look at the retailer's role. As such, the latter studies investigate the effect of a reference price on the bid value, but they focus only on one reference price concept at a time and do not analyze the bid formation process that consists of multiple steps and multiple price cues.

The focus of this study is on one specific interactive pricing mechanism – the so called "name-your-own-price" auction (NYOP) – where the seller specifies a hidden minimum threshold price that has to be met by the bidder for the purchase to be executed (Spann, Skiera, & Schäfers, 2004). The effects of reference prices on bidding behavior have not yet been analyzed for this interactive pricing mechanism.

Consequently, the aim of this paper is to analyze the process of bid formation in name-your-own-price auctions and the role of reference prices in this process. More specifically, we analyze whether a retailer can positively influence bid values by providing an ARP on its website when accounting for other relevant price cues. Additionally, we also analyze the effect of reference prices on other aspects of bidding behavior, namely, search behavior and purchase intentions. In contrast to previous studies, we distinguish between three reference price concepts, namely an internal, an external and an advertised reference price, and we determine their effect

on bid values. We also distinguish between both plausible and exaggerated values of the ARP as suggested by Jensen, Kees, Burton, and Turnipseed (2003) and Kamins, Dreze, and Folkes (2004).

The remainder of the paper is organized as follows. First, we develop a conceptual model for the process of bid value formation and hypotheses on how various reference price concepts influence bidding behavior in name-your-own-price auctions. Next, we present the design of an empirical study to test these hypotheses and report the results. Finally, we discuss our results and provide implications.

CONCEPTUAL MODEL

A reference price is defined as a norm that serves as a neutral point for judging the actual prices (Kalyanaram & Winer, 1995). Various theories have been proposed to explain the effect of a reference price on consumer behavior, most prominently: (1) the adaptation-level theory, i.e., consumers form an "adaptation level" through exposure to past stimuli and respond to a current stimulus based on that level (Helson, 1964) and (2) the assimilation-contrast theory, i.e., a new stimulus encountered by an individual is judged against a reference point that is formed on the basis of past experience; new stimuli that are close to an adaptation level are assimilated and perceived to be closer than they actually are, while stimuli that diverge sharply from that level provide the contrast effect (Sherif, 1963).

The effect of a reference price has been extensively analyzed in the posted-price scenario where consumers face a posted price charged for the product and make a decision as to whether they accept this price and conduct a purchase or not (Kalwani, Yim, Rinne, & Sugita, 1990; Rajendran & Tellis, 1994; Winer, 1986). A significant effect exerted by reference prices on consumer behavior has been found (Kalyanaram & Winer, 1995). The results show that

consumers use reference prices to judge the current actual price of the product. Prices below the reference price are perceived to be low (relatively inexpensive) and thus regarded as gains, while prices above it are perceived to be high (relatively expensive) and thus regarded as losses (Kalyanaram & Winer, 1995).

Nevertheless, this well-documented mental mechanism of comparative price assessment does not apply in case of name-your-own-price auctions where a consumer no longer faces a posted price that she would judge against various price standards. In this case, it is the consumer who sets the price of the product by submitting her bid. Specifically, in name-your-own-price auctions the seller specifies a hidden minimum threshold price that has to be met if the purchase is to be executed. Consequently, the bid submitted by the buyer is accepted or rejected depending on whether it exceeds this hidden threshold price. As a result, the use of reference prices is different in name-your-own-price auctions. The consumer no longer compares the reference price to the actual price of the product, as there is no actual price given. Instead, the reference price plays an even more important role in a situation of product value uncertainty, as it can influence the process in which the bid value is formed and the decision whether a consumer takes part in the auction.

Process of Bid Value Formation

Previous research identified various reference prices that are likely to play an important role in the bid formation process. First, consumers have some internal price standards concerning the product they would like to purchase which are based on their previous experience or prices considered as fair (i.e., IRP). These internal standards are likely to influence consumers' product valuation and consequently constitute the basis for the bid value as they enter the interactive pricing mechanism. Since consumers may often be uncertain about their IRP (Dickson & Sawyer,

1990), retailers may want to relieve this uncertainty by providing a suggested retail price. In this situation, consumers are likely to see an ARP having entered the online auction website prior to submitting the bid. Since an IRP is not constant over time, it is likely to get updated when a consumer faces new price information (Yadav & Seider, 1998). Therefore, an ARP is likely to be at least partly assimilated in the initial price beliefs (Yadav & Seider, 1998) and consequently influence the bid value. In addition, consumers may be interested in conducting an external search that would help to determine the bid. Since an IRP is formed through the past exposure to prices, it is also likely to change when a consumer faces new price information (Yadav & Seider, 1998). Therefore, additional cues in the form of prices in competing stores (i.e., an external reference price, ERP) are likely to be perceived as relevant and be assimilated in the initial price beliefs (Yadav & Seider, 1998). Hence, an ERP is also likely to influence the bid value.

As a result, the final bid value will not depend on one specific price cue, but various price information will play a role in the bid formation process. Below we present the process of bid formation that consists of the following stages: (1) formation of an IRP for the product of interest which constitutes the basis for the bid value, (2) assimilation of an ARP encountered on the online auction website, (3) assimilation of an ERP resulting from search behavior, and (4) bid formation and submission. Each stage contributes to the final bid (see Figure 1). Below, we analyze each stage of the bid formation process in more detail and derive hypotheses for the effects of the three reference price concepts existing in the literature on the bid value: an internal reference price, an external reference price, and an advertised reference price.

-- Please insert Figure 1 about here --

Hypotheses

An internal reference price is the price that a consumer has in her memory and that is formed on the basis of past experience. Often, the IRP is also considered as the average (e.g., Biswas & Blair, 1991), expected (Winer, 1986) or fair market price. In the name-your-own-price auction, consumers are likely to use their past price experience as well as their perception of a fair price as basis when determining the bid value. Additionally, the effect of an internal reference price on the bid value can be derived from Thaler (1985), who postulates that the total value of the product consists of two components: (1) acquisition utility, which is a measure of the value of the product purchased relative to its price and (2) transaction utility, defined as the difference between the price paid and the internal reference price for the product (Thaler, 1985). According to Thaler's theory, the overall perceived value of a product that a consumer is considering to purchase can be affected by that consumer's internal reference price. Empirical studies provide support for this notion. Ranyard, Charlton, and Williamson (2001) find that an internal reference price influences the product valuation. Consequently, we propose that an internal reference price will have a positive effect on the bid value.

H1. *An internal reference price (IRP) will have a positive effect on the bid value.*

Often, however, consumers may be uncertain about their IRP or may not have an IRP at all (Dickson & Sawyer, 1990). Research shows that buyers' ability to recall prices is generally poor (Dickson & Sawyer, 1990) and recalling prices requires cognitive effort. As a result, consumers may lack a benchmark for their bid determination process (Chernev, 2003) and may suffer from considerable product value uncertainty. In order to diminish this value uncertainty but also in an attempt to influence consumers initial price beliefs and increase the submitted bids, the retailer may provide a suggested regular price on his website, i.e., an advertised reference price.

For the consumer, an ARP will serve as a benchmark or an anchor but also as a signal for the value that the seller places on the product (Kamins, Dreze, & Folkes, 2004) which helps to determine the bid value. This strategy is beneficial for the retailer as the buyer's valuation of the product is not constant but changes as she obtains more information about the price range prevailing in the market (Monroe, 2003). Yadav and Seider (1998) propose that a consumer who encounters new price information in the form of an ARP is likely to update her prior price beliefs. As a result, facing an ARP, consumers change their initial price beliefs by assimilating the difference between the ARP and their IRP, especially in the situation of a salient and easily accessible ARP provided prior to bidding.

Support for this notion and a significant effect of seller-supplied reference prices has been provided both in the posted-price scenario (e.g., Urbany, Bearden, & Weilbaker, 1988) as well as in the context of online auctions (Kamins, Dreze, & Folkes, 2004). Consumers, however, react not to absolute prices, but to relative prices (Krishnamurthi, Mazumdar, & Raj, 1992). Thus, an ARP will have a positive effect on the product value estimation only when it is higher than the initial IRP. Otherwise, the product value estimation is likely to decrease. Consequently, this influences the bid value.

H2a. *An advertised reference price (ARP) will have a positive effect on the bid value if it is higher than the initial IRP.*

H2b. *An advertised reference price (ARP) will have a negative effect on the bid value if it is lower than the initial IRP.*

When providing an ARP, the retailer has a wide choice of different values, both plausible and implausible ones. A plausible reference price that falls in the consumer's assimilation region is likely to be accepted and thus influence the bid value. In contrast, an exaggeratedly high ARP may lie too far away from the initial standards and therefore be perceived with skepticism. The

assimilation-contrast theory suggests that if an ARP is too high, consumers are likely to reject it and it might thus not have any effect at all on the bid value. On the other hand, the anchoring and adjustment framework suggests that even very high and irrelevant anchors may influence the bid value since consumers do not adjust enough.

Empirical studies show that an exaggerated ARP, even though often discounted by consumers, may still increase their perceptions of the product value (e.g., Compeau & Grewal, 1998; Monroe, 2003; Urbany, Bearden, & Weilbaker, 1988). Chandrashekaran and Grewal (2003) provide support for the nonlinear relationship between the deviation of an ARP from an IRP and the extent of change in the IRP resulting from this difference. As long as the ARP is relatively low, consumers assimilate much of the information. When the ARP rises above the initial IRP, consumers begin to view the ARP with increased skepticism, but still assimilate part of it. In other words, as an ARP increases relative to the IRP, the extent of the difference absorbed into the IRP diminishes.

Nevertheless, an exaggerated ARP may still have a more favorable effect on the bid value than a plausible ARP (Biswas, 1992; Biswas & Blair, 1991; Burton, Lichtenstein, & Herr, 1993; Lichtenstein, Burton, & Karson, 1991). A plausible reference price may decrease the product valuation among some buyers, depending on whether the ARP is higher or lower than their initial belief (Biswas & Blair, 1991). An exaggeratedly high ARP, that is more likely to be higher than the IRP, can thus increase the product valuation and the bid value. Therefore, we argue that an exaggerated ARP will have a stronger positive influence on the bid value than a plausible ARP. This effect will be most visible when consumers perceive the ARP as believable. Whereas Urbany, Bearden, and Weilbaker (1988) show that in accordance with anchoring effects even an unbelievable ARP influences consumer behavior, we expect the hypothesized effect to be of a limited strength if an ARP is perceived as not believable.

H3a. *An exaggerated ARP will have a greater influence on the bid value than would a plausible ARP.*

H3b. *Believeability of the ARP will moderate the effect of the ARP level on the bid value.*

In order to further decrease the uncertainty and ease the bidding process consumers may undertake search for an external reference price. An external reference price may be constituted by a current price of the brand chosen on the last purchase occasion; it may be the lowest, the highest or the average market price; or it may be the price charged for a given product in a different store (Della Bitta, Monroe, & McGinnis 1981; Hardie, Johnson, & Fader 1993; Klein & Oglethorpe 1987; Mazumdar & Papatla, 1995; Rajendran & Tellis, 1994).

Similarly as in case of an ARP, the consumer is likely to revise her prior price beliefs as she encounters new price information (Yadav & Seider, 1998). Since an IRP is composed of the past prices, any current price should consequently update a consumer's IRP. The prices at the competitive stores may be especially important, because they help to assure that a consumer does not overbid and does not pay more than she would pay elsewhere. As an ERP is likely to have an influence on an IRP, we therefore can expect that it is likely to play a role also in the bid formation process.

Empirical studies indicate a significant effect of an ERP on consumer behavior both in the posted-price scenario (Hardie, Johnson, & Fader, 1993; Kumar, Karande, & Reinartz, 1998; Mazumdar & Papatla, 1995; Rajendran & Tellis, 1994) as well as in the context of eBay auctions (Dholakia & Simonson, 2005). Again, however, consumers do not perceive prices in terms of absolute values, but instead compare them to their IRP. Biswas and Blair (1991) argue that the effect of an ERP will be positive when it exceeds an IRP and negative when it is lower than an IRP.

H4a. *An external reference price (ERP) will have a positive effect on the bid value if it is higher than the initial IRP.*

H4b. *An external reference price (ERP) will have a negative effect on the bid value if it is lower than the initial IRP.*

By providing an ARP retailers may influence consumer search behavior, which is likely to have a strong impact on name-your-own-price retailers. The low cost of doing business on the Internet, the great number of competitors and the ease of making price comparisons all tend to drive prices down on the Internet (Zettelmeyer, 2000). Thus, consumers who conduct search are likely to find rather low prices, leading to a lower bid. Consequently, the retailer may want to deter consumers from conducting external search. By providing an ARP on its website, the seller can decrease value uncertainty and thus decrease the need to undertake external search (Urbany, 1986). Previous research in the posted-price scenario shows that when buyers are exposed to an ARP, their willingness to conduct additional search decreases, as the perceived benefits of search are lower than the costs of search (Della Bitta, Monroe, & McGinnis, 1981; Urbany, Bearden, & Weilbaker, 1988). Since the propensity to undertake search online has been shown to be similar to the propensity to undertake search offline (Jensen, Kees, Burton, & Turnipseed, 2003), we propose that the presence of an ARP will decrease the magnitude of external price search.

Nevertheless, when facing an exaggerated ARP, consumers may start to question its credibility and may feel deceived. Burman and Biswas (2007) argue that when facing unreasonable surcharge some consumers are likely to enter a correction phase in order to evaluate the provided information in more detail. The contrast between the initial evaluation and the exaggerated ARP is likely to increase the value uncertainty, rather than relieve it. As a result, this increased feeling of uncertainty may motivate consumers to conduct additional external search, especially in the online environment, where conducting search imposes very low cost.

Consequently, we propose that presence of a plausible ARP is likely to decrease search, whereas presence of an exaggerated ARP is likely to increase search.

H5a. *The magnitude of price search will be lower in the presence of a plausible advertised reference price (ARP).*

H5b. *The magnitude of price search will be higher in the presence of an exaggerated advertised reference price (ARP).*

So far, we discussed potential advantages of including an ARP on the retailer's website. However, the online environment enables consumers to conduct easy and fast search as well as provides access to an abundance of detailed product information (Zettelmeyer, 2000). Therefore, many consumers may still conduct some external search in spite of the presence of an ARP. In addition, unlike at bricks-and-mortar stores the consumer can easily find the prices of exactly the same product charged in different stores, and not just the prices of similar products. Compared to an ERP, which is a result of consumers' external search, a seller-supplied ARP can be regarded as less credible due to the possible manipulation from the seller's side (e.g., Grewal & Compeau, 1992). Furthermore, an ERP may be more valuable for consumers because it is objective, stems from different sources and constitutes a price at which the product can be actually bought elsewhere as opposed to an ARP. Krishnan, Biswas, and Netemeyer (2006) show that the more valuable the information is, the stronger its effectiveness. As a result, if consumers have access to an ERP, they are more likely to rely on it than on an ARP.

This proposition is in line with the findings of Grewal, Marmorstein, and Sharma (1996) and Krishnan, Biswas, and Netemeyer (2006). The authors distinguish between within-store price cues (i.e., sale price is compared with previous price, analog to an ARP) and between-store price cues (i.e., sale price is compared with competitor's price, analog to an ERP) and show that between-store cues are more effective than within-store cues when cues are concrete in nature.

While the effect of an ERP may only apply to a limited extend at eBay auctions due to the binding role of the minimum bid and a reservation price (Kamins, Dreze, & Folkes, 2004), we expect it to play an important role in name-your-own-price auctions. Therefore, we hypothesize that in NYOP an ARP has a smaller influence on the bid value in the presence of an ERP.

H6. *An advertised reference price (ARP) will have a smaller effect on the bid value in the presence of an external reference price (ERP).*

In the posted-price scenario an ARP has been found to increase purchase intentions (e.g., Urbany, Bearden, & Weilbaker, 1988) because it increases the transaction utility when compared to an actual selling price (Thaler, 1985). In online interactive pricing mechanisms, however, the role of an ARP changes. In the absence of an actual selling price, a seller-provided ARP signals the value of the product but also conveys information about the expected threshold price and the value required for a successful bid. Consequently, consumers with a product valuation below a seller-provided ARP are less likely to take part in the auction. The results of Kamins, Dreze, and Folkes (2004) support this notion. The authors show that in the presence of seller-supplied reference prices the number of auction participants is significantly lower. Moreover, a higher ARP makes consumers expect a higher threshold price of the seller, which decreases consumer surplus and may therefore further decrease purchase intentions. Additionally, if consumers have access to an ERP they can compare it to the ARP. Due to relatively low prices online (Brynjolfsson & Smith, 2000; Zettelmeyer, 2000), an ERP may be lower than an ARP and thus elicit a feeling of deception and price unfairness with respect to the seller-provided ARP. Previous research has shown that unfair price perceptions decrease purchase intentions (e.g., Campbell, 1999). In a similar vein, Burman and Biswas (2007) argue that facing unreasonably high surcharge costs, consumers may engage in further processing and question the offer. Their results show that consumers react negatively to unreasonably high surcharges in that they present

a lower willingness to purchase (Burman & Biswas, 2007). Therefore, we propose that presence and high values of an ARP will have a negative effect on purchase intentions.

H7a. *Presence of an ARP will have a negative influence on purchase intentions in name-your-own-price auctions.*

H7b. *The higher the level of an ARP, the lower the purchase intentions in name-your-own-price auctions are.*

EMPIRICAL STUDY

The aim of the study is to analyze the effect of various reference price concepts on bidding behavior, i.e., on the bid value and purchase intentions in order to test the hypotheses developed in the previous section. To do this, we conduct a computer-assisted laboratory experiment in which participants are provided with different levels of an ARP including no ARP at all and are allowed to search for an ERP on the Internet. Consequently, an ERP in this study results from online search conducted by the participants. Further, we analyze bid value, actual search behavior and purchase intentions as well as the interaction effects between an ARP and an ERP. Two different products are included in the design: running shoes and an mp3 player. We run separate between-subject analyses for two analyzed products with the second product serving as a replicate for checking the robustness of the results.

Methodology

Respondents were gathered in groups of 20 in a room where everyone was provided with his or her own computer with Internet access. The survey consisted of three parts. First, participants received two color pictures of two products, running shoes and an mp3 player with the short product description below the picture and were asked to familiarize themselves with the description. The products were chosen in order to having both a search product (mp3 player) and an experience product (running shoes). Having seen the products, participants received a

questionnaire where they were asked to state their IRP in the paper and pencil conditions: “How much do you expect the price of the product to be if it is not on promotion?” based on Lichtenstein and Bearden (1989) and Kalwani and Yim (1992). In addition, we asked participants how familiar they were with the respective product (1 - very unfamiliar, 5 - very familiar) (Biswas & Blair, 1991). Having filled in and returned the first part, participants could participate in the second part. A short description of the name-your-own-price auction was provided in order to introduce respondents to the auction rules. After reading the description, respondents were asked to submit a single bid for the products, using paper and pencil conditions. In other words, respondents were asked to report how much they would be willing to bid for the presented products: “How much would you bid for this product in the name-your-own-price online auction?”.

We randomly assigned participants to nine experimental treatments in which we manipulated an ARP for each product: (1) a plausible ARP for shoes and no ARP for the mp3 player, (2) an exaggerated ARP for shoes and no ARP for the mp3 player, (3) no ARP for shoes and a plausible ARP for the mp3 player, (4) an exaggerated ARP for shoes and a plausible ARP for the mp3 player, (5) no ARP for shoes and an exaggerated ARP for the mp3 player, (6) a plausible ARP for shoes and an exaggerated ARP for the mp3 player, (7) a plausible ARP for shoes and a plausible ARP for the mp3 player, (8) an exaggerated ARP for shoes and an exaggerated ARP for the mp3 player, and lastly (9) no ARP for shoes and no ARP for the mp3 player. The values for the plausible ARP were set at the average level of the prices found in online and offline stores (99.99 € and 69.99 € for running shoes and the mp3 player, respectively). The exaggerated ARP was created by doubling the plausible ARP (199.99 € and 139.99 €). The results of a pre-test conducted with twenty participants confirmed the values.

The participants were given five minutes to familiarize themselves with the NYOP auction description and ten minutes to determine their bids for both products. They were instructed that during that time they were allowed to search the Internet, but were not obliged to do so. After submitting a bid, questionnaires from the second part were collected.

In the third part, the participants received an additional survey with questions about their perception of believability of the ARP, i.e., (1) whether the price provided was realistic, (2) whether the price demanded was most likely to be the average market price, (3) whether the seller could be regarded as trustworthy, and (4) whether the price provided was dubious (5 point Likert scale, 1 – strongly disagree, 5 – strongly agree) based partly on Biswas and Blair (1991), Compeau, Grewal, and Chandrashekaran (2002), Lichtenstein and Bearden (1989), Lichtenstein, Burton, and Karson (1991), and Urbany, Bearden, and Weilbaker (1988). In addition, we asked about search behavior: (1) How extensively have you searched the Internet for the prices? (1 – not at all, 5 – very extensively), (2) How many websites have you visited while looking for a price? (3) How many different retailers have you checked?, and (4) What was the average price resulting from your online search? Finally, we asked about purchase intentions (1 – purchase very unlikely, 5 – purchase very likely) (Grewal, Monroe, & Krishnan, 1998). Altogether, 180 participants took part in the experiment (undergraduates and graduates studying at a large Western European university). One flight ticket within Europe, two vouchers for 20 € and eight cinema vouchers for 5 € were offered as an incentive to participate in the experiment.

Results

We start with the manipulation check. We use the four questions about the reference price's perceived believability to form the factor "believability" (Cronbach alpha is equal to .88 and .90 for shoes and the mp3 player, respectively). The results show that a plausible ARP was

perceived to be significantly more believable than an exaggerated ARP with both running shoes and the mp3 player ($p<.01$). Therefore, we conclude that our ARP-level manipulation was successful. The average reported IRP was 106.08 € for shoes and 74.30 € for the mp3 player.

Among all 180 participants, 123 undertook external search in case of shoes, finding an average ERP of 84.11 € and 114 undertook external search in case of the mp3 player, finding an average ERP of 68.11 €. Among those who undertook search, the average number of websites visited was 2.30 for shoes and 2.06 for the mp3 player. These results are higher than the results found by Johnsohn, Moe, Fader, Bellman, and Lohse (2004), who came up with an average number of websites visited of between 1.2 and 1.8, depending on the product category. The average bid value is equal to 86.72 € and 59.53 € for shoes and the mp3 player, respectively. Across all 9 treatment conditions, the lowest average bid for shoes equal to 73.59 € was observed in the condition (3) where no ARP for shoes and a plausible ARP for the mp3 player was provided (see Table 1). The highest average bid value for shoes of 107.85 € was observed in condition (2) with an exaggerated ARP for shoes and no ARP for the mp3 player. The lowest average bid for the mp3 player equal to 52.77 € was observed in the condition (1) with a plausible ARP for shoes and no ARP for the mp3 player. The highest average bid value for the mp3 player equal to 67.95 € was observed in condition (6) with a plausible ARP for shoes and an exaggerated ARP for the mp3 player.

-- Please insert Table 1 about here --

In our conceptual model, we posit that the bid formation process consists of several stages where different reference price concepts are likely to influence the bid value. Therefore, we first analyze the deviations of the bid value from an IRP, ERP, and ARP in order to see the extent to which various reference prices were assimilated in the bid value. A similar analysis was

conducted by Chandrashekaran and Grewal (2003) and Yadav and Seider (1998) who inspect the differences between an ERP and an IRP measured after exposure to an ERP.

The results show a very interesting pattern. The difference between the bid value and the IRP varies a lot depending on presence and level of an ARP and an ERP which indicates that the bid value does not only depend on the IRP but the ARP and the ERP also play an important role in the bidding process (see Table 2). Further, Table 2 shows that different reference prices are assimilated to a different extent. In a situation when respondents conducted search and found a low ERP (i.e., lower than their initial IRP), they assimilated the ERP almost completely and submitted the bid at the level of the low ERP making only slight adjustments. As a result, the difference between the ERP and the bid is very small (i.e., -2.56 to 7.91 for shoes and .50 to 5.09 for the mp3 player) and it is mostly the ERP that drives the bid value. In a situation when respondents found a high ERP (i.e., higher than the initial IRP), they were less likely to assimilate it and consequently the difference between the ERP and the bid value is much higher. In fact, in presence of a high ERP respondents were more likely to base their bid on their initial IRP than on the ERP. This is especially visible in case of the mp3 player where the difference between the IRP and the bid value varies between -2.83 and 20.10 whereas the difference between the ERP and the bid value varies between 15.69 and 30.00. In the absence of an ERP, respondents mostly based their bid on the ARP if it was lower than their initial IRP and on the IRP if the ARP was higher than the initial IRP. These results show that consumers' bids are driven mostly by an ERP and then by an ARP but only when these are lower than their initial IRP. Otherwise, an IRP was used as basis for the bid value. Lastly, whereas in case of both an ERP and an ARP, the bid value lies always below the reference price, it did exceed an IRP in three cases for both products: (1) when an ARP was higher than an IRP and no ERP was searched for, (2) when an ERP was higher

than an IRP and no ARP was provided, and lastly (3) when both an ARP and an ERP were higher than an IRP.

-- Please insert Table 2 about here --

In hypothesis H1 we propose a positive influence of an IRP on the bid value, while hypotheses H2 and H4 propose a positive effect of an ERP and an ARP respectively if they are higher than the IRP and a negative effect if they are lower than the IRP. In order to test hypotheses H1, H2 and H4, we conduct an ANCOVA with the presence of an ARP and an ERP treated as fixed effects and an IRP as well as the ARP believability as covariates. We distinguish between the following conditions in case of an ARP: (1) no ARP (60 respondents for shoes and the mp3 player), (2) low ARP: an ARP present and lower than the IRP (32 respondents for shoes and 34 respondents for the mp3 player), and (3) high ARP: an ARP present and higher than the IRP (88 respondents for shoes and 86 respondents for the mp3 player). Similarly, we have the following conditions for an ERP: (1) no ERP (57 respondents for shoes and 66 respondents for the mp3 player), (2) low ERP: an ERP present and lower than the IRP (93 respondents for shoes and 66 respondents for the mp3 player), and (3) high EPR: an ERP present and higher than the IRP (30 respondents for shoes and 48 respondents for the mp3 player).

In Table 3 we present the results from the ANCOVA. Similarly to Yadav and Seider (1998) we can interpret the parameters as showing the role of various price cues in the bid formation process. As can be seen, an IRP has a positive and significant influence on the bid value for both shoes (.32, $p<.01$) and the mp3 player (.27, $p<.01$), which is consistent with our hypothesis H1. The results also show that when a low ERP is found, it significantly decreases the bid value for shoes (-23.79, $p<.01$) as well as for the mp3 player (-6.74, $p<.1$). However, a high ERP increases the bid value only insignificantly. Thus, results are consistent with hypothesis H4b but not with hypothesis H4a. Finally, we investigate the effect of an ARP. Compared to the

situation in which no ARP is given, the presence of a high ARP significantly increases the bid value but only when it is perceived as believable (8.02, p<.01 for shoes and 4.02, p<.01 for the mp3 player).[1] Therefore, our results are partially consistent with hypothesis H2a regarding a high ARP.

-- Please insert Table 3 about here --

In the next step, we test hypothesis H3 and analyze the effect of different levels of an ARP on bid values (see Table 4). The results show that the mean bid value for shoes is 78.88 € in the situation when no ARP is provided and increases to 80.54 € when a plausible ARP is provided and to 100.65 € when an exaggerated ARP is provided. In case of the mp3 player, the average bid value is 57.23 € in the situation when no ARP is provided and decreases to 56.29 € when a plausible ARP is provided but increases to 65.07 € when an exaggerated ARP is provided. These results already indicate a strong increase in bid values when an exaggerated ARP is provided compared to situations when a plausible ARP is published by the retailer.

We further analyze this effect in an ANCOVA where we control for ARP believability. The results show that when an ARP is perceived believable, an exaggerated ARP has a stronger positive effect on the bid value (22.10, p<.01 for shoes and 10.46, p<.01 for the mp3 player) than a plausible ARP (7.43, p<.10 for shoes and 4.90, p<.10 for the mp3 player). However, when an ARP is not believable, a plausible ARP has no significant influence on the bid value whereas an exaggerated ARP significantly decreases the bid value for both shoes (-20.23, p<.05) and the mp3 player (-14.66, p<.10). As a result, hypothesis H3 can be supported when an ARP is perceived as believable, but it is rejected when an ARP is not perceived as believable. These results contrast the finding of previous studies showing that even an exaggerated ARP positively

[1] In this and the following analyses, we also additionally tested if the experimental conditions for the first product (shoes) have an effect on consumer behavior for the second product (mp3 player). We did not find a significant effect of the experimental conditions for shoes on the results for the mp3 player.

influences consumers due to anchoring effects. We find that in the online environment we are more likely to observe rejection of an unbelievable exaggerated ARP than discounting.

-- Please insert Table 4 about here --

Next, we analyze the effect of an ARP on search behavior. In hypothesis H5 we propose that the presence of a plausible ARP decreases consumer search while an exaggerated ARP is likely to increase it. We find that when a plausible ARP is provided, 70 % (60 %) of participants undertake external search, when an exaggerated ARP is provided 65% (72%) compared to 70 % (58 %) in the situation when no ARP is present for running shoes (mp3 player). The differences are insignificant.

In order to test H5, we run ANCOVAs with our three search measures as dependent variables, an ARP treatment condition as fixed effect and ARP believability as a covariate (see Table 5). Contrary to our hypothesis, the results mostly show that an ARP had no significant effect on the search extent. Only in case of the number of websites that the respondents searched we can observe that an exaggerated ARP significantly increases the search behavior (1.25, $p<.05$ for shoes and .95, $p<.05$ for the mp3 player) unless it is perceived believable (-.47, $p<.10$ for shoes and -.35, $p<.10$ for the mp3 player). This implies that consumers may become suspicious when they see an exaggerated ARP and search even more. The effect of an ARP on search is consistent if we additionally control for product familiarity in the ANCOVA. Consequently, hypothesis H5 can be partly supported in cases when an ARP is perceived as unbelievable.

-- Please insert Table 5 about here --

The results above show that the majority of participants conduct external search. Since the effect of an ARP on the bid value is likely to depend on whether an ERP is present or not, we check for this possibility. Figure 2 presents the mean bid values for three experimental conditions: (1) no ARP, (2) a plausible ARP, and (3) an exaggerated ARP in the presence and

absence of an ERP. We can clearly see that an exaggerated ARP increases bid values stronger in absence of an ERP whereas its effect diminishes in the presence of an ERP. These results are consistent with hypothesis H6 and underline the importance of accounting for external reference prices when analyzing bidding behavior in name-your-own-price auctions.

-- Please insert Figure 2 about here --

A more detailed analysis is presented in Table 6 where we compare three experimental treatments: (1) no ARP, (2) a plausible ARP, and (3) an exaggerated ARP for situations when an ERP was or was not found. First, the results show that the average bid value is higher in absence of an ERP (82.89 for shoes and 57.84 for the mp3 player) than in its presence (77.16 for shoes and 56.80 for the mp3 player). Further, we can see that for shoes a believable exaggerated ARP increases the bid value independent of presence of an ERP (18.34, $p<.01$ in absence of an ERP and 18.62, $p<.01$ in presence of an ERP). However, in presence of an ERP an exaggerated ARP decreases the bid value if not perceived as believable by consumers (-19.40, $p<.10$). We see a similar pattern for the mp3 player in presence of an ERP. An exaggerated ARP increases the bid if perceived believable (12.00, $p<.01$) but decreases the bid value if not perceived as believable (-19.48, $p<.05$). To sum up, an exaggerated ARP can have an adverse effect in presence of an ERP.

-- Please insert Table 6 about here --

Finally, we analyze the interaction effects of an ERP and an ARP on purchase intentions to test hypothesis H7 (see Table 7). We proposed that provision of an ARP decreases the purchase intentions. The results show that both a plausible and exaggerated ARP significantly decrease the purchase intentions for shoes when an ERP is present with a stronger negative effect of an exaggerated ARP (-.55, $p<.05$ for a plausible ARP and -1.12, $p<.01$ for an exaggerated ARP). In case of the mp3 player, an exaggerated ARP decreases purchase intentions in both situations when an ERP is absent (-.79, $p<.05$) and when an ERP is present (-.54, $p<.05$) whereas

a plausible ARP decreases purchase intentions in absence of an ERP (-.54, p<.10). Again an exaggerated ARP has a stronger negative effect. These results provide support for hypotheses H7a and H7b.

-- Please insert Table 7 about here --

CONCLUSIONS

New interactive pricing mechanisms in online retailing, such as name-your-own-price or eBay auctions, require consumers to submit a bid for a product and thus to indicate how much they are willing to pay for it. Such a procedure differs from the posted-price scenario, where consumers either accept or reject a seller's posted price, and it thus gives consumers more control over the transaction price. In our paper, we analyze the effects of three reference price concepts, an internal (IRP), an external (ERP) and an advertised reference price (ARP), on the bidding behavior in terms of bid value, purchase intentions and search behavior.

The results show that an IRP consistently and positively influences the bid value. This implies that consumers use the prices from their past experience, in order to determine the bid value. The bid value, however, substantially deviates from the IRP indicating that other price cues also play an important role in the bid value determination. First, our results suggest that consumers realize the benefits of easy and fast online search and look for prices in other online stores before conducting a purchase. However, an interesting pattern can be noticed in that consumers are only influenced by low ERP values, whereas high prices seem to be ignored and do not have any effect on bid values. This is consistent with the findings of Rajendran and Tellis (1994) that among various ERPs, it is the lowest price that acts as an important cue for a reference price. Taken together, our results are consistent with previous studies from the posted-

price scenario that conclude that both an IRP and an ERP are important determinants of product valuation (Mayhew & Winer, 1992; Rajendran & Tellis, 1994).

With regard to a seller-provided reference price, opposite to Kamins, Dreze, and Folkes (2004), our results imply that it has only a limited influence on bid values in name-your-own-price auctions when controlled for an IRP and an ERP. An ARP increases the bid value only if perceived as believable with a stronger effect for an exaggerated ARP than for a plausible ARP. These results imply that consumers assimilate both a plausible as well as an exaggerated ARP as long as they are believable. However, in the presence of an ERP, an exaggerated ARP significantly decreases the bid value if not perceived believable. Thus, we extend the existing results from online auctions and we emphasize the importance of including the effect of an ERP in the analysis of bidding behavior. Further, in contrast to findings from the offline environment showing that consumers discount an exaggerated ARP, we demonstrate that consumers are more likely to reject an exaggerated ARP in the online environment which can lead to severe adverse effects for the retailer.

Further we show that the effect of an ARP on search behavior and purchase intentions differs in interactive pricing scenario compared to traditional settings. In the posted-price scenario an ARP has been found to decrease the external search and increase purchase intentions. These results are, however, not replicated in the online interactive pricing scenario. First of all, we show that in the context of a name-your-own-price auction the presence of an ARP decreases search only to a limited extent and only when it is perceived as believable. Further, if an exaggerated ARP is provided, it motivates consumers to search more. These results imply that search is more beneficial in interactive pricing mechanisms than in offline posted-price scenarios. Apparently, the motivation not to overbid the prices charged in other stores plays a very important role in name-your-own price auctions. Second, we show that in name-your-own-price

auctions an ARP does not increase purchase intentions but can even decrease them. A seller-provided ARP conveys information about the value required for a successful bid and consumers with a product valuation below it are less likely to take part in the auction. Further, exaggerated values may evoke perception of unfairness which further decreases purchase intentions.

Altogether, our results show that an ARP offers only limited possibilities for online retailers to influence consumer behavior in interactive pricing mechanisms. An exaggerated ARP is likely to increase the bid value that consumers would submit, but at the same time it will decrease the purchase intentions and consumers' willingness to participate in an auction. Higher bid values result from anchoring and value signaling effects which make consumers think that high bid values are necessary for winning the auction. On the other hand, higher prices to be paid are related to lower purchase intentions because they decrease consumer surplus.

We acknowledge several limitations to our study. First, we use an experimental setting with no purchase obligation, which may result in a hypothetical bias and biased bids submitted by respondents (Voelckner, 2006). Nevertheless, this effect is likely to occur in all treatment conditions and will not differ between treatment conditions. Second, additional product categories would make it more feasible to generalize our results. Third, we focus on one specific format of interactive pricing mechanism. Future research may analyze other interactive pricing mechanisms, such as search key auctions and online pricing in general (e.g., Jap & Naik, 2004; Pan et al., 2004). Fourth, the analysis of different forms of providing such ARPs is important to online auction retailers. Whereas our results may discourage providers from publishing an ARP, other framing possibilities could help an ARP to positively influence consumers. Fifth, the effect of reference prices is likely to differ among consumers. Therefore, future research may analyze to what extent different segments use various reference prices in the bid formation. Such analysis may help online auction providers to develop segment specific strategies. Sixth, the interaction of

reference prices with bidder and seller reputations—which affect auction outcomes (e.g., Bruce, Haruvy, & Rao, 2004; Dholakia, 2005)—merits further research. Finally, in addition to the analyzed reference prices, coupons are also likely to play an important role in the bid formation process. Their role, however, requires further research.

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Table 1: Average bid values for experimental treatment conditions

	Bid values for shoes			Bid values for mp3 player		
	ARP for shoes					
ARP for mp3 player	None	Plausible	Exaggerated	None	Plausible	Exaggerated
None	79.50[a]	79.84[a]	107.85[a]	63.90[a]	52.77[a]	55.02[a]
Plausible	73.59[a]	80.15[b]	103.05[a]	54.60[a]	56.54[a]	57.73[a]
Exaggerated	83.54[a]	81.50[a]	91.04[a]	61.30[a]	67.95[a]	65.94[a]

[a] n=20; [b] n=19

Table 2: Average differences between the bid value and IRP, ARP, and ERP for various experimental treatment conditions

	Shoes			Mp3 player		
	No ERP	Low ERP	High ERP	No ERP	Low ERP	High ERP
			IRP-bid			
No ARP	15.33[1]	41.49[4]	-10.64[7]	14.70[10]	24.56[13]	-2.83[16]
Low ARP	30.13[2]	63.96[5]	-[8]	71.47[11]	51.52[14]	20.10[17]
High ARP	-10.47[3]	27.60[6]	-23.63[9]	-10.05[12]	24.31[15]	-7.97[18]
			ARP-bid			
No ARP	-	-	-	-	-	-
Low ARP	8.37	29.73	-	18.99	15.57	10.09
High ARP	58.89	77.76	81.99	44.61	75.50	51.81
			ERP-bid			
No ARP	-	3.75	15.00	-	5.09	15.69
Low ARP	-	7.91	-	-	3.17	30.00
High ARP	-	-2.56	.86	-	.50	17.11

Low corresponds to lower than IRP, whereas high corresponds to higher than IRP
1: n=18, 2: n=8, 3: n=30, 4: n=31, 5: n=23, 6: n=39, 7: n=11, 8: n=0, 9: n=19
10: n=25, 11: n=15, 12: n=26, 13: n=17, 14: n=18, 15: n=20, 16: n=18, 17: n=1, 18: n=40

Table 3: Influence of IRP, ERP and ARP on bid values (ANCOVA)

Independent variables	Shoes	Mp3 player
Intercept	57.72***	39.23***
IRP	0.32***	0.27***
Low ERP	-23.79***	-6.74*
High ERP	5.07	4.25
Low ARP	-35.71	-19.61
High ARP	-2.89	-5.24
Low ARP * believability	9.84	4.29
High ARP * believability	8.02***	4.02*
n	179	180
F	9.89	5.77
p-value	.00	.00

*** $p<.01$, ** $p<.05$, * $p<.1$

Table 4: Influence of various levels of an ARP on bid values

Independent variables	Shoes		Mp3 player	
	Bid value	ANCOVA	Bid value	ANCOVA
Intercept		78.88		57.23
No ARP	78.88	0[a]	57.23	0[a]
Plausible ARP	80.54	-22.23	56.29	-16.32
Exaggerated ARP	100.65	-20.23**	65.07	-14.66*
Plausible ARP * believability		7.43*		4.90*
Exaggerated ARP * believability		22.10***		10.46***
n		179		180
F		14.94		5.17
p-value		.00		.00

[a] This parameter set to zero because it is redundant
*** $p<.01$, ** $p<.05$, * $p<.1$

Table 5: Influence of ARP on magnitude of search (ANCOVA)

Measure of search:	Shoes			Mp3 player		
	Extent of search	No. of websites	No. of retailers	Extent of search	No. of websites	No. of retailers
Intercept	2.08***	1.60***	1.57	2.02***	1.35***	1.78***
Plausible ARP	.84	.42	1.96	-.13	.28	.56
Exaggerated ARP	.52	1.25**	1.45	.49	0.95**	.04
Plausible ARP * believability	-.23	-.06	-.48	.04	-.13	-.15
Exaggerated ARP * believability	-.18	-.47*	-.12	-.17	-.35*	-.04
n	179	179	179	180	180	180
F	1.24	1.25	1.36	.73	1.64	.08
p-value	.30	.29	.25	.58	.17	.99

*** $p<.01$, ** $p<.05$, * $p<.1$

Table 6: Interaction effects of ERP and ARP on bid values (ANCOVA)

	Shoes		Mp3 player	
	ERP absent	ERP present	ERP absent	ERP present
Intercept	82.89***	77.16***	57.84***	56.80***
Plausible ARP	-12.24	-22.41	-19.94	-15.11
Exaggerated ARP	-3.02	-19.40*	1.55	-19.48**
Plausible ARP * believability	5.58	7.10	5.52	4.85*
Exaggerated ARP * believability	18.34***	18.62***	6.12	12.00***
n	56	123	66	114
F	8.73	5.09	1.78	4.00
p-value	.00	.00	.15	.01

*** $p<.01$, ** $p<.05$, * $p<.1$

Table 7: Interaction effects of ERP and ARP on purchase intentions

	Shoes		Mp3 player	
	ERP absent	ERP present	ERP absent	ERP present
Intercept	3.11***	3.50***	3.32***	3.26***
Plausible ARP	.24	-.55**	-.54*	.13
Exaggerated ARP	-.30	-1.12***	-.79**	-.54**
n	56	123	66	114
F	1.19	11.13	2.81	4.23
p-value	.31	.00	.07	.02

*** $p<.01$, ** $p<.05$, * $p<.1$

Figure 1: Process of bid value formation

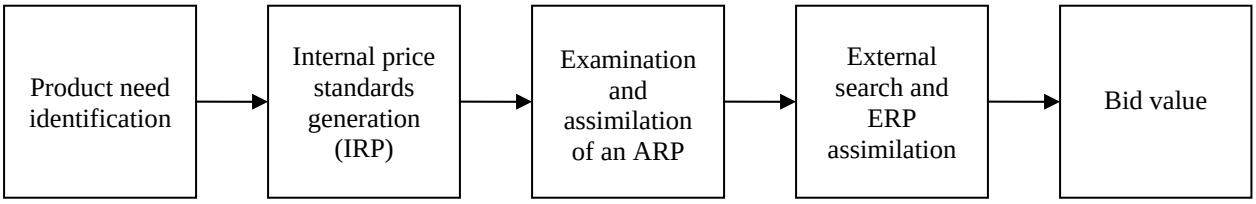

Figure 2: Effect of ARP and ERP on bid values