WILLINGNESS TO PAY VERSUS EXPECTED CONSUMPTION VALUE IN VICKREY AUCTIONS FOR NEW EXPERIENCE GOODS

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Abstract

Vickrey auctions are commonly used to elicit willingness to pay for new food products. This paper shows that in a multi-period context, it can be optimal to bid higher than the expected consumption value for new experience goods to obtain information about the quality of the goods. The degree of value uncertainty, the purchasing frequency, and expected future market prices affect both the expected value of the quality information and the weakly dominant bidding strategy in Vickrey auctions for new experience goods.

Keywords: experience goods, value of information, Vickrey auctions.

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Information about the quality of food products is valuable for consumers. However, when consumers encounter a new product attribute, they are often uncertain about the quality of the product. In this paper, we investigate how uncertainty about quality affects the weakly dominant bidding strategy for new products in Vickrey auctions.

A Vickrey auction is a private value auction in which the bidders submit sealed bids. The winner is the highest bidder and the price equals the second-highest bid. Vickrey showed that, in such an auction, it is a weakly dominant strategy for people to bid their willingness to pay (WTP) for the good on offer. People have an incentive to truthfully reveal their private preferences because the auction separates what they say from what they pay. Underbidding consumers risk foregoing a profitable purchase, whereas overbidding consumers risk making an unprofitable purchase.

In the last 15 years, the Vickrey auction has been widely used to elicit WTP for food quality attributes (e.g., Alfnes and Rickertsen; Buhr et al.; Fox et al; Hayes et al.; Hoffman et al.; Lusk, Feldkamp, and Schroeder; Lusk et al.; Melton et al.; Noussair, Robin, and Ruffieux; Roosen et al.; Rousu et al.; Rozan, Stenger, and Willinger; Umberger and Feuz). The appeal of the Vickrey auction for valuation work is that it is demand revealing in theory, relatively simple to explain, and has an endogenous market-clearing price. In the typical valuation application of the Vickrey auction, two or more goods are offered and the participants bid on all goods simultaneously. To avoid income or substitution effects, one of the goods is randomly drawn as binding and sold to the highest bidder. The other goods are not sold. This winning restriction makes the valuations independent of each other, and hence, makes the simultaneous auction

approach an incentive-compatible method for eliciting WTP for several competing goods from one group of participants.

Product attributes are often divided into three categories: search, experience, and credence (Nelson; Darby and Karni). Search attributes are aspects of the product that can be determined by visual inspection, e.g., price and color. Experience attributes are aspects of the product that cannot be fully determined before the product is consumed, e.g., taste, tenderness, and juiciness. Credence attributes are aspects of the product that cannot be discerned by visual inspection or consumption, but rather consist of seller claims about the product. For food products, these claims are often linked to the production process, e.g., statements regarding the country-of-origin or claims that the product is GM-free, organically grown, or produced under conditions of humane animal treatment. In most countries, laws regulate the use of the most prominent credence attributes associated with food products.

Vickrey auctions and other types of incentive-compatible experimental markets have been used to study all three types of product attributes. Examples include Hoffman et al., who investigated consumer WTP for new packaging for fresh beef (a search attribute), Umberger and Feuz, who investigated consumer WTP for beef flavor (an experience attribute), and Noussair, Robin, and Ruffieux, who investigated consumer WTP for GM versus non-GM products (a credence attribute).

Nelson defined experience goods as products whose quality cannot be fully determined before they are purchased. According to this definition, most food products can be considered as experience goods. The eating quality of a new brand or type of

food, such as GM-foods, is only fully determined after purchase and consumption of the product. Search and credence attributes are often associated with experience attributes. This is illustrated clearly in Umberger and Feuz, who investigated consumer WTP for beef flavor (an experience attribute), but categorized the beef by its intramuscular fat content (a search attribute) and country of origin (a credence attribute). Consuming a product with experience attributes provides both a consumption value and information about the quality. This information is valuable because it can affect future purchase decisions and thereby increase future utility.

Consumers who take part in an experimental auction market where new experience goods are offered might have incentives to bid higher than the expected consumption value to acquire information about the quality of the good. Shogren, List, and Hayes explored what they referred to as the "strikingly high price premia paid for new food products in lab valuation exercises" (p. 1016). They constructed an experimental design in which people bid in consecutive auctions over a two-week period for three goods that differed in terms of familiarity. Their result suggests that preference learning about unfamiliar goods explained the high bids, not the novelty of the lab experience. Their observations are consistent with the view that the bids for unfamiliar goods include an information value that reflects consumers' desire to learn more about the goods.

In this paper, we investigate how uncertainty about the quality of a new experience good affects the weakly dominant bidding strategy in Vickrey auctions. Furthermore, we investigate how elements outside the market experiment such as future

market prices and frequency of purchase affect the deviation between WTP and expected consumption value. The remainder of the paper proceeds as follows. First, we set up a consumer model with two competing brands, one familiar incumbent brand and a new brand of unknown quality. Second, we investigate the consumers' weakly dominant bidding strategy for the two brands in a Vickrey auction. Third, we illustrate the results with numerical examples. Finally, we conclude the paper.

Consumer Model

In response to empirical evidence of an order-of-entry and what he referred to as conventional wisdom in marketing, Schmalensee developed an economic model to account for the pioneering advantage for experience goods. The model's basic premise is that there is an experiential asymmetry between incumbent and new brands. The consumers have tried and, therefore, know the quality of the incumbent brands. In contrast, the consumers have no experience with the new brands, and are unsure about the quality of these brands. This experiential asymmetry creates an advantage for the incumbent brand. See e.g., Kamins, Alpert, and Elliott; Niedrich and Swain; Villas-Boas for thorough discussions of the pioneering advantages in the marketing literature.

We extend Schmalensee's consumer model to include a small scale Vickrey auction conducted before the introduction of the new brand into the market. We assume that the auction results may affect the auction participants' individual demand, but that the number of participants in the auction is so small that the results has no effect on the aggregated demand or on the producers pricing policies in later periods. This in mind, we

conduct a partial analysis of the bidding strategies in the Vickrey auction assuming the future prices are exogenously given.

Following Schmalensee, we set up a consumer model for the introduction of a new brand. Let us consider a narrowly defined product class, such that individual consumers can be sensibly modeled as using, at most, one brand in the class at any instant. It is assumed that the product is what Nelson called an "experience good", so that the only way consumers can know the quality of the good is to purchase and try it. One trial is both necessary and sufficient to determine the quality of any single brand. The purchase decisions are made using purely private information; that is, consumers do not share information about product quality with each other.[1] There are two brands of the experience good available, one incumbent brand with a well-known quality, and a new brand with unknown quality. The value of the incumbent brand is v_1. The consumers attach a probability of $\pi \in \langle 0,1 \rangle$ to the new brand being of low quality and a probability of $(1-\pi)$ to the new brand being of high quality. The value of the new brand is $v_{2L} = v_2 - a$ in the case of low quality, and $v_{2H} = v_2 + a$ in the case of high quality, so that $v_{2H} - v_{2L} = 2a > 0$. The time between purchases is assumed constant and equal to one period, so that the trial of a new brand consumes the entire normal interpurchase time. The one-period discount rate is $r \in \langle 0,1 \rangle$. All other factors remaining equal, a more frequent purchase implies a smaller value of *r*. Consumers are assumed to be risk neutral and to have infinite horizons.

Let us assume that the market prices of the two brands are p_1 and p_2, respectively. Further, we assume that $v_2 - a - p_2 < v_1 - p_1 < v_2 + a - p_2$. If the new brand is of low quality, its net consumption value is lower than that of the incumbent brand, whereas if the new brand is of high quality, its net consumption value is higher than that of the incumbent brand. These restrictions are consistent with Schmalensee, although he assumed that $v_2 - a < v_2 + a = v_1$ and used optimizing firms to find $p_2 < p_1$.

In any period, the consumer either knows or does not know the value of the new brand. If the consumer does know the value of the new brand, his or her decision problem is very simple—the consumer simply chooses the alternative with the highest net consumption value. The consumer should choose the new brand if the value of the new brand is $v_2 + a$, whereas he or she should choose the incumbent brand if the value of the new brand is $v_2 - a$. If the consumer does not know the value of the new brand, the expected net consumption value of the new brand is $\pi(v_2 - a - p_2) + (1-\pi)(v_2 + a - p_2)$. In a single-period model, the consumer should try the new brand if and only if the expected net consumption value of the new brand is higher than the net consumption value of the incumbent brand,

(1) $$\pi(v_2 - a - p_2) + (1-\pi)(v_2 + a - p_2) > v_1 - p_1 .$$

In a multi-period model, the consumers should try the new brand if and only if the expected net value of trying the new brand is higher than the net value of continuing to purchase the incumbent brand,

$$(2) \qquad \pi\left(v_2 - a - p_2 + \left(v_1 - p_1\right)/r\right) + \left(1-\pi\right)\left(v_2 + a - p_2\right)\left(1+r\right)/r > \left(v_1 - p_1\right)\left(1+r\right)/r$$

Alternatively, inequality (2) can be specified as,

$$(3) \quad \left(1-\pi\right)\left(v_2 + a - p_2 - \left(v_1 - p_1\right)\right)/r > v_1 - p_1 - \left(\pi\left(v_2 - a - p_2\right) + \left(1-\pi\right)\left(v_2 + a - p_2\right)\right)$$

where $\left(1-\pi\right)\left(v_2 + a - p_2 - \left(v_1 - p_1\right)\right)/r$ is the *expected information value* from trying the new brand. It equals the current net value of buying a high quality new brand instead of the incumbent brand from the next period on, multiplied by the probability that the new brand is a high quality brand. The consumer should try the new brand only if the expected information value from doing so is larger than the expected net consumer loss from buying the new brand instead of the incumbent brand in this period, $\left(v_1 - p_1\right) - \left(\pi\left(v_2 - a - p_2\right) + \left(1-\pi\right)\left(v_2 + a - p_2\right)\right)$.

From inequality (2), we formulate the function $\mathrm{F}\left(\pi, r, a, p_1, p_2\right)$, which is positive if and only if the consumer will try the new brand in the market. The function increases in all variables that increase the expected payoff of trying the new brand when it is introduced in the market.

(4)

$$\mathrm{F}(\pi, r, a, p_1, p_2) = \pi\left(v_2 - a - p_2 + (v_1 - p_1)/r\right) + (1-\pi)(v_2 + a - p_2)(1+r)/r - (v_1 - p_1)(1+r)/r$$

.

We differentiate F with respect to its elements to see if an increase in π, r, a, p_1, and p_2 make it more or less likely that the consumer will try the new brand in the market.

(5) $$\frac{\delta \mathrm{F}}{\delta \pi} = -2a + \left(v_1 - p_1 - (v_2 + a - p_2)\right)/r < 0$$

(6) $$\frac{\delta \mathrm{F}}{\delta r} = (1-\pi)\left(v_1 - p_1 - (v_2 + a - p_2)\right)/r^2 < 0$$

(7) $$\frac{\delta \mathrm{F}}{\delta a} = \left(1 - \pi + r(1-2\pi)\right)/r$$

(8) $$\frac{\delta \mathrm{F}}{\delta p_1} = (1 - \pi + r)/r > 0$$

(9) $$\frac{\delta \mathrm{F}}{\delta p_2} = -(1 - \pi + r)/r < 0$$

The probability of trying the new brand is decreasing in π and *r*, increasing in *a* for all products that are purchased on a regular basis, increasing in the price of the substitute (the incumbent brand), and decreasing in its own price. An increase in π will decrease the expected payoff from trying the new brand by decreasing the expected consumption

value and decreasing the expected information value. An increase in r will decrease the value of future payoffs and thereby decrease the expected information value. An increase in a will increase the expected information value, but the effect on the expected consumption value depends on the value of π. If $\pi < 0.5$, then an increase in a will have a positive effect on the expected consumption value, whereas if $\pi > 0.5$, then an increase in a will have a negative effect on the expected consumption value. The total effect of an increase in a is positive for all products that are purchased on a regular basis and not very likely to be of low quality. For example, for $r = 0.1$, the derivative of F with respect to a is positive if $\pi \leq 0.91$. The own- and cross-price effects are negative and positive, respectively, as expected.

Vickrey Auction

If the consumers' first encounter with the new brand is in a Vickrey auction before its introduction into the market, the decision problem is more complicated. The expected information value depends on what the consumers plan to do if they do not know the quality when the new brand is introduced in the market.

For simplicity, let us assume that the auction takes one period, and that participants in that period can buy only the product in the auction. In other words, there are no outside options in the auction period. The bidders' optimal strategy is to bid so that they maximize the discounted expected net consumption value of the auction and all future periods, EV, given that, in the future, consumers will try to maximize the discounted net consumption value of all future periods. For the incumbent brand with a

known quality, we find the weakly dominant bidding strategy by solving the following maximization problem with respect to $Bid1$:

$$(10) \qquad \underset{Bid1}{Max}\ EV(Bid1) = \begin{cases} S & if\ Bid1 \le p_1^A \\ v_1 - p_1^A + S & if\ Bid1 > p_1^A \end{cases}$$

where S is given by,

(11)

$$S = Max\left\{(v_1 - p_1)/r,\ \pi\left(\left(v_2 - a - p_2\right)/\left(1+r\right) + \left(v_1 - p_1\right)/\left(r\left(1+r\right)\right)\right) + \left(1-\pi\right)\left(v_2 + a - p_2\right)/r\right\}$$

If $Bid1 > p_1^A$, then the consumer buys the incumbent brand in the auction, otherwise he or she does not. Either way, the consumer gains no new information about the quality of the new brand. His or her maximization problem in the next period is unchanged.

For the new brand of unknown quality, we find the weakly dominant bidding strategy by solving the following maximization problem with respect to $Bid2$:

$$(12) \qquad \underset{Bid2}{Max}\ EV(Bid2) = \begin{cases} S & if\ Bid2 \le p_2^A \\ \pi\left(v_2 - a - p_2^A + (v_1 - p_1)/r\right) & \\ +\left(1-\pi\right)\left(v_2 + a - p_2^A + (v_2 + a - p_2)/r\right) & if\ Bid2 > p_2^A \end{cases},$$

where S is given in equation (11). If $Bid2 > p_2^A$, then the consumer buys the new brand in the auction, otherwise he or she does not. If the consumer does not buy the new brand in the auction, he or she gains no new information about the quality of the new brand. His or her maximization problem in the next period is unchanged. If he or she buys the new brand, the quality of the brand is revealed, and, in the next period, the consumer will choose the alternative with the highest quality. With a probability of π, the alternative with the highest quality will be the incumbent brand, and with a probability of $(1-\pi)$ the alternative with the highest quality will be the new brand.

In Vickrey auctions, "the optimal strategy for each bidder…will obviously be to make his bid equal…to that price at which he would be on the margin of indifference as to whether he obtains the article or not" (Vickrey, p. 20). We will use this feature of the Vickrey auction to solve the two maximization problems.

To maximize equation (10) and find the optimal bid for the incumbent brand, we assume that the bidders are indifferent about winning the auction or not when $Bid1 = p_1^A$,

(13) $$v_1 - Bid1 + S = S \Leftrightarrow Bid1 = v_1 .$$

The weakly dominant strategy is to bid the consumption value of the incumbent brand. The outcome of the auction for the incumbent brand has no effect on what will happen in the market, so S cancels out. The multi-period solution equals the single-period solution.

There is no new information to be gained from consuming the incumbent brand, and, therefore, there is no information value associated with the incumbent brand. In addition, we can see that the dominant bidding strategy for the incumbent brand is independent of π, r, a, p_1, and p_2.

To maximize equation (12) and find the optimal bid for the new brand, we assume that the bidders are indifferent about winning the auction or not when $Bid2 = p_2^A$,

$$S = \pi\left[v_2 - a - Bid2 + (v_1 - p_1)/r\right] + (1-\pi)\left[v_2 + a - Bid2 + (v_2 + a - p_2)/r\right]$$

(14)

$$\Rightarrow Bid2 = \pi\left(v_2 - a + (v_1 - p_1)/r\right) + (1-\pi)\left(v_2 + a + (v_2 + a - p_2)/r\right) - S$$

.

The weakly dominant strategy in the auction for the new brand depends on S. This means that the dominant strategy in the auction for the new brand depends on what the consumers plan to do if they do not know the quality of the new brand when it is released into the market.

First, let us assume that $S = (v_1 - p_1)/r$, so that the consumer would stay with the incumbent brand if he or she did not know the quality of the new brand. This gives the following dominant bidding strategy for the new brand,

(15) $$Bid2 = \pi\left(v_2 - a\right) + (1-\pi)\left(v_2 + a\right) + (1-\pi)\left[v_2 + a - p_2 - (v_1 - p_1)\right]/r$$

The optimal bid equals the expected consumption value plus the expected information value. In this case, the expected information value is the value of buying a high quality new brand instead of the incumbent brand, from the next period on, $\left(v_2 + a - p_2 - (v_1 - p_1)\right)/r$, multiplied by the probability that the new brand is of high quality, $(1-\pi)$.

Second, let us assume that $S = \pi\left(\left(v_2 - a - p_2\right)/(1+r) + \left(v_1 - p_1\right)/\left(r(1+r)\right)\right) + (1-\pi)\left(v_2 + a - p_2\right)/r$, so that the consumer would try the new brand in the market. This gives the following dominant bidding strategy for the new brand,

$$(16) \qquad Bid2 = \pi\left(v_2 - a\right) + (1-\pi)\left(v_2 + a\right) + \pi\left(v_1 - p_1 - \left(v_2 - a - p_2\right)\right)/(1+r)$$

The optimal bid equals the expected consumption value plus the expected information value. In this case, the expected information value is the current value of buying the incumbent brand instead of the new brand if the new brand is of low quality, in the next period, $\left(v_1 - p_1 - \left(v_2 - a - p_2\right)\right)/(1+r)$, multiplied by the probability that the new brand is of low quality, π.

It is straightforward to show that if $v_1 - p_1 = v_2 - a + p_2$, $v_1 - p_1 = v_2 + a + p_2$, $a = 0$, $r = 1$, $\pi = 0$, or $\pi = 1$, there would not be any information value in trying the new brand, and the weakly dominant bidding strategy would be equal to the expected

consumption value. In addition, it is straightforward to show that the two bidding strategies for the new brand, (15) and (16), give the same weakly dominant bidding strategy when $\mathrm{F}(\pi, r, a, p_1, p_2) = 0$, i.e., when the consumers are indifferent about testing or not testing the new brand in the market. Hence, the optimal bid for the new brand is a continuous function of the consumption values (v_1, v_2, a), the market prices (p_1, p_2), the probabilities $(\pi, 1-\pi)$, and the discounting factor *r*. Furthermore, it can be shown that the highest expected value for the new brand, v_{2H}, constitutes an upper limit and the expected consumption value, $\pi(v_2 - a) + (1-\pi)(v_2 + a)$, constitutes a lower limit for the optimal bid for the new brand. Hence, it will never be optimal to bid higher than $v_2 + a$ or lower than $\pi(v_2 - a) + (1-\pi)(v_2 + a)$.

We differentiate the optimal bid function with respect to π, r, a, p_1, and p_2 to investigate how the optimal bid for the new brand is affected by changes in the probability of the brand being low quality, the discounting factor, the valuation spread for the new brand, the market price of the incumbent brand, and the market price of the new brand, respectively. Keeping in mind our initial assumptions for π, r, a, p_1, and p_2, we obtain the following results for a change in π,

$$\text{(17)} \qquad \frac{\delta Bid2}{\delta \pi} = \begin{cases} -2a + \left(v_1 - p_1 - \left(v_2 + a - p_2\right)\right)/r < 0 & \textit{if } \mathrm{F} \le 0 \\ -2a + \left(v_1 - p_1 - \left(v_2 - a - p_2\right)\right)/(1+r) < 0 & \textit{if } \mathrm{F} > 0 \end{cases}.$$

The expected consumption value is decreasing in π, whereas the expected information value is increasing in π as long as $\mathrm{F}(\pi, r, a, p_1, p_2) > 0$. The total effect of an increase in π is a decrease in the optimal bid, independent of what the consumer plans to do if he or she does not win the auction.

Equation (18) shows the effect of a marginal increase in the discounting factor,

$$(18) \qquad \frac{\delta Bid2}{\delta r} = \begin{cases} (1-\pi)\left(v_1 - p_1 - (v_2 + a - p_2)\right)/r^2 < 0 & if\ \mathrm{F} \le 0 \\ \pi\left(v_2 - a - p_2 - (v_1 - p_1)\right)/(1+r)^2 < 0 & if\ \mathrm{F} > 0 \end{cases}.$$

Increasing the discounting factor *r* is the same as reducing the purchase frequency. This has no effect on the expected consumption value, but it decreases the information value through reducing the current value of future payoffs. An increase in *r* decreases the optimal bid.

Equation (19) shows the effect of a marginal increase in the valuation spread for the new brand,

$$(19) \qquad \frac{\delta Bid2}{\delta a} = \begin{cases} (1-\pi + r(1-2\pi))/r & if\ \mathrm{F} \le 0 \\ (1-\pi + r(1-2\pi))/(1+r) & if\ \mathrm{F} > 0 \end{cases}.$$

For products bought very seldom and with very large probabilities of being low quality, the optimal bid decreases as *a* increases. For other products, the optimal bid increases when *a* increases. For example, for $r = 0.1$, the derivative of $Bid2$ with respect to *a* is

positive if $\pi \leq 0.91$. The effect of change in a is strongest when the consumer does not plan to try the new brand in the market.

Equation (20) shows the effect of a marginal increase in the market price of the incumbent brand,

$$(20) \qquad \frac{\delta Bid2}{\delta p_1} = \begin{cases} (1-\pi)/r > 0 & if\ \mathrm{F} \leq 0 \\ -\pi/(1+r) < 0 & if\ \mathrm{F} > 0 \end{cases}.$$

The market price of the incumbent brand does not affect the expected consumption value of the new brand, and the total effect of the change in p_1 is a result of a change in the expected information value. If the consumer does not plan to try the new brand in the market, the expected information value and the optimal bid for the new brand increase as the market price of the incumbent brand increases. However, if the consumer does plan to try the new brand in the market, the expected information value and the optimal bid for the new brand decrease as the market price of the incumbent brand increases. The effect of p_1 on the expected information value occurs through a change in the net consumption value of the incumbent brand, $v_1 - p_1$. A marginal increase in v_1 would have had the opposite effect of the marginal increase in p_1 discussed here.

Equation (21) shows the effect of a marginal increase in the market price of the new brand,

$$(21) \qquad \frac{\delta Bid2}{\delta p_2} = \begin{cases} -(1-\pi)/r < 0 & if\ \mathrm{F} \le 0 \\ \pi/(1+r) > 0 & if\ \mathrm{F} > 0 \end{cases}.$$

The expected future market price of the new brand does not affect the expected consumption value of the new brand, and the effect of the change in p_2 is a change in the expected information value. If the consumer does not plan to try the new brand in the market, the expected information value and the optimal bid for the new brand decrease as the market price of the new brand increases. However, if the consumer does plan to try the new brand in the market, the expected information value and the optimal bid for the new brand increase as the market price of the new brand increases.

Numerical examples

To illustrate how the optimal bid for the new brand changes with π, r, a, p_1, and p_2, we present four figures. In all four figures, π varies from 0 to 1, and one of the other variables takes several values. The basic model included in all four figures is $v_1 = 1.0$, $v_2 = 0.8$, $a = 0.2$, $p_1 = 0.6$, $p_2 = 0.4$, $r = 0.1$, and $a = 0.2$.

From figure 1 (and figures 2, 3, and 4), we can see that an increase in π decreases the weakly dominant bidding strategy. However, the expected information value increases when π increases as long as π is not so larger that consumers will not try the product in the market. This is consistent with equation (17).

Figure 1 illustrates how an increase in *r* from 0.1 to 0.2 and to 0.3 affects the optimal bid. We can see that an increase in the discounting factor *r* decreases the optimal

bid. Increasing r has no effect on the expected consumption value, but it decreases the information value by reducing the current value of future payoffs. This is consistent with equation (18).

Figure 2 illustrates how a change in a from 0.2 to 0.3 affects the optimal bid. When a equals 0.2, then $v_{2L} = 0.6$ and $v_{2H} = 1.0$, and when a equals 0.3, then $v_{2L} = 0.5$ and $v_{2H} = 1.1$. We can see that an increase in a increases the slope of the expected consumption value curve. Furthermore, the increase in a increases the expected information value from trying the new brand. In other words, when a increases, the difference between the optimal bid and the expected consumption value increases. These results are consistent with equation (19).

Figure 3 illustrates how a change in p_1 from 0.6 to 0.5 and to 0.7 affects the optimal bid. We can see that an increase in p_1 increases the optimal bid if the consumer does not plan to try the new brand in the market. However, if the consumer does plan to try the new brand in the market, the optimal bid decreases when the value of the incumbent brand increases. These results are consistent with equation (20).

Figure 4 illustrates how a change in p_2 from 0.4 to 0.3 and to 0.5 affects the optimal bid. We can see that an increase in p_2 decreases the optimal bid if the consumer does not plan to try the new brand in the market. However, if the consumer does plan to try the new brand in the market, the optimal bid decreases when the value of the incumbent brand increases. If p_2 had been increased to 0.6, there would have been no

expected information value and the optimal bid curve would have been equal to the expected consumption value curve. These results are consistent with equation (21).

Conclusion

In Vickrey auctions for a new experience good, it is optimal to bid higher than the expected consumption value to obtain information about the quality of the good. The degree of value uncertainty, the purchasing frequency, and expected future market prices all affect the value of the quality information and the thereby the consumers' WTP for the new product. The weakly dominant strategy discussed in this paper is consistent with Vickrey's optimal bidding results, however a part of the WTP is based on a potential surplus that be gained in future periods. It is also important to notice that the information value is equally important in all incentive-compatible methods for eliciting WTP for products with unknown quality.

The predictions of the model is consistent with the experimental results in Shogren, List, and Hayes, who explored what they referred to as the strikingly high price premia paid for new food products in lab valuation exercises. They found that auction participants' WTP for familiar goods were unaffected by trying the good, while the WTP for unfamiliar goods were reduced after the consumers had tried them. The reduction in WTP after the consumers had tried the unfamiliar good can be interpreted as a reduction in the information value from further testing of the good.

Researchers cannot affect the valuation of the incumbent brands, the expected future market prices, or the purchasing frequency, but they can significantly reduce the uncertainty about the quality of the new brand. If the consumers know the quality with certainty, the weakly dominant bidding strategy is to bid the expected consumption value of the new good. Therefore, if the quality uncertainty is not an important part of an experimental market study, it might be wise to allow the consumers to test the product before the market experiment. This will alleviate the uncertainty about the quality and thereby reduce the importance of elements outside of the experiment, such as the expected future market prices, or the purchasing frequency.

Footnotes

[1] Consumers might not share information because it is too costly to search for other consumers of the product or because the reports of other consumers are unreliable. That is, the "quality" might depend upon unobservable private tastes.

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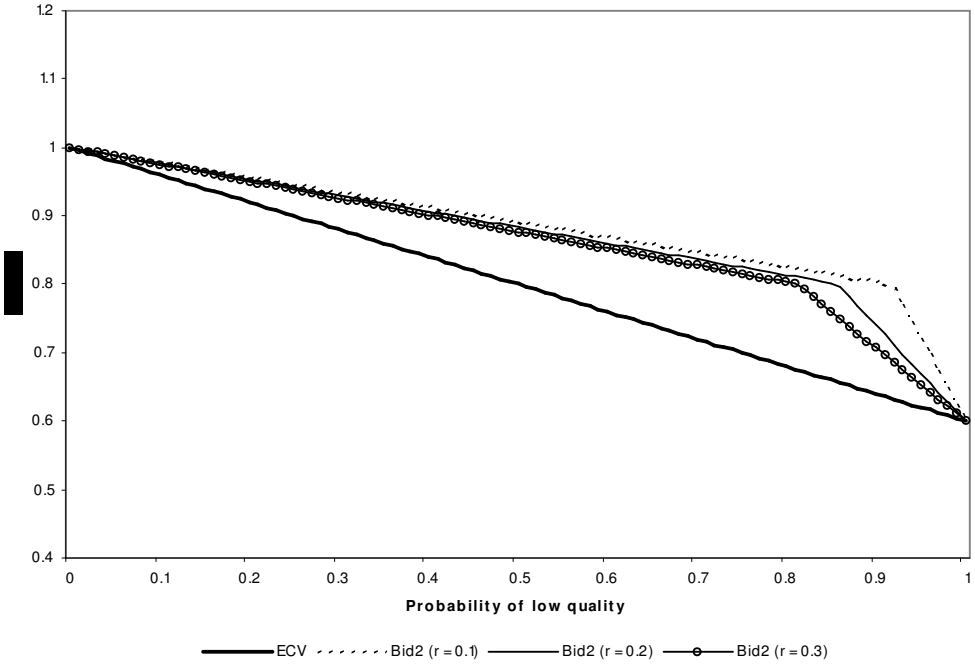

Figure 1. Effect of changes in *r* on the optimal bid for a new experience good

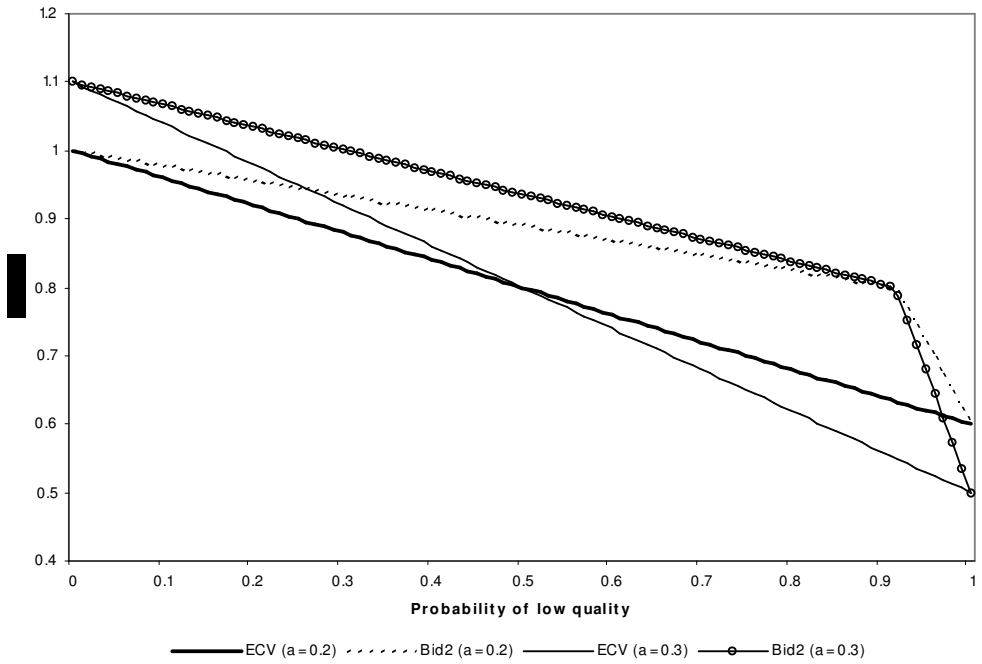

Figure 2. Effect of a change in *a* on the optimal bid for a new experience good

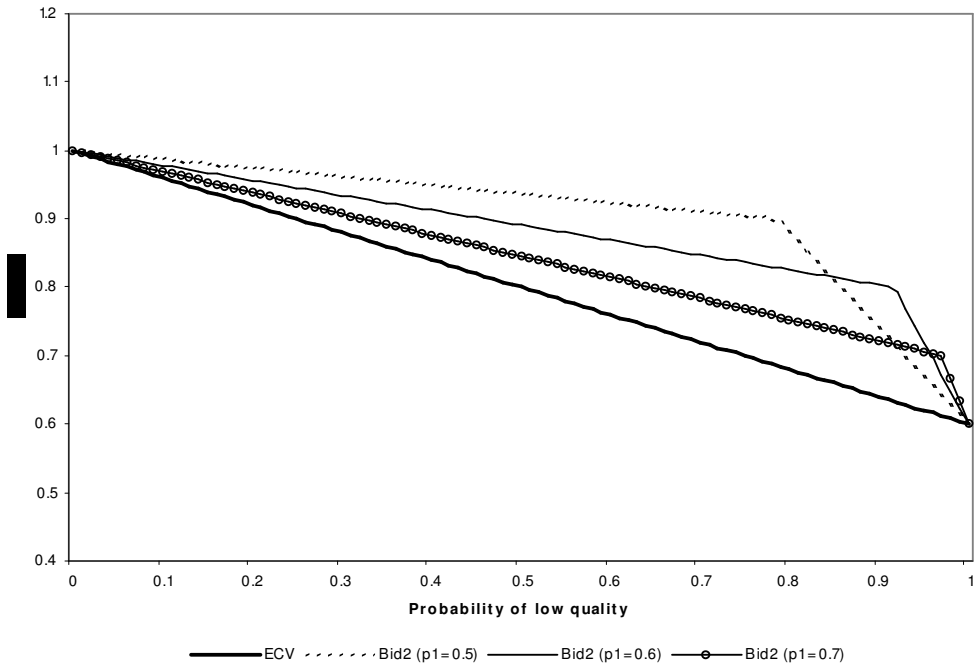

Figure 3. Effect of changes in p_1 on the optimal bid for a new experience good

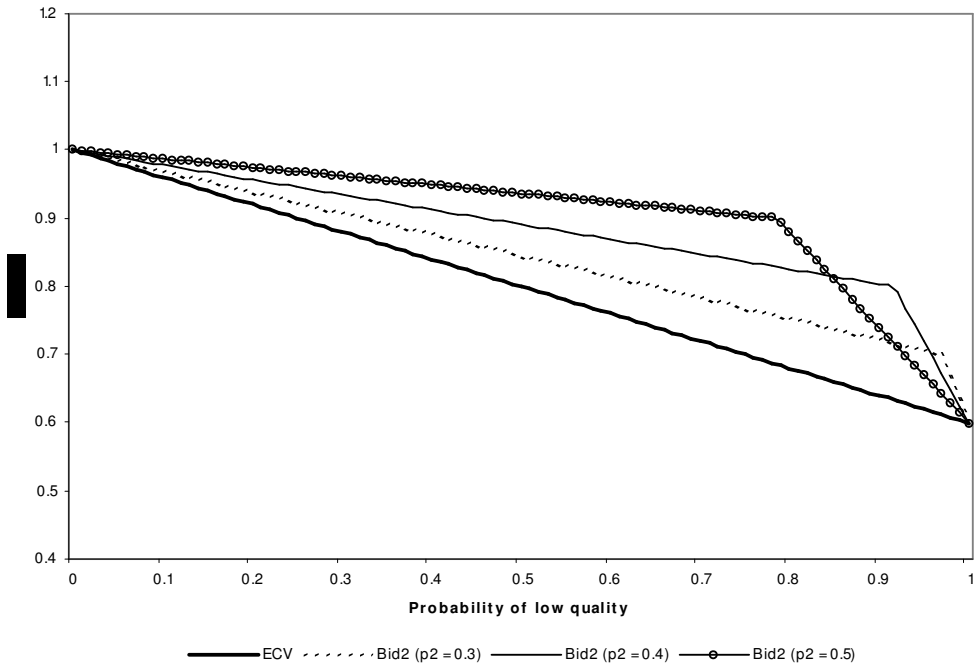

Figure 4. Effect of changes in p_2 on the optimal bid for a new experience good