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Valuing traceability of imported beef in Korea: an experimental auction approach*

Ji Yong Lee, Doo Bong Han, Rodolfo M. Nayga Jr and Song Soo Lim†

The major objective of this study is to estimate Korean food shoppers' willingness to pay (WTP) for imported beef with traceability. We use an experimental elicitation method, the random *n*th price auction, to identify consumers' valuation for traceable imported beef. We also analyse the effect of different types of information on these valuations. Results indicate that consumers are generally willing to pay a 39 per cent premium for the traceable imported beef over similar beef without traceability. Results also suggest that in contrast to the insignificant effect of positive information, negative and two-sided information about traceability significantly reduces WTP.

Key words: beef, experimental auction, information effect, traceability, willingness to pay.

1. Introduction

Continuous food safety scares have intensified public awareness and concern all over the world. Since the 1980s, cases of bovine spongiform encephalopathy (BSE) and avian influenza have appeared in many countries, resulting sometimes in death. Moreover, swine fever and foot-and-mouth disease (FMD) have led to the slaughter of livestock and raised concern for public health. These food safety crises have escalated consumers' demand for high-quality food and increased food safety standards. Food safety problems have also caused a loss of consumer confidence in food marketing chains. After the outbreak of BSE or 'mad cow' disease in the United States, food safety concerns on imported beef intensified in Korea and resulted in consumers desiring more information about the distribution and safety of imported beef. Consumers demanded that the Korean government improves food safety and provides them the tools that would allow them to choose safer food.

Korea opened its beef market and started to import beef from the United States, Australia, Canada and New Zealand in 2001. After the opening of the

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† Ji Yong Lee is Researcher at Korea Rural Economic Institute, Seoul, Korea. Doo Bong Han (email: han@korea.ac.kr) is Professor at the Department of Food and Resource Economics, Korea University, Seoul, Korea. Rodolfo M. Nayga, Jr. is Professor at the Department of Agricultural Economics and Agribusiness, University of Arkansas, Fayetteville, AR, USA. Song Soo Lim is Associate Professor at the Department of Food and Resource Economics, Korea University, Seoul, Korea.

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Korean beef market, the percentage of total beef consumption that was imported reached over 50 per cent. However, the heavier dependence on imported beef increased the public's concerns about getting beef-related diseases in the country. For example, beef from the United States, which accounted for 60 per cent of all imported beef, was temporarily stopped in 2004 because of the 'mad cow' disease. The Korean government did not reopen its beef market to the United States until 2007.

The increasing dependency on imported beef from the United States has made Korean consumers more concerned about the safety of imported beef. Because of the significantly higher price of Korean beef compared to imported beef, the number of cases of retailers disguising imported beef as Korean beef has also increased. In fact, the number of cases of imported beef disguised as Korean beef has increased by 40 per cent from 2008 to 2009 according to the National Agricultural Products Quality Management Service (NAQS). Consequently, the Korean government and the beef industry are contemplating formulation of a new food policy system (i.e. traceability of imported beef) to assure consumers about the safety and reliability of imported beef.

The new traceability system will trace the history, process and marketing location of the imported beef coming to Korea by recorded information. The purpose of the new traceability system for imported beef is to prevent safety problems related to the importation of beef and to minimise consumers' anxiety about food safety problems. Another purpose is to provide information on the imported beef market, which will both foster transparency in distribution channels of imported beef and consumer ability to select safer beef.

To partly determine the market feasibility of the new traceability system, it is necessary to know how consumers would value the new traceability system for imported beef.

It will also be beneficial to policymakers to recognise public opinion and response to differing types of information on the new traceability system so as to efficiently implement a new food policy. However, no other known study has examined this issue. We attempt to fill this void by using a non-hypothetical experimental auction approach to elicit consumers' willingness to pay (WTP) for imported beef with the new traceability system. We specifically focus on US beef because: (i) the reopening of the Korean market to US beef after the BSE outbreak caused more serious food safety concerns and problems in Korea and (ii) the incidence of US beef being disguised as Korean beef or even as other imported beef (i.e. Australia and New Zealand beef) has recently increased. We also specifically focussed our sample on married females because they are by far the primary shoppers of imported beef in Korea. Because market information can influence consumers' purchasing behaviours, especially when it is related to food safety, we also analyse the effect of different types of information (i.e. positive, negative and two sided) about the new traceability system on consumers' WTP for traceable beef.

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2. Experimental auction

An experimental auction[1] is a mechanism for eliciting consumers' WTP for new goods and services using non-hypothetical and incentive compatible mechanisms. The use of actual products and cash in the experiments allows the participants to focus on a valuation task (Fox *et al.* 1997; Shogren *et al.* 2001; Lusk *et al.* 2004a,b; Noussair *et al.* 2004). Hypothetical bias is also minimised because of the incentive compatibility properties of these auctions. That is, these auction mechanisms provide subjects an incentive to reveal their true valuation of the good being auctioned. In experimental auctions, each subject submits his or her bid to obtain goods. Because auction participants' bids represent their valuation of the goods, subjects' values of the goods are obtained directly.

In this study, we use the random *n*th price auction (see Shogren *et al.* 2001). This experimental auction is theoretically an incentive compatible elicitation method and is widely used. Because this method relies on an endogenous market clearing price, results from the random *n*th price auction tend to be more accurate than other mechanisms such as the Becker–DeGroot–Marschak (BDM) mechanism (Lusk and Rousu 2006). This method can also be viewed as a combination of the Vickrey second-price sealed-bid auction (Vickrey 1961) and the BDM method (Becker *et al.* 1964). The random *n*th price auction is particularly designed to engage off-margin bidders. The endogenous price ensures that the market price is related to participants' private values (Shogren *et al.* 2001). Hence, the weakly dominant strategy of the random *n*th price auction is for participants to reveal their true values for the goods. Subjects do not know the winning position until the bids are all submitted; therefore, this method tends to remove the competitive biases that could exist in other experimental auction mechanisms, such as the second-price sealed-bid auction (Shogren *et al.* 2001). A few studies compared the random *n*th price auction with other methods (e.g. List 2003; Lusk *et al.* 2004a; Parkhurst *et al.* 2004). They found that participants' valuation from the random *n*th price auction is unbiased and accurate. In addition, the random *n*th price auction displayed the highest speed of convergence between participants' WTP for and willingness to accept a genuine public good compared to other methods.

3. Information effects

A new traceability system for imported beef would mean that all information will be opened to the public. However, when the new food policy is

[1] It is possible that experimental auctions can sometimes cause an upward bias in WTP due to competitive and bid affiliation effects among participants even if these mechanisms are incentive compatible. However, the auction mechanism we use in this study, the random *n*th price auction, minimizes these potential biases based on the Shogren *et al.* (2001) study.

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implemented, asymmetry between positive and negative information, which can influence consumer perceptions, is also generated. For example, positive information would facilitate the implementation of the new policy, but negative information would impede it. Furthermore, asymmetrical information could result in market failure if information signals to consumers are absent. Therefore, it is crucial to assess the public reaction to different types of information about the traceability system before implementing a new food policy.

We investigated the effects of different information on new traceability requirement for imported beef. Positive information (food safety improvement), negative information (marketing cost increase) and both positive and negative information on the new traceability system were provided to auction participants to assess the effect of information on consumers' WTP for imported beef with traceability. Several previous studies have examined information effects (Fox *et al*. 2002; Tegene *et al*. 2003; Lusk *et al*. 2004a; Rousu *et al*. 2004; Corrigan *et al*. 2009). Fox *et al*. (2002) used an experimental auction to examine consumers' WTP for irradiated pork. They investigated how positive and negative information affected consumers' WTP for irradiated pork. Their results showed that positive information provided favourable evaluations of irradiated pork, and negative information resulted in lower bids for irradiated pork. In addition, the effect of negative information outweighed the effects of positive information. Tegene *et al*. (2003) examined consumers' WTP for biotech food under different information conditions on biotechnology. They found that participants influenced by negative information discounted genetically modified (GM) labelled food and put more weight on negative information than positive information. Lusk *et al*. (2004a) investigated the effects of information on environmental benefits, health benefits and world benefits of biotechnology. Results indicated that different information on those benefits decreased the amount of money auction participants demanded to GM food. In addition, information effects varied depending upon the type of benefits of biotechnology and locations where their study was conducted. Rousu *et al*. (2004) identified consumers' demand for GM food products according to different information on biotechnology. According to the results, negative GM product information significantly reduced consumers' demand for GM products. They also showed that independent third-party information on biotechnology dissipated the public good value, i.e. the mutual benefits from sharing one or more of the following: production costs, the members' characteristics or a good characterised by excludable benefits (Sandler and Tschirhart 1980), of negative GM information. Corrigan *et al*. (2009) estimated consumers' WTP for GM golden rice using the open-ended choice experiment (OECE) and experimental auction. They also found that participants placed more weight on negative information than positive information.

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4. Experimental design

We conducted our experiments in Seoul and Gyeonggi province, Korea, in February 2010. A total of 100 consumers participated in our auction.[2] All participants were initially contacted by phone and made an appointment for the experiment. Auction participants were randomly recruited in Seoul and Gyeonggi province[3] in Korea. In this study, we deliberately chose only female married participants because they are by far the predominant shoppers of imported beef (Jeong *et al.* 2002).

Our auction experiments included four treatments, corresponding to different information provided to subjects: no information (only definition of traceability provided), positive information (food safety improvement), negative information (a marketing cost increase) and two sided (both positive and negative) (see Appendix). Each treatment was conducted using two sessions or groups, with each group consisting of 10 to 13 subjects.

We performed the auctions using five rounds. A monitor instructed participants that all rounds had an equal chance of being chosen as the binding round in the auction. Participants were also informed that they could bid zero in any round if they thought the values of the US beef without traceability and the US beef with traceability were equivalent. All participants were paid about AUD[4] \$10 for taking part in the experiment. No participant was allowed to participate in more than one experiment.

In our experiments, we auctioned a 200 g pack of US beef with traceability. Before the auction, we provided our subjects with a 200 g pack of US beef without traceability as part of their gift for participation (in addition to the participation fee) and also provided a reference price of about AUD \$3 for a 200 g pack of US beef without traceability.

The random *n*th price auction was conducted as follows:

Step 1: A seat was assigned to each participant such that it would not be easy for one participant to communicate with the other participants in the room. An ID number was given to each participant by the monitor.
Step 2: Participants were informed verbally and were also provided with written instructions to bid their WTPs to exchange their baseline beef (US beef

[2] According to surveys by some economists, beef price is the factor of greatest concern when consumers buy imported beef, and consumers also prefer Korean beef to imported beef if these prices are similar (Jeong *et al.*2002). However, some participants in the auction submitted abnormally high bid prices to buy imported US beef compared to Korean beef price, so we excluded these participants in the analysis. To identify outliers, we used a box-whisker plot. The results showed that excluded participants are statistically outliers. We also estimated mean WTPs and model with the original data. The estimated results with the original data were similar to presented results in this study. However, as expected, mean WTPs with the outliers are higher than the results presented and the ordering of mean WTPs with information was different from the results in the study. Mean bid price made with no information was higher than mean bid price made with positive information. In addition, the standard deviation of mean WTPs from original data was higher than the results presented due to outliers (see Appendix).

[3] Over 50 percent of national population in Korea lives in Seoul and Gyeonggi province.

[4] AUD \$ means Australian dollar.

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without traceability) for the alternative beef (US beef with traceability). The products were identical except for the traceability attribute.
Step 3: To further educate the participants about the auction mechanism, we provided subjects with a practice random *n*th price auction. We provided subjects with a baseline genetically modified chocolate bar and then asked them their WTPs to exchange the baseline chocolate bar with alternative chocolate bar (non-genetically modified). The trial was designed to provide participants extensive experience with how the actual auction would operate and to demonstrate that their best bidding strategy should be to provide their true valuation for the good being auctioned. We proceeded to the next step only after we were absolutely sure that all subjects understood how the auction mechanism works and that their best strategy is to provide their true valuation for the good being auctioned.
Step 4: After the practice auctions with the chocolate bars, we conducted the random *n*th price auction for US beef. At the start of each round, each participant submitted a sealed bid representing her WTP to exchange the baseline beef with the alternative beef.
Step 5: The monitor collected the bids and then randomly drew the *n*th bid that would represent the market price for the round. After posting the *n*th bid, all bids above this price level were identified. The winners of the round were the subjects whose bids exceeded the *n*th bid. The ID numbers of the winners and their corresponding bids were then noted and announced after each round.
Step 6: Each session was conducted with five rounds of auction. After the conclusion of the five rounds, a binding round was randomly chosen and the winners in that round had to pay the market price determined in that round (*n*th bid) to exchange their baseline beef product with the alternative beef product.

5. Experimental results

As previously noted, we excluded a few subjects from the analysis because their bids were considered outliers. Consequently, 90 participants were included in the analysis excluding these outliers: no information (20 subjects), positive information (24 subjects), negative information (22 subjects) and two sided (24 subjects). Summary statistics of the variables used in the analysis are shown in Table 1. The average age of the subjects was 44.3 years; 57 per cent of participants had graduated from high school, and 33 per cent had graduated from university. In addition, participants indicated that they are concerned first with food safety when buying imported beef, followed by quality concerns. On average, the household size of participants was 3.6 persons. The monthly average household income before tax was from about AUD $4000 to $5000. Participants indicated that they buy imported beef about once per month, and most participants thought that traceability of

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Table 1 Participants' socio-economic characteristics

Variables	Categories	Mean	SD
Age		44.3	9.4
Household size		3.6	1.1
Buy*		1.2	1.3
Income†	$1000 to 2000	6.8%	
	$2000 to 3000	11.4%	
	$3000 to 4000	32.9%	
	$4000 to 5000	19.3%	
	$5000 to 6000	11.4%	
	$6000 to 7000	4.5%	
	$7000 to 8000	4.5%	
	Higher than $8000	9.1%	
Awareness‡	Not informed at all	1.1%	
	Not very informed	21.6%	
	Somewhat informed	46.6%	
	Well informed	22.7%	
	Extremely well informed	6.8%	
Need§	Somewhat needed	4.5%	
	Much needed	34.1%	
	Absolutely necessary	60.2%	
Trust¶	Not much trust	2.3%	
	Some trust	35.2%	
	Much trust	47.7%	
	Extreme trust	13.6%	
Education	Elementary school	1.8%	
	Middle school	5.8%	
	High school	57%	
	University	33%	
	Postgraduate	2.2%	
Concern	Price	13%	
	Quality	17%	
	Safety	60%	

*Frequency of buying imported beef per month.
†The household income level was reported in eight $1000 intervals.
‡The level of awareness about traceability of imported beef.
§Traceability of imported beef is needed for food safety.
¶The level of trust of information on traceability of imported beef.

imported beef was needed for food safety. Based on a five-point likert scale, the level of awareness and trust on traceability system for imported beef are 3.2 and 3.6, respectively.

Average bids of subjects in each round are shown in Table 2. Consumers' WTPs for imported beef with traceability range from about AUD $1 in round 1 to $1.3 in round 4. Hence, consumers on average are willing to pay a 34 per cent to 44 per cent premium for the traceable imported beef. These figures for average premium imply that consumers would value a traceability requirement or system for imported beef because of concerns about food safety. The BSE or 'mad cow' disease problem has been an especially sensitive issue in Korea, and consumers' food safety standards have risen because of this problem (Jeong *et al.* 2005; Lee *et al.* 2006).

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Table 2 Mean bids by the round

	Round				
	1	2	3	4	5
Mean	1.00	1.16	1.25	1.31	1.30
Median	0.98	0.98	1.22	1.46	1.46
SD	0.64	0.62	0.62	0.61	0.60

Unit: AUD.

As previously mentioned, we conducted the experiments using multiple rounds to allow participants to incorporate market information into their valuations (Lusk *et al*. 2004a,b). Corrigan and Rousu (2006) argued that the posting of bid prices biases participants' behaviours in later rounds. On the other hand, Fox *et al*. (1997) and List and Shogren (1999) argued that posting of bid prices allows for a learning effect, thereby providing subjects an additional opportunity to reveal their true values. As can be observed in Table 2, the mean bid price in our round 5 is lower than in round 4. This result implies that consumers displayed their maximum WTP in round 4, not in round 5. The advantage of the random *n*th price auction over the second-price sealed-bid auction is the randomness of the determination of the market price and number of winners in each round (Shogren *et al*. 2001). This randomness engages bidders and reduces the likelihood of bid affiliation bias in participants. To identify whether the bids stabilise over the five rounds, we divided the mean bid prices by the standard deviation in each round. Table 3 shows that the bids tend to stabilise in rounds 4 and 5.

As previously mentioned, we conducted our experiments using four information treatments. Hence, recruited subjects were randomly assigned to these treatments: (1) no information (provided definition of traceability only), (2) positive information only, (3) negative information only and (4) two-sided information. The information provided in each treatment is exhibited in the Appendix. In the two-sided information treatment (treatment 4), the order of information presentation was randomly determined for each subject to avoid order effects.

Table 4 shows the mean bids across the four information treatments. Based on average price of imported US beef without traceability, results indicate that consumers are willing to pay a 39 per cent premium for the traceable US beef over similar beef without traceability. Results also suggest that

Table 3 Stabilisation index for bid price (Mean bid price/SD)

	Round				
	1	2	3	4	5
Mean bid/SD	1.56	1.88	2.03	2.14	2.15

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Table 4 Mean bids across the information treatments

	Information			
	No	Positive	Negative	Two sided
Mean	1.47	1.48	0.75	1.07
Median	1.46	1.47	0.49	0.98
SD	0.58	0.39	0.72	0.47

Unit: AUD.

WTP for the new traceability system is significantly influenced by the type of information provided to subjects. Positive information on the traceability system resulted in higher WTP values. However, the WTP difference between positive information and no information treatments is not statistically significant. Specifically, the WTPs of subjects provided with positive information are only 0.3 per cent higher than the WTP of subjects provided with no information. On the other hand, the WTP values of subjects provided with negative information are 49 per cent lower than those provided with no information. Results from the two-sided treatment suggest that those provided with both positive and negative information gave WTP values that were between the values in the positive and negative information treatments.

We conducted a simple mean equality *t*-test[5] on the WTPs from the different treatments. *T*-test results appear in Table 5. The mean equality *t*-test on the WTPs implies that estimated mean WTPs are statistically different between the no information and negative information treatments. The mean WTPs also differ between the no information and two-sided information treatments. However, WTPs are not significantly different between the no information and positive information treatments. Consistent with the previously discussed studies that have evaluated information effects, our results suggest that consumers respond more sensitively to negative information than positive information. This finding means that policymakers should try to educate consumers about the new traceability system for imported beef to offset the negative information effect. Nayga *et al.* (2006) also argued that consumer education is a key to changing consumers' perceptions.

We also developed a regression model to determine the effect of different factors on WTP. Because some participants submitted zero bids for US beef with traceability and because of the panel nature of our data, we used a random effects Tobit model to run the regression. Independent variables are participants' demographic characteristics, information treatments and round effects. Preliminary data analysis identified relatively low correlations ranging from 0.02 to 0.25 among the explanatory variables, implying no significant collinearity problems in our model.

[5] To test whether the bids are normally distributed, we used the Jarque-Bera normality test. The test statistic was 4.97 and its probability was 0.08; therefore, we rejected the null hypothesis of normal distribution at the 10 per cent significance level but not at the 5 per cent level.

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Table 5 *T*-test for equality of WTP means across the information treatments

	Mean WTP differences	*t*-value
No and positive information	0.005	−0.06
No and negative information	0.73***	7.06
No and two-sided information	0.40***	4.83

***Denote significance at 1% level.

Table 6 exhibits the parameter estimates of our WTP model. The positive sign for age indicates that older subjects are willing to pay more for imported beef with traceability than younger subjects. This result implies that older people are more concerned about safety of imported beef and desire more information about the imported beef market than younger people. Participants with high knowledge about traceability systems bid higher values perhaps because they realise the benefits of having a new traceability system. If BSE or 'mad cow' disease occurs in beef-exporting countries, consumers who buy more imported beef will be more exposed to it. Therefore, the positive sign for frequency in buying imported beef shows that consumers who buy more imported beef want to obtain more information on the imported beef market. Income also bears a positive sign, which suggests that WTP is positively related to income.

With regard to the information effects, results from the random effects Tobit model are consistent with previous unconditional test results discussed earlier. Specifically, negative and two-sided information negatively influence WTPs while positive information does not significantly influence WTPs.

Table 6 Random effects Tobit regression results

Variables	Coefficient	SE
Intercept	1.88***	0.004
Age	0.01**	0.004
Awareness	0.07*	0.037
Buy	0.06***	0.019
Education	−0.11*	0.060
HHsize	0.01	0.029
Income	0.05**	0.016
Trust	0.03	0.045
Positive	0.06	0.082
Negative	−0.70***	0.091
Two sided	−0.46***	0.089
Round2	0.16*	0.089
Round3	0.26***	0.089
Round4	0.30***	0.089
Round5	0.29***	0.089
	Log likelihood −2648.34	

*,** and *** denote significance at 10%, 5% and 1% levels, respectively.

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Specifically, relative to the baseline no information group, those in the positive information treatment are willing to pay about AUD $0.06 more, but this is not statistically significant. Subjects in the negative information treatment are willing to pay about AUD $0.70 less, and those in the two-sided information treatment are willing to pay about AUD $0.46 less than those in the baseline no information treatment, ceteris paribus.

6. Conclusions

Imported beef represents a significant percentage of total beef consumption in Korea. Korean consumers' demand for more transparency and food safety of imported beef has been heightened by past safety-related incidents, such as the mad cow disease. Consequently, the Korean government is contemplating the implementation of a traceability system for imported beef. However, the feasibility of this proposed new traceability system would partly depend on consumers' WTP for traceable imported beef. No other study has evaluated this issue in Korea. To fill this void, we conducted non-hypothetical economic experiments using random *n*th price auctions to elicit consumers' willingness to pay for a new traceability system for imported beef in Korea. We also analysed the effect of different types of information (i.e. positive, negative and two sided) about the traceability system on WTP. Our results generally suggested that subjects were willing to pay a significant premium for imported beef with traceability. Considering the average price of imported beef in Korea, our subjects were willing to pay a 50 per cent premium for imported beef with traceability when they were provided with the positive information only on the new traceability system. But even for participants who were given only negative information about the increase in marketing costs of a new traceability system, WTP values reflected a 26 per cent premium for imported beef with traceability. Those provided both positive and negative information would pay a 37 per cent premium for imported beef with traceability.

Information effects were quite important, in that negative information, whether presented alone or with positive information, tended to significantly reduce WTP. Interestingly, positive information did not significantly increase WTP compared to the baseline no information. Specifically, compared to WTP of consumers in the baseline no information treatment, WTP for consumers given only positive information was only 0.3 per cent higher, while WTP for consumers given only negative information was about 49 per cent lower.

Our results generally suggest that consumers hold relatively positive attitudes toward the new traceability system and that they value its implementation regardless of the type of information provided to them. However, a caveat of this finding worth mentioning is that we only examined valuation of married women because they are by far the predominant shoppers of imported beef. While there is no reason to believe that results would differ,

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future research should replicate our study for other population groups in Korea to test the robustness of our findings.

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Appendices

Appendix 1 Information treatments

Treatment 1. No information (definition of traceability only)
The traceability system for imported US beef will trace the history, process and marketing location of imported beef coming to Korea by means of recorded information

Treatment 2. Positive information (food safety improvement)
The traceability system for imported US beef will trace the history, process and marketing location of imported beef coming to Korea by means of recorded information
The new traceability system for imported US beef provides a set of information on quarantine, processes and locations of imported beef. The Korean government introduced the new traceability system for imported US beef to lessen consumers' food safety concerns. This system prevents disguising imported US beef as domestic beef and disseminates all marketing information to the public. Therefore, it establishes transparency in the beef market. This system also enhances public health by preventing harmful imported beef. For example, if beef-related diseases occur in the United States, the traceability system for imported US beef will automatically block flows of harmful imported beef in all marketing channels

Treatment 3. Negative information (a marketing cost increase)
The traceability system for imported US beef will trace the history, process and marketing location of imported beef coming to Korea by means of recorded information
Implementing the new traceability system for imported US beef entails cost to construct infrastructure in the distribution phase and a processing plants. Labour must be recruited and machines must be installed to check the imported US beef. These costs could lead to price increases in imported beef because the new traceability system for imported US beef is expected to increase distribution costs by approximately 10 per cent

Treatment 4. Positive and negative information
Both the positive and negative information were provided to subjects. The order of presentation of the positive and negative information was randomly determined for each subject in this treatment

Appendix 2 Mean bids by round from original data that include outliers

	Round				
	1	2	3	4	5
Mean	1.24	1.39	1.46	1.53	1.53
SD	1.15	0.83	0.81	0.82	0.92

Unit: AUD.

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Appendix 3 Mean bids across the information treatments from original data that include outliers

	Information			
	No	Positive	Negative	Two sided
Mean	2.17	1.55	0.96	1.12
SD	1.11	0.40	0.93	0.51

Unit: AUD.

Appendix 4 Random effects Tobit regression results from original data that include outliers

Variables	Coefficient	SE
Intercept	2.373***	0.478
Age	−0.003	0.005
Awareness	0.003	0.047
Buy	0.078***	0.023
Education	−0.157**	0.060
HHsize	−0.075**	0.029
Income	0.036*	0.022
Trust	0.161***	0.061
Positive	−0.672***	0.108
Negative	−1.222***	0.114
Two sided	−1.056***	0.114
Round2	0.16	0.118
Round3	0.225*	0.118
Round4	0.299**	0.118
Round5	0.297**	0.118
	Log likelihood −3417.86	

*, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

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