Consumer preferences for sustainably produced ultra-high-temperature milk in China

Saiwei Li,1,2 Rigoberto A. Lopez,3 Chen Zhu,1,2 and Yumei Liu1,2*

1Beijing Food Safety Policy and Strategy Research Base, China Agricultural University, No. 17 Tsinghua East Road, Haidian District, 100083 Beijing, P. R. China
2College of Economics and Management, China Agricultural University, 108 Mailbox, No. 17 Tsinghua East Road, Haidian District, 100083 Beijing, P. R. China
3Department of Agricultural and Resource Economics, University of Connecticut, Storrs 06269

ABSTRACT

Contrary to ongoing declines in per capita milk consumption in the United States and Europe, per capita milk consumption in China is experiencing dramatic increases, making China one of the most dynamic global dairy markets. Meeting the rapid growth in milk demand presents environmental challenges under current dairy farm production in China. This article measures Chinese consumer valuation of environmentally sustainable milk and of correlated attributes such as food safety and geographic origin. The authors used a discrete choice experiment to collect survey data from a stratified sample of respondents in 5 cities. Applying a mixed logit demand model to the data, they estimated the probability of choosing sustainably produced UHT pasteurized milk over conventional milk, as well as consumers’ willingness to pay for the sustainably produced milk. Empirical results confirm that, overall, consumers value sustainably produced milk as they are willing to pay a premium of $2.01/L, well above the cost of conventional milk. Consumer segments more likely to purchase sustainably produced milk include the young, males, and childless households, as well as those already concerned about the environment and food safety. In addition, this article also finds that consumers exhibit a strong degree of home bias in that they prefer domestic brands with domestically sourced raw milk. Valuable new knowledge is provided for policy makers, producers, and marketers interested in designing marketing strategies, and for other researchers interested in general food sustainability issues.

Key words: sustainability, dairy, environment, demand, China

INTRODUCTION

China is the most dynamic segment of the global dairy market (Gooch et al., 2017), supported by rapid income growth, urbanization, and shifts in consumption habits (Wang et al., 2015). Contrary to ongoing declines in per capita milk consumption in the United States and Europe, per capita milk consumption in China is increasing dramatically. From 2007 to 2020, China’s per capita milk consumption doubled from 18 to 38 kg (USDA, 2019; MARA, 2021). Moreover, China is expected to triple its milk consumption in the next 30 yr (Bai et al., 2018).

Although the robust increase in milk demand is good news for China’s domestic dairy industry and foreign dairy exporters alike, meeting such growth in demand under current dairy farm production methods presents environmental challenges. For instance, dairy farm production is expected to contribute up to 35% of global greenhouse gas emissions from livestock production in the next 30 yr (Bai et al., 2018). In fact, dairy farm production is an important generator of methane, carbon dioxide, nitrogen oxide, ammonia, acid gases, and greenhouse gases (Pirlo, 2012; Njuki et al., 2016; US Environmental Protection Agency, 2020). It is interesting to note that China emits 1.68 kg of CO2/kg of milk produced, far higher than the lowest emitter in the world: New Zealand (0.77 kg; Jin and Wei, 2022). An additional environmental issue is the vast quantities of fresh water required in dairy production, which has led to serious water depletion in China (Huang et al., 2014).

Ensuring sustainable consumption and production patterns has been recognized as one of 17 sustainable development goals (SDG) in the United Nations’ 2030 Agenda for Sustainable Development (United Nations, 2015). To respond to this call, the Chinese government has integrated the implementation of the 2030 Agenda into the nation’s medium and long-term development strategies, such as the 13th Five-Year Plan for National
Economic and Social Development (Sen and Ruoyun, 2019). Facing environmental pressure from dairy production, the National Dairy Industry Development Plan (2016–2020) issued by Chinese Ministry of Agriculture (2016) has set developing environmentally friendly production as one of the goals of the Chinese dairy industry. Because sustainable development has become a national policy for future development in China (Renmin Net, 2019), learning more about consumers’ preferences for sustainable milk will help us better understand and predict the demand for dairy products and the development of the dairy industry.

In this study, we investigated Chinese consumer preferences for sustainably produced milk, an aspect of consumer behavior largely overlooked in previous work. Previous studies mainly focused on sustainable food with organic labels or “Green Food” labels, and indicated a high level of preference among Chinese consumers (Wu et al., 2014; Yu et al., 2014; Liu et al., 2016; Yin et al., 2017; Chen et al., 2019; Wang et al., 2019; Tong et al., 2020). However, organic food certification and green food certification are adopted to ensure food safety and only make requirements on chemical inputs in Chinese regulations, which do not set good standards for environmental sustainability (Yu et al., 2014). Only a few studies focused on the environmental impact of food production and investigated Chinese consumer preferences for seafood (Xu et al., 2012), pork (Lai et al., 2018), and lamb (Taft et al., 2016). For example, Lai et al. (2018) indicated that consumers in Beijing and Shanghai, 2 metropolitan areas in China, are willing to pay $3.50/kg and $6.15/kg more for environmentally friendly produced pork [$1 = 6.74 RMB (accessed on July 31, 2022)]. The only previous study focusing on sustainable milk is by Gao et al. (2020), who focused exclusively on urban consumers in Beijing and on quality perception. They found that although consumers were willing to pay a 40% premium for such milk, relatively few consumers were familiar with the concept of sustainability.

This article makes 2 principal contributions. First, it fills a gap in knowledge of consumer preferences for sustainability produced milk in China. Our study extends Gao et al. (2020) by encompassing 5 city areas (not only Beijing) and a wider range of milk attributes, such as green production, brand, raw milk origin, food safety, and investigating the role of pre-existing environmental attitudes. Meanwhile, the study includes rural markets, which is precisely where the highest growth of milk consumption is occurring (Sina News, 2019). Second, this study contributes to the more general literature on consumer responses to environmentally friendly production, which has shown that sustainability, along with other credence attributes such as food safety and domestic production, can increase consumers’ brand loyalty (e.g., He and Lai, 2014).

**MATERIALS AND METHODS**

This study was approved by the ethics committee of Beijing Food and Safety Policy and Strategy Research Base (Beijing, China). Our research plan consisted of 3 stages. As there are no readily available consumer-level data with the information that we needed to answer our research questions, we designed a choice experiment to collect data from a sample of consumers. After administering the resulting questionnaire, we analyzed the data via estimation of a mixed logit demand model, given the discrete choices faced by respondents in the experiment.

**Choice Experiment Design and Questionnaire Development**

The choice experiment in this study includes only UHT milk, which is the most produced and consumed type of milk in China. Milk attributes were selected according to the objective of the study and by the importance they have in determining consumer milk choices. Five milk attributes were included: price, domestic brand, domestic raw milk origin, green production claims, and food safety claims. Table 1 presents all attributes and corresponding levels in the choice experiment. Price is expressed in RMB/carton, where one carton includes 12 bottles of UHT milk. The 4 price levels were determined based on the average selling price for conventional and organic milk in the Chinese market. Food safety and quality have been recognized as key issues in Chinese dairy market, especially after the 2008 melamine safety incidents (Qiao et al., 2012). Therefore, food safety claims about milk products play an important role in Chinese consumers’ milk consumption (Ortega et al., 2012). Meanwhile, brand and country of origin were also viewed as important milk safety and quality indicators (Zheng et al., 2010; Yang et al., 2018). Green production claims were dictated by the objective of our research to measure consumers’ attitudes toward environmentally friendly milk production.

According to our choice experiment design, by including 5 attributes the full factorial design involves $(4 \times 2 \times 2 \times 2 \times 2)^2 = 4,096$ profiles. To reduce the number of profiles, a D-optimal fractional factorial experimental design by the JMP 13 software (SAS
Institute) was used to create 12 choice scenarios, which allowed for estimation of all main and 2-way interaction effects. This design maximizes the determinant of the variance-covariance matrix of the model to be estimated. Each choice included 2 alternatives and an opt-out option. A sample choice set is shown in Table 2. The first and second choice columns represent milk choices that respondents were asked to consider as if they were making a purchase in real life, whereas the third alternative allowed the respondents to opt out of choosing either of the first 2 products. Including an opt-out option avoids making the choice set conditional, and it allows the estimation of true demand models, rather than conditional models (Louviere et al., 2000). As is customary, the choice experiment design was embedded in a questionnaire that was pre-tested before releasing it for administration.

Consumer characteristics of interest, because they might affect milk choices included age, gender, income, education, number of children in the household, and concerns about environmental issues and protection, elucidate the heterogeneity of consumer preferences for sustainably produced milk. For instance, concerns about environmental issues were measured by asking respondents “how concerned are you about environmental issues and protecting the environment?” and responses ranged from 1 (not at all concerned) to 5 (extremely concerned). Product characteristics of interest included whether the milk was sustainably produced, whether the raw milk material was sourced and processed in China or from foreign countries, price, brand, and level of food safety (basic or high).

### Sampling and Data Collection

The questionnaire was administered in 5 Chinese city areas that include an urban as well as rural population: Beijing, Shanghai, Shijiazhuang, Xi’an, and Harbin. The survey was conducted from July to August 2017. These 5 cities were chosen because of their different levels of economic development and annual disposable incomes. Beijing and Shanghai comprise 2 metropolitan areas in northern and eastern China, respectively, and are first-tier cities in terms of economic development and wealth. The annual disposable incomes per capita in Shanghai and Beijing in 2019 were $10,364 and $10,113, respectively (NBSC, 2019). Xi’an, Harbin, and Shijiazhuang are second-tier cites located in the western, northern, and northeast regions of China. The annual disposable incomes per capita of $5,084, $4,792, and $4,378, respectively, are slightly above and below the national average level of $4,587 in 2019 (CSFY, 2021; NBSC, 2020; SBS, 2020; XBS, 2020). Note that $1 = 6.7 yuan in June 2019. Before the formal survey, early stages included face-to-face interviews with 10 participants in Beijing to pretest the survey.

The survey was carried out based on stratified multistage sampling. First, 2 city districts and one county in each area were randomly selected. Then, in each city district and county, 50 respondents were randomly interviewed. Second, in each selected county, 2 villages were randomly selected, and 25 respondents were interviewed in each village. The respondents who were interviewed had to be responsible for food shopping in their households. Finally, a total of 1,000 consumer re-

### Table 1. Attribute descriptions in the choice experiment

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Levels</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>30, 45, 60, 75</td>
<td>Price expressed in RMB per carton of UHT milk.</td>
</tr>
<tr>
<td>Brand</td>
<td>China, foreign</td>
<td>The milk products were processed by Chinese or foreign manufacturers.</td>
</tr>
<tr>
<td>Raw milk origin</td>
<td>Domestic, imported</td>
<td>The raw milk was produced in mainland China or imported from another country.</td>
</tr>
<tr>
<td>Green production</td>
<td>Yes, no</td>
<td>Yes indicates that this product claims that milk production applies energy and resource-saving, pollution-reducing management, and technology to reduce the environmental impact. No means no such claims.</td>
</tr>
<tr>
<td>Food safety</td>
<td>Basic, high</td>
<td>Basic indicates that this product meets process standards and the use of food safety practices that will reduce your likelihood of becoming ill. High indicates that the food safety of this product is ensured or certified by a particular institution.</td>
</tr>
</tbody>
</table>

### Table 2. Example of a choice set in the questionnaire survey

<table>
<thead>
<tr>
<th>Choice block</th>
<th>Choice 1</th>
<th>Choice 2</th>
<th>Choice 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>60</td>
<td>30</td>
<td>I don’t want to take either Choice 1 or Choice 2.</td>
</tr>
<tr>
<td>Brand</td>
<td>Foreign</td>
<td>Chinese</td>
<td></td>
</tr>
<tr>
<td>Raw milk origin</td>
<td>Imported</td>
<td>Domestic</td>
<td></td>
</tr>
<tr>
<td>Green production</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Food safety</td>
<td>Basic</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>I would buy.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
responses, including 500 urban consumers, 250 suburban consumers, and 250 rural consumers, were recorded. Excluding nonresponses, data from 975 sample consumers were included in the final analysis.

The widely distributed survey area ensured that the study sample offered a good representation of Chinese consumers. The sociodemographic characteristics of the respondents are summarized in Table 3. Many of the respondents (69.03%) were females, which is consistent with the fact that female members of the household are the typical food purchasers in China. Nearly 50% of the respondents were between 26 and 45 yr old. The respondents were generally well educated. The highest education level of 33.64% of the respondents was college, and 54.06% had junior high school or high school as their highest education level. The main reason for the high education levels was that we conducted surveys in 5 relatively developed cities in China, which have more consumers with higher education levels. Approximately 74.77% of respondents reported a family income below $1,589/mo. Once the data were operational, they were analyzed via the mixed logit model detailed below.

**Method for Data Analysis**

We analyzed the effect of consumers’ choices and product and consumer characteristics with respect to sustainable milk using a mixed logit demand model—a product characteristic approach that avoids the issue of irrelevant independent alternatives in standard logit models (Train 2009; Hole and Kolstad 2012). The model is based on the random utility framework proposed by Lancaster (1966). Specifically, consumers are assumed to choose an attribute portfolio of a UHT milk within their budget constraint. The utility of consumer \( i \) choosing product \( j \) among \( J \) (\( J = 3 \) in this study) alternatives of UHT milk products is represented by

\[
v_{ij} = \alpha_i p_j + \beta_i X_j + \gamma_i \text{GREEN}_j + \xi_i + \epsilon_{ij} \quad \text{[1]}
\]

where \( p_j \) is the price of milk product \( j \); \( \text{GREEN}_j \) equals 1 if the milk product \( j \) was produced with environmentally friendly methods; \( X_j \) is a vector of product characteristics other than price and the use of environmentally friendly production methods; \( \xi_i \) denotes unobserved product characteristics; and \( \epsilon_{ij} \) is an independent and identically distributed error term. The individual specific parameters to be estimated are \( \alpha_i, \beta_i, \) and \( \gamma_i \). Following Zhu et al. (2016), to capture potential heterogeneous responses to environmentally friendly products we further specify the random parameter \( \gamma_i \) to be composed of fixed and variable components that change with a vector of consumers’ demographic characteristics \( Z_i \):

\[
\gamma_i = \gamma_0 + \delta Z_i + \tau \zeta_i, \quad \text{[2]}
\]

where \( \delta \) is a vector of parameters that measures how consumers’ preferences for environmentally friendly milk products vary with observable demographics of consumer \( i \), and \( \tau \zeta_i \) captures the unobservable consumer characteristics.

Thus, letting the probability of consumer \( i \) purchasing product \( j \) be designated as \( \text{Prob}_ij \), we have

\[
\text{Prob}_ij = \int_{\xi} e^{v_{ij}} \sum_{j=1}^J e^{v_{ij}} f(\zeta) d\zeta. \quad \text{[3]}
\]

To quantify the consumer welfare effect of UHT milk produced with environmentally friendly production methods, we calculate individual willingness to pay (WTP) estimates for sustainable milk. Consumers’ WTP is calculated as the negative ratio of the estimated coefficient(s) on the milk product attribute to the price coefficient as

\[
\text{WTP}_i = -\left(\frac{\gamma_0 + \delta Z_i + \tau \zeta_i}{\alpha_i}\right) / \alpha_i, \quad \text{[4]}
\]
where the numerator in the expression of Equation 4 is the estimated coefficient for milk price, thus showing the trade-off of the money-metric value of the attribute to the consumer. We calculate Equation 4 for all consumers in the sample.

RESULTS AND DISCUSSION

Econometric Results

The mixed logit model with 2 specifications was estimated. The model results are presented in Table 4. Serving as the benchmark specification, model 1 includes only the random coefficients of the 5 UHT milk attributes. Model 2 further reveals the interaction effects between green consumer characteristics, including age, gender, income, education, number of children in the household, and concerns about environmental issues and protection. To capture potential heterogeneity in consumer preferences, coefficients of product attributes are assumed to follow a normal distribution in both models. Standard deviations of parameter distributions that are significantly different from zero indicate heterogeneity in the estimates of the parameters around their respective means. In contrast to the coefficients of the product attributes, coefficients of the interaction terms are assumed to be nonrandom; thus, only their means (as opposed to their standard deviations) are reported. The Akaike information criterion (AIC) and the Bayesian information criterion are widely used in model selection criteria. Both of them are calculated based on likelihood of the model given the data and the number of estimated parameters in the model, and Bayesian information criterion also includes the number of entries in the database (Rossi et al., 2020). According to Aho et al. (2014), AIC is more appropriate when models have been further parsed into complex model selection, and smaller values indicate better models. Therefore, according to AIC, model 2 has better goodness-of-fit than model 1, suggesting that the inclusion of interaction terms helps improve the fit of the model.

As the results of model 1 show, the estimated coefficients of all product attributes except price are highly significant and positive (all \( P < 0.01 \)), indicating that the presence of any of these attributes is likely to increase consumers’ utility derived from UHT milk consumption. The significant standard deviation coefficients of all product attributes (all \( P < 0.01 \)) indicate that consumers had heterogeneous preferences for all attributes, necessitating the random parameters logit modeling procedure.

It was found that green production had a significant and positive effect on preferences with respect to the choice of milk products (\( P < 0.01 \)), indicating that Chinese consumers prefer to buy UHT milk produced under environmentally friendly conditions. The proportion of the difference between the highest and lowest value of an individual attribute in the sum of the differences between the highest and lowest worth of each attribute was the basis for the relative importance evaluation. For the calculation method, refer to Wu et al. (2015). Accordingly, the descending order of relative importance was food safety (37.34%), domestic brand (31.67%), green production (17.74%), and domestic raw milk origin (13.24%). As the results show, except
for price, food safety was the most important attribute for the respondents, followed by domestic brand and green production. The results also show domestic bias with respect to brand and raw milk origin, as consumers prefer milk processed by Chinese brands and milk of domestic raw milk origin.

Our results also show that consumer characteristics were significantly related to consumers’ preference for sustainable milk. First, age was found to have a significant effect on consumer preference for environmentally friendly produced milk \( (P < 0.01) \). Second, gender was also significantly related to consumers’ choice of sustainable milk \( (P < 0.01) \). Our results show that compared with female consumers, male consumers prefer to purchase sustainably produced milk. Third, consumers raising fewer children in their household tend to purchase sustainable milk \( (P < 0.01) \). One possible explanation for this result may be that consumers who raise more children are more likely to be concerned about meeting the nutritional and health needs of their children on a limited family budget for food consumption. Finally, consumer attitudes toward environmental issues were found to be significantly related to their preferences for sustainably produced milk \( (P = 0.02) \). Consumers who are concerned about environmental issues and protection are more willing to purchase sustainably produced milk. This implies that consumers with a high awareness of environmental issues and protection consider sustainability when purchasing milk.

### Willingness to Pay Estimates

We estimated consumers’ WTP for UHT milk produced via sustainable production methods. Figure 1 presents the distribution of our calculated consumers’ individual WTP. They range from slightly negative for a few consumers to a high premium over 30 RMB/L ($4.63/L) for some. The estimated average WTP per liter of sustainably produced \( \text{(GREEN)} \) milk is 13.61 RMB/L ($2.10/L; $1 = 6.74 RMB, accessed on July 31, 2022) for sustainable milk. This indicates that consumers are willing to pay an extra 13.61 RMB/L to buy sustainably produced milk compared with traditional milk, indicating relatively strong consumer purchase intentions for sustainably produced milk in China. This is not particularly surprising in the Chinese dairy product market, where high-end dairy products are popular (Liu, 2021). The demand for high-end dairy products comes from the increasingly strong nutritional and health needs of Chinese consumers, as well as risk aversion due to lack of confidence in the safety of domestically produced dairy products caused by past food safety incidents. Take the prominent e-commerce site Taobao as an example, on which the top 10 UHT milk and organic UHT milk products by sales, product prices can reach up to $2.94/L and $4.63/L, respectively. Taobao, known as China’s eBay, is the largest e-commerce platform in China. This popular shopping marketplace provides an easier way for Chinese consumers to purchase a variety of goods. According to Statista, as of July 2022, there were more than 333 million visits in Taobao per month. Data accessed from https://www.statista.com/statistics/1250711/most-popular-online-marketplaces-china/#statisticContainer. At Hema, a popular online supermarket in Beijing, for another example, product prices among the top 10 fresh milk products by sales can reach $5.77/L. This is substantially higher than what was found in previous studies on consumers in other countries by about a factor of 3. A survey of German consumers shows that their WTP is $0.61/L more for pasture-raised cow milk certified with the classical label and $0.46/L more for pasture-raised milk labeled with a cause-related marketing claim (Kühl et al., 2017). Nam et al. (2020) found that Korean consumers are willing to pay $0.67/L more for milk produced by mountainous dairy farming than by traditional dairy farming.

Willingness to pay a premium for sustainably produced milk is particularly strong among male consumers, younger consumers, consumers with lower incomes, and consumers with fewer children. This result is supported by other studies, which showed that compared with female Chinese consumers with higher environmental consciousness, male Chinese consumers had higher levels of awareness and knowledge related to the environment and exhibited greater sustainable con-
Implications for the Dairy Industry

The study provides useful information for practitioners. The dairy industry and policy makers should consider implementing information campaigns among consumers aimed at informing them of the importance of sustainability and fostering a better understanding of the features of environmentally friendly dairy production. Referring to the results of this study, consumers are more likely to pay a premium for sustainable products if they are aware of environmental issues and protection and of the importance of sustainable production. This finding should be of interest to (and profitable for) those dairy enterprises whose costs are higher due to adopting sustainable production methods. Considering that the food safety of dairy products is still the most important attribute that Chinese consumers care about, sustainable consumption campaigns should also highlight nonenvironmental benefits. Therefore, when promoting sustainable milk, a joint concept of healthy and environmentally friendly foods would be feasible (Hoek et al., 2017). For example, emphasizing that sustainable food has better quality would be a beneficial marketing strategy in China (Gao et al., 2020). However, only emphasizing the need for and importance of sustainable production cannot by itself justify that the move would be profitable (Nam et al., 2020). Much more effort should be paid to differentiating sustainably produced dairy products from conventionally produced products by, for example, labeling environmentally friendly production so that consumers can easily identify sustainable milk, given their higher WTP for this product. Food labeling is a way to indicate the credence attributes of food, such as production methods, and enable consumers to make informed purchasing decisions. However, the environmentally friendly production label is a new concept to Chinese consumers, in contrast to the mandated “Green Food,” and “Organic Food” labels that have already been introduced in the Chinese food market (Xu et al., 2012). The unique “Green Food” label was introduced mainly to address food safety and is a more practical and less stringent certification, given that most food products cannot reach the rigorous standards of “Organic Food” in China (Yu et al., 2014). Therefore, the government should devise policies or pass regulations to formally establish an “Environmentally Friendly” label and, together with the dairy industry, explore the potential promotion of this label.

We propose some recommendations for future study. First, the application of real incentives to choice experiments should be considered to simulate more realistic consumption scenarios and estimate consumers’ WTP for sustainable dairy products. Stated choice surveys are extensively applied to elicit consumer preferences for public and private goods in existing literature (Michaud et al., 2013). The experimental design and statistical analysis used in this study for sustainably produced milk in China are applicable to other contexts in terms of foods and countries. However, the choices made by consumers in hypothetical surveys might not reflect real preferences (Michaud et al., 2013). A real choice experiment for sustainably produced milk could be made incentive-compatible by a real exchange of a product against cash. Some studies indicate no difference between hypothetical and actual choice experiments (de-Magistris et al., 2013), whereas others suggest that the hypothetical surveys would overestimate consumers’ WTP (Lusk and Schroeder, 2004). Second, a large variation might exist in certain consumers’ understanding of sustainably produced milk in this study, which is an important factor shaping their choices in the experiment. Although respondents were informed what environmentally friendly production is before conducting the choice experiments during our survey, they still lack knowledge about the importance and influence of environmentally friendly production. Previous studies show that individuals’ preferences are sensitive to changes in the information level, and more detailed information can drive up consumer WTP (Chen et al., 2017; Bengart and Vogt, 2021). Therefore, it is worthy to explore the effect of varied information related to sustainable milk on consumer choice decisions, which could identify effective advertising strategies for stakeholders. Third, the current literature suggests that consumers show different preferences and WTP for sustainable food that has been certified by various food chain actors in different countries (Yin et al., 2017), which was not taken into consideration in this study.
research. It would be interesting to further investigate and compare Chinese consumers’ preferences for sustainable milk certified by China and other countries, such as Australia and the EU, or certified by different actors, such as manufacturers, governments, or third parties.

CONCLUSIONS

Chinese dairy consumption continues to increase dramatically, and this growth poses challenges to the environment, given the contribution of conventional production methods to greenhouse gas emissions and water use. The objective of this study was to examine consumer preferences and WTP for sustainably produced milk in relation to the viability of increasing production of such milk. Based on an experimental survey of Chinese consumers in 5 major cities, we find that, overall, consumers prefer sustainably produced milk and that they are willing to pay a premium of $2.01/L. Given this, it seems that such preferences would likely cover additional costs of production, particularly from submarket segments most likely to buy it, including the young, males, and childless households, as well as those already concerned about the environment and food safety. Finally, it is worth noting that Chinese consumers exhibit a strong degree of home bias, preferring domestic brands with domestically sourced raw milk.

ACKNOWLEDGMENTS

This research was supported by the Sino-Dutch Dairy Development Centre of China Agricultural University (Beijing, China; No. SDDDC2018R01), the USDA National Institute of Food and Agriculture (Washington, DC; Hatch project 1020636), and the Richard DelFaverio Fund for Agricultural and Resource Economics at the University of Connecticut (Storrs, CT). We appreciate comments on an earlier version presented at the 2020 American Agricultural Economics Association meetings. The authors have not stated any conflicts of interest.

REFERENCES


ORCIDS

Saiwei Li https://orcid.org/0000-0003-4632-2400
Rigoberto A. Lopez https://orcid.org/0000-0001-7106-1896
Chen Zhu https://orcid.org/0000-0003-3582-9022
Yumei Liu https://orcid.org/0000-0002-2983-4258