

Consumer and Manager Preferences for Food Attributes in the Restaurant Industry: The Implications for the Imported Duck Industry in China

Preferensi Konsumen dan Manajer untuk Atribut Makanan di Industri Restoran: Implikasi terhadap Industri Bebek Impor di China

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Abstract

Unprecedented economic growth in China has created a new market potential for high-quality foods in the global food industry. This has led several studies to investigate consumer preferences for food safety and quality attributes in the retail market. However, there are limited studies related to the food service sector, specifically to combine these two concepts. Therefore, this study was conducted to investigate these preferences from the perspectives of both the customers and restaurant managers in relation to ducks in the Chinese food service sector. This involved estimating the willingness-to-pay for quality and safety attributes such as branding, premium quality, safety certification, and the biotech country of origin, including the United States, the European Union, and China using regression analysis. The empirical results showed that Chinese consumers and restaurant owners/managers have a similar preference for branded, high quality, and safe domestic products. However, their relative preferences for these attributes are not identical, as indicated by the consumers' highest preference for safety certification, while managers mostly focus on the quality. These findings are expected to provide more information on the market preferences for food produced in emerging Asian economies with special diet cultures and traditions.

Keywords: consumer preferences, duck, food safety, food service, manager preferences

Abstrak

Pertumbuhan ekonomi yang belum pernah terjadi sebelumnya di Cina telah menciptakan potensi pasar baru untuk makanan berkualitas tinggi di industri makanan global. Beberapa penelitian telah dilakukan untuk mengetahui preferensi konsumen terhadap keamanan pangan dan atribut kualitas di pasar ritel, tetapi penelitian terkait preferensi tersebut pada sektor jasa pangan belum banyak dilakukan. Oleh karena itu, penelitian ini dilakukan untuk mengetahui preferensi konsumen dan manajer restoran terhadap keamanan pangan dan kualitas bebek pada sektor jasa pangan di Cina. Estimasi menggunakan analisis regresi dilakukan pada kesediaan konsumen dan manajer restoran untuk membayar atribut kualitas dan keamanan pangan, seperti merek, kualitas premium, sertifikasi keamanan, dan negara asal biotech, termasuk Amerika Serikat, Uni Eropa, dan Cina. Hasil empiris menunjukkan bahwa konsumen Cina dan pemilik / manajer restoran memiliki preferensi yang sama terhadap produk dalam negeri yang bermerek, berkualitas tinggi, dan aman, tetapi tingkat preferensi mereka berbeda untuk atribut tersebut. Hal ini ditunjukkan oleh preferensi tertinggi konsumen terdapat pada sertifikasi keamanan, sedangkan manajer sebagian besar fokus pada kualitas. Hasil penelitian ini diharapkan dapat memberikan lebih banyak informasi tentang preferensi pasar untuk makanan yang diproduksi di negara berkembang di Asia dengan budaya dan tradisi diet khusus.

Kata kunci: bebek, jasa pangan, keamanan pangan, preferensi konsumen, preferensi manajer

INTRODUCTION

China's current economy is primarily driven by consumer demand and this has shifted considerable attention to consumer food preferences in

the agricultural value chain of retail outlets with the focus on quality, safety, and place of origin (Lim et al., 2013; Qoddhar et al., 2013; Pouliot & Wang, 2018; Martiansyah et al., 2021). For example, previous studies found that some consumers

prefer meat without hormones or antibiotics (Ortega et al., 2014; Asante - Addo & Weible, 2020) and use the brand to presume the expected quality (Dwivedi et al., 2018) while some were reported to show a preference for domestic meat over imported ones (Lim et al., 2013; Wang et al., 2013b; Lai et al., 2018). Most of these studies were conducted using the choice experiment as the state-of-art method to assess consumer demand based on the monetary values of the attributes derived in order to guide industry decisions (Lagerkvist & Hess, 2011; Ortega et al., 2015). Moreover, a very rich empirical study has also been conducted on consumer food preferences in relation to the food retail sector using the same method as the previous ones mentioned.

The market share of the food service sector is increasing in developed and fast-developing countries compared to food retails but the attention on consumer safety and quality preferences is lower. Several studies have been conducted on consumers dining out preferences as indicated by the review provided by Gao et al. (2016) but most of them were observed to have emphasized restaurant attributes instead of food quality attributes as discovered in Ali & Nath (2013). Meanwhile, a few such as Hwang & Ok (2013) and Medeiros & Salay (2013) mentioned food quality attributes and they both claimed that extrinsic attributes such as taste are more important than intrinsic attributes such as nutritional quality for restaurant customers. Schjøll & Alfnes (2017) also summarized the findings from some previous studies that descriptively labeled menu with information on the brand and the results showed geographic region as the factor with the higher willingness-to-pay (WTP) but the consumers were found not to care about country of origin when they purchase meat at restaurants as much as they did at retail outlets. Moreover, studies also investigated consumers' WTP for food quality attributes in the food service sector (Lu & Gursoy, 2017; Jang et al., 2011) and another focused on the preference of restaurant owners/managers/chefs for food ingredients (Roy & Ballantine, 2020) but only a few attempted to investigate the combination of these concepts. Therefore, this current study focuses on the food service sectors using the demand for a duck in Chinese restaurants as the case study. This is considered necessary due to the difference in the preference and behaviors of the customers in food retail sectors and food service sectors in the country. It is also important to note that the term "manager" was used to represent the owner, manager, chef,

and any other person making ingredients purchasing decisions in the restaurants.

The rapid growth in Chinese income allowed its 1.4 billion citizens to consume 86 million tons per year and this is almost twice the figure recorded for the US based on 2018 OECD data. This substantial increase in the consumption of meat (including poultry) with dairy, fish, and other animal-based food is supported by the country's quick expansion of domestic production, thereby causing a sharp increase in the importation of different inputs including feed, veterinary products, genes, and other biotech products.

A strong factor observed to be affecting Chinese consumers' decisions in recent years is food safety due to the segmented farm production (Ortega et al., 2014; Wang et al., 2013a). This has made consumers more cautious, thereby leading to the preference for brand recognition, market channel differentiation, as well as quality and safety certification. This allows companies focusing on agribusiness in developed countries and interested in exporting to benefit from this change in the Chinese market due to the fact that they have established reputations. Meanwhile, some studies have been conducted on consumer preferences for meat product quality and safety attributes in Chinese retail markets (Ortega et al., 2011; Zhang et al., 2012; Zheng et al., 2021). Moreover, Liu et al. (2013) thoroughly discussed 69 studies on Chinese consumer preferences and knowledge of food safety certification programs such as hazard-free, green, and organic foods and found that consumers are sensitive to food safety and willing to buy safer food but often lack the necessary knowledge to assess the food safety. It is also important to note that China has a very diverse consumer market with different purchasing powers, attitudes, and lifestyles in different regions. This means there is a possibility of different forms of resistance to foreign consumer products depending on the consumers.

Ducks used to be traditionally raised and consumed at home using local style cuisine in Southern China but are currently consumed in restaurants nationwide with sophisticated preparation procedures and a classic example is Peking Roast Duck. Moreover, imported ducks and those with foreign genetics from the EU or US which are mostly raised in modern facilities owned by large firms have been discovered to have higher quality and cost than domestic breeds being raised by small farmers. These products fit better with the

quality being demanded by the Chinese food service industry. However, it is important to note that the extra layers of processing and service provided also cause a variation in the preference and demand of the consumers regarding the food service sector and the food retail sector.

Therefore, this study explores the preferences of consumers in terms of quality and safety attributes desired in ducks consumed in restaurants in order to fill the study gap discovered in relation to the lack of food safety and quality demand in the food service sector and also to provide information on the derived attribute demand for imported goods. The preferences were investigated from the perspectives of both the end consumer in the form of customers in restaurants and direct consumers in the form of the restaurants in the food service sector represented by their managers using major Chinese cities as the case study. Moreover, the results are expected to be used for international agribusiness firms in determining the appropriate biotechnology-based products to be exported to the Chinese market and also to allow domestic firms to compete with international firms.

METHODS

Survey

A total of four cities including Beijing, Shanghai, Guangzhou, and Chengdu were selected due to the interest of this study in urban areas which are considered to be the major focus of the food service sector and also a common target for importers. These cities represent the different cultures in China, for example, Beijing is the capital city located in the north where Peking Roast Duck derives its name and consists of high-income residents with substantial international exposure. Shanghai is on the east coast with the most prosperous economy and deepest Western cultural influence. Guangzhou is the Southern coastal city next to Hong Kong with an active private business sector, high income, and traditional Cantonese-style roast duck. Chengdu is an inland city in the Southwest and its economic development is observed to be lower than the other top tier cities but has a very diverse cuisine with duck discovered to be traditionally grown and consumed using different styles.

A survey was conducted in each of these four cities during the summer of 2018 to 25 randomly selected restaurants serving duck dishes and the process involved interviewing one manager and

five customers dining in each of them by trained graduate student enumerators. The restaurants range from the large upscale apartments with many private dining rooms to small 'mom and pop' eateries. Moreover, for the customers, common demographic information (gender, age, education, and children in household), consumption behavior (dining out frequency, duck order frequency, dining in a group or not, and duck part preference), and economic information (price of the main dish, income, income change, and moving up to the city) were obtained after which a choice experiment was conducted to elicit their preferences. This led to the collection of a total of 505 completed individual surveys. Meanwhile, for managers, demographic information such as gender, age, education, and restaurant employment experience were also obtained followed by the inquiries on the restaurant characteristics (annual sales, duck sale quantity, popular duck dishes, average dish price, source of duck supplies) and preferences (quality preference, ranking of duck parts). This was also followed by a separate choice experiment for the 102 managers.

Choice Experiment Models

The choice experiment methodology is based on the Lancasterian approach to consumer demand which states that consumers do not derive utility from the good itself but the value of its attributes. The model traditionally presents consumers with a choice between two or more product profiles described by alternative attributes as well as an opt-out option. This is usually followed by the use of the random utility model to estimate the systematic (observable) and stochastic (unobservable) portions of the utility a consumer receives from selecting an option with a particular set of attributes in a choice situation. Therefore, this current study used Peking Roast Duck as the menu product in the experiment for consumers, and the attributes include price per dish (¥40/60/80/100), safety certification (additional certification/regular), duck brand (branded/unbranded), quality (premium/regular), and biotech country of origin (US/EU/China).

The price level is the factor mostly considered in the market while safety certification refers to any voluntary certification indicating higher food safety standards such as HACCP, Organic Food, Green Food, Hazard-Free Food, and others administered by different government agencies in China (Ortega et al., 2011). The meat without any

of these certifications is required to satisfy government basic safety standards administered by the appropriate health and quarantine agencies. Most of the Chinese restaurants serving Peking Roast Duck offer two different dishes on the same menus and these include a regular dish and a premium quality dish served at different prices. The premium dish often uses different raw ducks such as the branded type with more muscle meat relative to fat and it is normally served fancifully. Moreover, it was discovered from the focus group discussions that consumers are familiar with the concepts presented in the choice experiment.

For managers, the raw duck was used to represent the product they buy from suppliers with the prices set at four levels of ¥10, ¥14, ¥18, and ¥22 per Jin while the other attributes are similar to those used in the customer experiment except for the use of the premium quality to represent high-quality raw duck with ideal meat/fat ratio, body size, and specific body part sizes.

A random parameter logit (RPL) model was used to estimate the WTP for each attribute based on the random utility model as previously applied in Wang et al. (2018) and Ortega et al. (2017). Meanwhile, the deterministic component of Utility (V) in the random utility model was represented as follows:

$$V = \beta'x = \beta_1\text{Price} + \beta_2\text{BR} + \beta_3\text{QA} + \beta_4\text{CR} + \beta_5\text{US} + \beta_6\text{EU} + \beta_7\text{OptOut} \quad (1)$$

where β is the vector of random parameters with each having its mean and variance which repre-

sents the individual preferences while x is the vector of attributes designed for the choice experiment in the i th alternative which includes the *Price*, *BR* (branded), *QA* (premium quality), *CR* (additional safety certification), *US* (biotech from the US), *EU* (biotech from Europe), and *OptOut* (not buying either alternative).

The WTP for attribute k was calculated as the ratio between the marginal utility of the attribute to the marginal disutility of price as indicated in Equation (2)¹ after which the result was multiplied by two due to the coding effects.

$$\text{WTP}_k = -2 \text{MV}_k / \text{MV}_p = -2 \beta_k / \beta_1, \quad k = 2, \dots, 7 \quad (2)$$

RESULTS AND ANALYSIS

Descriptive Analysis

The consumers were categorized into five groups based on the annual family income, and the duck ordering frequencies were found to be quite consistent across the groups as indicated in Figure 1 which showed that approximately ten percent almost always order duck when dining while about five percent did not. However, a contrasting trend was observed for the lowest income groups with five percent almost always ordering while ten percent did not. The remaining 85% which are across all income groups were discovered to have split equally into the two categories. These findings showed that duck is common poultry meat in China even though there is no clear trend of its consumption across income levels.

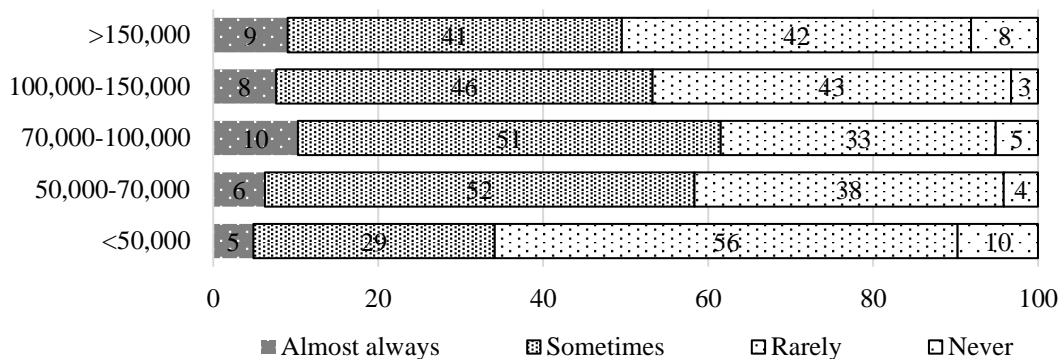


Figure 1. Duck Dish Ordering Frequency across Different Income Groups in RMB Yuan

¹ This is for model (1) only. When the attributes interact with other variables, the marginal utility of each attribute contains additional terms.

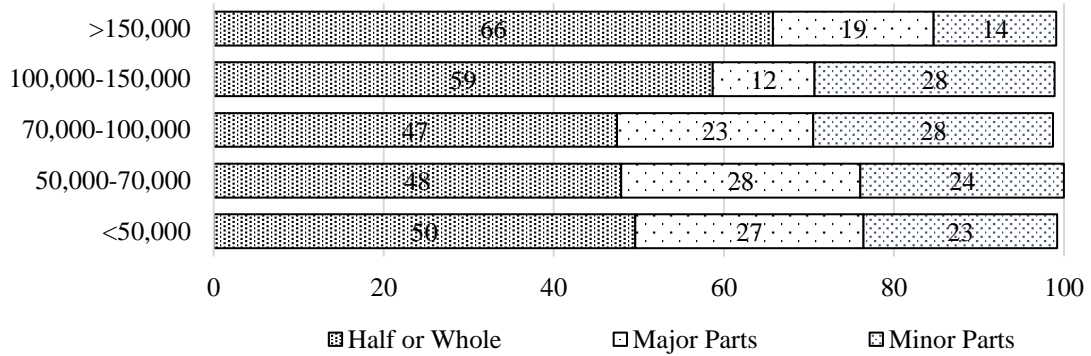


Figure 2. Consumer Preference on Alternative Duck Cuts by Income Groups in Yuan.

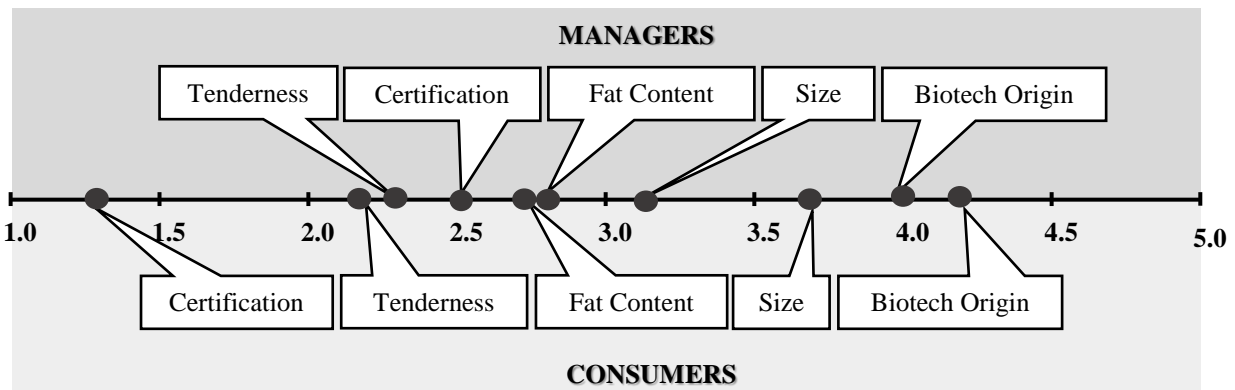


Figure 3. Comparison of Attribute Preferences between Managers and Customers

Chinese restaurants offer whole and half roast duck compared to restaurant menus in the EU and US which typically offer only duck breast entrées. The major parts such as legs and sliced meat from breast or legs, and a wide array of minor parts, among which head, neck, wings, feet, tongues, gizzards, and livers are considered delicious appetizers or side dishes. The preference for these different parts can be interesting to the duck biotech industry towards developing the breeds that yield the ideal size of certain parts relative to the body size of the duck. Moreover, the bottom three income groups seem to have an identical preference for the alternative parts as indicated by approximately 50% placing order for the whole or half duck dishes while 25% each prefer those made with major parts and minor parts respectively as indicated in Figure 2. However, the preference for whole or half duck increases at the expense of minor parts as people move to the top two income groups while the major parts of duck do not obtain any popularity even when consumers get richer.

The results also showed that 53% of 102 restaurants serving duck dishes acquire the meat from contracted wholesalers, 16% from duck farms directly, 14% from poultry processors or butchers,

9% from the open wholesale market, 6% from specific restaurant suppliers, and very few from retail markets or mother company for chain restaurants.

A visual comparison of the preferences among alternative food safety and quality attributes between customers and managers is presented in Figure 3. The meat tenderness, fat content, duck size, safety certification, and biotech country of origin were listed to be ranked by these respondents from 1 which represents the most important to 5 which is the least important. The results showed that the average rankings by managers ranged between 2.2 and 4 while those for the customers were between 1.3 and 4.2. This means the consumers prefer one factor to another while managers are less discriminatory, but there are some consistencies observed between the two groups, for example, they both think the biotech source country is the least important while safety certification and meat tenderness are the two most important attributes followed by fat content and size.

Some attributes such as fat content and tenderness are directly observable during the consumption by customers and the preference ranking was the same as the trend for the managing staff. Other attributes such as safety certification and biotech source country are usually not revealed to

the customers except the restaurants label them on their menus, but this is not common industry practice. Moreover, customers may also not know the size of dishes which are not the whole body or whole parts, and these show the differences between the sellers and buyers of the menu products. However, it is important to note that the high ranking of tenderness by both managers and customers is consistent with the findings of previous studies on hospitality.

The additional sociodemographic variables presented in Table 1 showed that the gender of the customers and managers is almost balanced and are both quite young with an average age of 33 years old, thereby reflecting the current situation in the Chinese food service industry. Moreover, more than half of the customers in the four major Chinese cities studied have a college education or higher while managers are primarily without a college education, approximately 35% of the

Table 1. Sample average for model explanatory variables

Customer		Manager	
Female	48.0%	Female	47.6%
Average Age	33.8 years	Age	33.4 years
Graduate	25.6%	Graduate	2%
Undergrad	36.3%	Undergrad	5.6%
Tech school	17.6%	Tech school	28.7%
High School	19.1%	High School	63.4%
Family size	3.4	Experience	6.3 years
# children	0.5	Biotech Source Preference	
Income rise	34.9%	Chinese	91.1%
Income drop	9.6%	EU	1.0%
Migrant	24.9%	No preference	7.9%
Dine out times per month	7.9	US	0.0%
Order duck*	49.8%	Duck sold per week	425 Jin
Group dine*	94.7%	Annual sale	4.01 Million Yuan
Entrée price	46.6 Yuan	Entrée price	39.0 Yuan

* There are four categories, never, rarely, sometimes, and almost always, and the focus of this report is on the percentage of the sum of the last two categories.

Table 2 Parameter estimation and WTP for major attributes by consumers

	Whole Sample ^{1,2}	Beijing	Shanghai	Chengdu	Guangzhou
Mean					
Price	-0.013 (0.0012)***				
Brand	0.41 (0.036)***				
Quality	0.38 (0.032)***				
Certified	0.63 (0.039)***				
US	-0.20 (0.045)***				
EU	-0.11 (0.045)**				
Opt-Out	-1.66 (0.10)***				
Standard Deviation					
Brand	0.47 (0.044)***				
Quality	0.38 (0.055)***				
Certified	0.46 (0.051)***				
US	0.74 (0.051)***				
EU	0.64 (0.049)***				
WTP Estimates (¥/entrée)					
Brand	61.63 (3.54)***	122.02	86.31	34.79	100.93
Quality	57.19 (3.46)***	144.45	82.49	23.96	104.15
Certified	94.31 (5.44)***	242.96	116.17	51.82	111.85
US	-30.20 (3.44)***	-115.91	-41.76	-26.05	NA
EU	-17.03 (3.48)***	-73.29	NA ³	-23.57	NA
Opt-Out	-124.52 (5.63)***	-306.58	-113.28	-88.71	-145.89

¹Standard errors in parenthesis, ²Significance at the 10%, 5%, and 1% level are indicated by *, **, and ***, respectively. ³The WTP for EU in Shanghai and US and EU in Guangzhou are not calculated because their corresponding coefficients are insignificant.

customers experienced an income increase in the past two years, and approximately 25% only migrated to these cities from a rural area or small town. It was also discovered that the average entree price of the restaurants is 39.0 Yuan and this is in line with the average entree price of 46.6 Yuan the customers pay when dining out.

The restaurant managers strongly prefer Chinese domestic duck breeds and observed not to be familiar with US breeds at all while some EU breeds have gained market recognition. It is important to note that these characteristics are the average of those recorded across all the cities studied. Meanwhile, there are variations in their cuisine styles and economic development levels as indicated in previous studies and these affect the preferences.

A blocked D-efficiency design was used to ensure each subject was able to evaluate nine decision scenarios with four blocks of subjects, thereby, producing 909 valid choice situations for restaurant managers and 4,526 for customers. The results are discussed separately as follows.

Regression Analysis for Restaurant Customers

The results of the RPL model using pooled data from all cities are placed in the first column of Table 2. Moreover, the first two columns show that all attributes and their standard deviations are significant, thereby confirming the random parameter model is necessary to capture preference heterogeneity among consumers. It was discovered that the consumers are willing to pay premiums for entrees using branded, high quality, and certified duck while discounting those using imported breeds as indicated by the right column which shows the values of the willingness to pay (WTP) for these three attributes to be ¥61.63, ¥57.19, and ¥94.31 respectively with the value for the safety certificate being the highest. These results are in line with other Chinese consumer preferences for other meat products as reported by Ortega et al. (2011), Ortega et al. (2012), and Zhang et al. (2012) that the consumers are very concerned about food safety. Traditionally, imported EU or US ducks are less preferred to strong-tasting, domestically-produced, and often older-age ducks. However, the prevalence of food safety incidents in the country in recent years and the growing consumer disposable income have made the consumers rely more heavily on credence attributes such as brand, quality, certification, and country of origin to determine the intrinsic product quality.

Meanwhile, the finding that the US duck is discounted more heavily than the EU duck is consistent with the strong market penetration of EU duck in the Chinese market than US duck. The results also showed the possibility of a loss of value by the customers in a situation duck is no longer part of their option set as indicated by the negative opt-out WTP.

The model was estimated for each city separately and the mean WTPs with corresponding significant attribute coefficients are placed in the last four columns of Table 2. It was discovered that coefficients for EU in Shanghai and both EU and US in Guangzhou are insignificant, thereby indicating a preference heterogeneity other than the significant coefficients for mean and standard deviations of the attributes not reported in the table. Guangzhou consumers were observed to value imported and domestic duck genes in the same way and this is a likely reflection of the commercial and global integration of the neighboring duck importing giant, Hong Kong. Meanwhile, Shanghai consumers only slightly discount US imports relative to the magnitude of their WTPs for other attributes due to its epicurean culture while Beijing and Chengdu consumers strongly prefer domestic duck because of the traditional regional cuisine which requires eating strong-tasting domestic duck. The discount associated with the imported technologies does not mean Chinese consumers distrust the safety or quality of such products considering the fact that these two attributes have been controlled and the ducks are raised in China although the genes are from either the EU or the US. The preference of domestic genes over imported was observed to be primarily caused by taste preference as confirmed by the direct follow-up questions during the interviews. Moreover, the magnitudes of the WTPs for other attributes also indicate a regional heterogeneity with Beijing consumers discovered to value brand, quality, and certification most followed by those in Guangzhou, Shanghai, and Chengdu. This is expected considering the immense popularity of Peking (or Beijing) roast duck in Beijing, the fact that Hong Kong is the largest importer of duck meat in the world, the economic prosperity of Shanghai, and the relative economic paucity of Chengdu.

The effects of demographic and economic variables on WTP were also analyzed as indicated in Table 3. The process involved consolidating the original five income categories into two which include the high category for those with an annual

household income higher than ¥150,000 and the normal category which is the default. This was implemented to keep the number of variable interactions with the main attributes at a manageable level. Moreover, the income change categories were also consolidated into two which are the income increase and no increase categories which include both unchanged and decreased groups. The original four duck ordering frequency categories were also combined into two which are the frequent duck ordering category for those that often order duck dishes while dining out and sometimes do while the other category includes those that did not order or rarely do.

In addition to the significant main attributes, it was discovered that high-income customers are consistently willing to pay more such as ¥27.06 for premium-quality duck, ¥38.06 for a duck with biotech from the US and, ¥30.46 for those from EU than the lower-income customers. Moreover, the overall WTP for the imported genes by higher-income consumers was positive compared to the negative recorded for EU and US duck genes by the default lower-income consumers. This simply

means the higher-income consumers have additional WTPs for imported genes compared to domestic genes. Moreover, age was discovered to have a negative effect on WTP as indicated by the reduction of ¥1.29 in each additional year for food safety certification and ¥1.17 for biotech from the US. The results also showed that customers ordering ducks frequently have a lower WTP for food safety but value safety certification compared to the default lower frequency consumers.

Regression Analysis for Restaurant Managers

The base model estimates for managers are listed in the first column of Table 4 and all the coefficients were found to be significant except for Opt-Out. Moreover, the WTP for the brand, quality, and certificate are all positive except for biotech from US and EU which are negative. Managers' ranking of the WTPs for the three major attributes is relatively different compared to those of the customers although the magnitudes are not comparable for different products such as duck dishes versus raw ducks. The results showed that managers have almost similar WTP for high-

Table 3. Effects on consumer WTP by age, income, duck order frequency, and income change

	Coefficient ²	Standard Deviation	WTP
Price	-0.013 (0.0012)***		
Brand	0.34 (0.11)***	0.46 (0.045)***	62.88
Brand x Age	0.0027 (0.0029)		0.41
Brand x High Income	-0.025 (0.083)		-3.76
Brand x Income Increase	-0.063 (0.074)		-9.48
Brand x Freq. Duck Order	0.037 (0.069)		5.49
Quality	0.29 (0.10)***	0.35 (0.053)***	56.98
Quality x Age	0.0015 (0.0026)		0.23
Quality x High Income	0.18 (0.075)**		27.06
Quality x Income Increase	0.028 (0.066)		4.17
Quality x Freq. Duck Order	-0.030 (0.062)		-4.42
Certified	1.03 (0.12)***	0.44 (0.052)***	93.68
Certified x Age	-0.0086 (0.0031)***		-1.29
Certified x High Income	-0.087 (0.088)		-13.02
Certified x Income Increase	0.067 (0.078)		9.98
Certified x Freq. Duck Order	-0.23 (0.073)***		-34.36
US	-0.052 (0.14)	0.72 (0.057)***	-29.56
US x Age	-0.0078 (-0.0078)**		-1.17
US x High Income	0.25 (0.10)**		38.06
US x Income Increase	0.014 (0.09)		2.12
US x Freq. Duck Order	0.12 (0.086)		17.27
EU	-0.034 (0.14)	0.65 (0.052)***	-16.87
EU x Age	-0.0040 (0.0036)		-0.60
EU x High Income	0.20 (0.10)**		30.46
EU x Income Increase	-0.019 (0.089)		-2.86
EU x Freq. Duck Order	0.037 (0.085)		5.53
Opt-Out	-1.67 (0.11)***		-124.72

¹Standard errors in parenthesis; ²Significance at the 10%, 5%, and 1% level are indicated by *, **, and ***, respectively.

quality ducks and ducks with an additional safety certificate but the value for the high quality is slightly higher. This is interesting considering the fact that managers are not the primary consumers and this makes them show lesser care for safety compared to the customers. There is a possibility that they do not know the real preference of the customers due to the fact that it is not a conventional practice to label the certification on the menu, thereby making it difficult for customers to identify the dish cooked with certified duck. This was also observed to be similar for the brand. Meanwhile, the quality attribute reflected by fat content and tenderness are directly observable by the customers and these are the focus of managers towards ensuring customer satisfaction. It was also discovered that managers prefer ducks with domestic biotech and discount EU more than the US even though both estimates have quite a large magnitude.

Managers' preferences were found to be heterogeneous across cities as shown in the last four columns of Table 4. The relative sizes of the WTP across cities are different even though the WTPs for the attributes are ranked similarly for each city as they appear in the pooled data model. Beijing is the city with the highest WTP for the brand, qual-

ity, and certificate while Chengdu rose to the second-highest from the bottom in the customer model. This showed that managers in Chengdu are willing to pay a very high price for each attribute even though the customers are not willing compared to their counterparts in Shanghai and Guangzhou. This difference between customers and managers indicate that the food service sector competition is more intensive as the customers are locally confined while the suppliers are beyond city limits, thereby requiring restaurants to pay a higher cost to purchase ingredients with better quality even though the customers are not ready to pay a high price for the food.

The very high discount for EU and US genes by Beijing restaurants relative to other cities is directly related to the major duck dish sold in Beijing, the Peking Roast Duck. This dish traditionally uses a special variety called Beijing Filled Duck which has more fat for the desired crispy skin, and despite the consumer health awareness is raised against fat in China, the restaurants place more attention on taste than health when compared to a home-made meal. Nevertheless, new style Peking Roast Duck dishes have been introduced by luxury restaurants using leaner ducks than the traditional ones.

Table 4. Parameter Estimation and WTP for Attributes by Managers

	Whole Sample ^{1,2}	Beijing	Shanghai	Chengdu	Guangzhou
<i>Mean</i>					
Price	-0.071 (0.027)***				
Brand	0.30 (0.072)***				
Quality	0.63 (0.095)***				
Certified	0.62 (0.093)***				
US	-0.82 (0.097)***				
EU	-0.96 (0.13)***				
Opt-Out	-0.042 (0.027)				
<i>Standard Deviation</i>					
Brand	0.040 (0.10)***				
Quality	0.65 (0.14)***				
Certified	0.55 (0.23)***				
US	0.64 (0.19)***				
EU	0.81 (0.17)***				
WTP Estimates (¥/entrée)					
Brand	8.42 (1.71)***	36.70	7.66	8.49	3.50
Quality	17.69 (3.60)***	45.75	8.17	47.24	5.68
Certified	17.34(3.71)***	41.98	19.93	19.44	9.23
US	-23.05(4.41)***	-70.83	-20.57	-41.35	-11.70
EU	-27.00(5.48)***	-70.96	-22.02	-61.33	-8.62
Opt-Out	-0.59(3.03)	NA ³	NA	-6.12	-5.95

¹Standard errors in parenthesis; ²Significance at the 10%, 5%, and 1% level are indicated by *, **, and ***, respectively. ³The WTP for EU in Shanghai and US and EU in Guangzhou are not calculated because their corresponding coefficients are insignificant.

Table 5. Parameter and WTP for major attributes crossed with sales and price for managers

	Coefficients ²	Standard Deviation	WTP
Price (¥/Jin)	- 0.0748 (0.0282)***	N/A	N/A
Brand	0.2520 (0.1741)	0.0235 (0.1029)	8.69
Brand x Sales (¥100,000/yr)	0.0010 (0.0014)	N/A	0.03
Brand x Avg. Entrée Price (¥)	0.0009 (0.0045)	N/A	0.02
Quality	0.3367 (0.2291)	0.5773 (0.1104)***	16.69
Quality x Sales (¥100,000/yr)	- 0.0014 (0.0018)	N/A	- 0.04
Quality x Avg. Entrée Price (¥)	0.0090 (0.0057)	N/A	0.24
Certified	0.6427 (0.2374)***	0.4877 (0.1926)***	18.17
Certified x Sales (¥100,000/yr)	0.0044 (0.0021)**	N/A	0.12
Certified x Avg. Entrée Price (¥)	- 0.0037 (0.0060)	N/A	- 0.10
US	- 1.1269 (0.2306)***	0.6138 (0.2249)***	- 22.35
US x Sales (¥100,000/yr)	0.0000 (0.0019)	N/A	0.00
US x Avg. Entrée Price (¥)	0.0076 (0.0058)	N/A	0.20
EU	- 0.8640 (0.2795)***	0.7612 (0.1729)***	- 25.90
EU x Sales (¥100,000/yr)	0.0029 (0.0023)	N/A	0.08
EU x Avg. Entrée Price (¥)	- 0.0058 (0.0071)	N/A	- 0.16
Opt Out	- 0.0822 (0.2374)	N/A	- 1.10

¹Standard errors in parenthesis; ²Significance at the 10%, 5%, and 1% level are indicated by *, **, and ***, respectively.

There are also other sources of heterogeneity apart from the cultural differences associated with the locations and these include restaurant characteristics such as the scale and class in terms of the types of customers being served. Therefore, annual sales and average dish price were included in the model as a form of interaction with the main attributes as indicated in Table 5.

The only significant coefficient for interaction terms other than the main attributes is the positive cross between annual sales and certification. It was discovered that larger restaurants are willing to pay more on duck with additional food safety certification with each additional ¥100,000 sale per year observed to be pushing up the WTP for the certificate by a small amount of ¥0.12 per Jin. Meanwhile, the “class” of the restaurant, either high with expensive menu items or low with cheap menu items, does not make a difference. It is important to note that managers’ characteristics were excluded from the final model because of insignificance and the results showed that restaurants have more homogeneous preferences irrespective of their scale, “class”, and managers’ characteristics.

Comparison between Restaurant Customers and Managers

The results showed that restaurant managers in China have similar trends with their customers as indicated by their preference for domestic biotechnology to imported ones, additional safety

certification, and higher quality in terms of tenderness and ideal fat content. This means the restaurants understand their customers and are making efforts to satisfy them. However, their rankings of these attributes are slightly relatively different and this is associated with the possible incomplete transformation between the restaurants and customers at the processing stage. The direct consumer of ducks using the imported biotechnology is the food service industry and not the customers and this means the US and EU agribusinesses need to focus more on the preferences of the restaurant managers.

The highest preference of the customers is safety certification while the least is the premium quality, but managers prefer quality most followed closely by safety certificate. This is consistent with the findings of previous studies that restaurants are concerned with directly observable physical quality attributes such as fat content than the food safety attributes (Hwang & Ok, 2013; Medeiros & Salay, 2013). It was also discovered that customers discount US biotech more than EU biotech while the opposite was recorded for managers and this is associated with the fact that EU products, led by the UK Cherry Valley, have been in the Chinese market for a few decades while US products have recently started obtaining the recognition of the restaurants. Therefore, it is possible to use advanced biotechnology from the EU and US to assist in growing the ducks with ideal quality measures that meet the Chinese consumers’

preferences such as the fat content, size, and meat texture.

Consumers in first-tier cities are more willing to pay for branded, high quality, and certified duck due to the fact that they are mostly higher-income individuals. Therefore, agribusiness planning to enter the Chinese market should focus on first-tier cities to achieve maximum market penetration.

CONCLUSIONS

This study examined the consumer preference concerning food quality attributes in food service sectors using duck in China as an example. The restaurant managers and customers were differentiated as the direct and ultimate duck consumers and a choice experiment survey of these individuals in four major cities was used to calculate their WTPs for branded products, premium quality products, products with additional safety certificates, and those with the US or EU biotech origin. It was discovered that duck is commonly offered in restaurants with more than half of the customers surveyed found to order the dish sometimes or almost always. Moreover, the ducks used by these restaurants are mostly supplied by wholesalers with contracts and this is considered an important factor for large duck processors.

The preferences of managers and customers were generally observed to be similar and this means the terminal consumers' attribute demand is transformed consistently into the direct consumers' derived demand for the commodity. The results showed that they both prefer branded ducks with desired quality and safety as well as domestic biotech under the same safety and quality conditions. However, a small difference was observed and this involved the high preference of the customers for food safety while the directly observable physical quality attributes such as fat content were ranked higher by the restaurants. This was discovered to be in line with previous findings that Chinese consumers care most for food safety even though they have the opportunity to trade off the health and nutrition value of low fat with the taste and texture of the meat. This means food safety is very special and the restaurants in the Chinese market, specifically those in the food sector, need to place extra attention on this factor.

This trend was observed to be different in the retail sector where the direct consumers of raw ducks, restaurant managers, are more concerned with the duck quality most in terms of ideal meat/fat ratio, body size, and specific body part

sizes than the customers. Therefore, it is recommended that both domestic and international integrated duck firms improve the genetic characteristics of ducks to meet the taste preference of Chinese terminal consumers and also leverage their branded product with additional quality and safety attributes. It was also suggested that they work with the restaurants to provide information on duck brands, safety certificates, and other non-observable attributes on the menu.

The findings also showed strong regional differences in China with the first-tier cities including Beijing, Shanghai, and Guangzhou observed to accept imported biotech more and have higher willingness to pay for high quality, branded, and certified products. Therefore, it is also recommended that the right region and consumer segments be targeted by the restaurants and suppliers.

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