



Emerging markets for imported beef in China: Results from a consumer choice experiment in Beijing



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ABSTRACT

The purpose of this study is to explore emerging markets for imported beef in China by assessing Beijing consumer demand for quality attributes. This study utilizes data from an in-store choice experiment to evaluate consumer willingness-to-pay for select food quality attributes (food safety, animal welfare, Green Food and Organic certification) taking into account country-of-origin information. Our results show that Beijing consumers value food safety information the most, and are willing to pay more for Australian beef products than for US or domestic (Chinese) beef. We explore the various relationships between the quality attributes, find evidence of preference heterogeneity and discuss agribusiness and marketing implications of our findings.

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1. Introduction

Beef is emerging as an important source of protein in China. This is a result of rising urban incomes, beef being considered more of a luxury meat, and Chinese consumers' perception of beef as a healthy alternative because it is leaner than traditional pork containing untrimmed fat (Brown, Longworth, & Waldron, 2002; Longworth, Brown, & Waldron, 2001; Ortega, Wang, & Chen, 2015; Ortega, Wang, & Eales, 2009). Beef production in China grew close to twenty-fold during 1984–2012 from 343,000 to 6,732,000 tons while production of pork increased 3.7 times from 14,450,000 to 54,930,000 tons during the same period (China Statistical Yearbooks, 2014). Chinese consumer demand for beef is expected to increase in the future given projected growth rates in GDP, and the fact that lower-income household per capita consumption of meat remains significantly lower than that of their wealthier counterparts (Zheng & Henneberry, 2010).

With the exception of the 2004–2008 period, Chinese beef imports have risen since the early 1990s; a result of increased demand for beef (Fig. 1). Due to the bovine spongiform encephalopathy (BSE) outbreak reported in the U.S. in December 2003, beef imports, regardless of the country-of-origin, plummeted to the import level in the early 1990s during the 2004–2008 period. However, since 2008, consumer demand

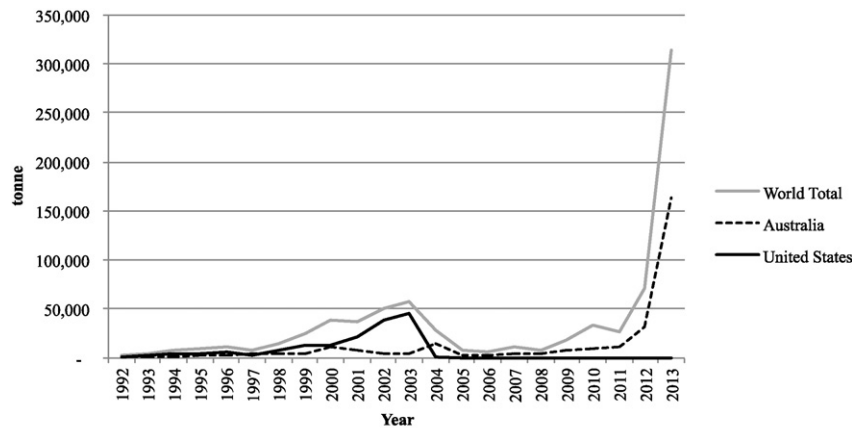
for imported beef has increased beyond the pre-BSE outbreak levels. From 2012 to 2013, beef imports increased 4.5 times. Specifically, the share of Australian beef has soared since China restricted U.S. beef imports in December 2003.

While beef consumption in China is rising, concerns about beef safety have increased significantly in recent decades (Feng, Fu, Wang, Xu, & Zhang, 2013). One of the reasons behind these worries is that frequent and lethal food safety incidents throughout China have heightened consumers' attention to the safety of their food supply. In 2003 and 2004, 1481 and 2305 cases of serious food poisoning accidents were reported resulting in 262 and 255 fatalities, respectively (Bai, Ma, Gong, & Yang, 2007). In addition, the growing incidences of animal diseases outside of China have also increased concerns over food safety. Many researchers have pointed out that outdated food safety laws, weak supervision, and the emergence of large-scale production and processing as fundamental reasons for the increase in unsafe food products (Lin, Zeng, Li, & Ni, 2010; Ortega, Brown, Waldron, & Wang, 2014a; Ortega, Wang, & Olynk, 2014b).

Because of the short development history of the beef industry that began with the economic reforms, no scientific research on beef safety has been conducted prior to the early 1970s (Epstein, 1969; La Fleur & Foscue, 1927). The number of studies related to food safety started to rise in the late 1970s (Lin et al., 2010) and can be classified into two primary approaches: the institutional approach and the consumer preference approach. The former has primarily addressed government regulations, organizational issues, and food safety control systems. Bai

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Source: UN Commodity Trade Statistics, UN Statistics Division

Fig. 1. Beef imports into mainland China.
Source: UN Commodity Trade Statistics, UN Statistics Division.

et al. (2007) studied the status of food safety and the two primary types of food safety assurance systems: compulsive food safety admittance and voluntary food safety consumer assurance systems. They reported that both the Chinese government and food companies have moved in a positive direction to enhance the quality and safety of food products. Waldron, Brown, and Longworth (2010) identified optimal agricultural modernization strategies, and found that the fast-track development of high-value, modern, and large-scale supply chains is a risky plan, and a gradual and facilitative approach to modernization with the development of mid-value supply chains is more appropriate. More recently, Feng et al. (2013) explored the advantages and obstacles of a cattle/beef traceability system using radio frequency identification (RFID) technology that has been developed to improve food safety and reassure consumers.

Studies utilizing the consumer preference approach have focused on simple changes in consumer preference trends related to beef safety in China. Brown et al. (2002) noted that consumers have a higher willingness-to-pay (WTP) for safe beef products because of their concerns over products contaminated during production or after slaughter. However, only markets in major cities such as Beijing, the focus of this study, have the capability to provide premium-quality beef to consumers. Consumers are less likely to buy beef products from cattle raised in remote pastoral areas considering those regions carry the highest risk for contamination that is caused by unsanitary environments and long transportation distances. Wu, Xu, and Gao (2011) found that Chinese respondents in urban areas would be willing to pay more for certified traceable food, including beef, after becoming aware of a food traceability system. In contrast to these studies, this paper evaluates Beijing consumer preferences for various aspects of beef quality taking into account country of origin information.

Methodological approaches to assess consumer preferences for food quality vary depending on the objective of the research. These often include regression analysis, factor analysis, structural equation modeling and experimental methods such as discrete choice analysis and experimental auctions, among others. Discrete choice modeling in particular has been a popular tool used to analyze factors affecting food choice, including various dimensions of food quality (e.g. Loureiro & Umberger, 2007; Lusk & Schroeder, 2004; McKendree, Widmar, Ortega, & Foster, 2013). Prior research on Chinese consumers has analyzed preferences for quality in overall food products (e.g. Yin, Wu, Du, & Chen, 2010) as well as staple products such as pork and dairy products (e.g. Ortega, Wang, Wu, & Olynk, 2011; Ortega et al., 2014a, 2014b; Bai, Zhang, & Jiang, 2013; Ortega, Wang, Olynk, Wu, & Bai, 2012). However, little is known about food quality attributes and their economic value for beef in China. This study provides an economic assessment of Beijing consumer preferences for select quality attributes in beef, including country

of origin, enhanced food safety information, animal welfare, and organic food certification by using a choice experiment.

2. Material and methods

2.1. Methods

In order to analyze consumer preferences and demand for quality attributes, we utilize a discrete choice experiment (CE) approach. The CE methodology has been applied to a wide range of food studies to understand individual preferences for food attributes over the last decade. The CE technique enables researchers to easily compare demand for intangible attributes or characteristics such as food safety and animal welfare assurance, which are often not revealed in markets. Once researchers select the attributes that are expected to affect consumers' choices and carefully design the options and levels of the choice decisions, they are able to determine which characteristics have the strongest effect on consumer preferences and derived demand. By estimating interaction terms between attributes, the CE approach also allows for exploration of how attributes are related to each other (i.e. imperfect complements or substitutes) even though respondents are not asked to directly answer how important each attribute is to them.

Choice experiments are rooted in Lancasterian consumer theory (Lancaster, 1966) and random utility theory (Hanemann & Kanninen, 1999; Manski, 1977; McFadden, 1974; Thurston, 1927). The Lancasterian approach to consumer theory assumes that utility is derived from the characteristics of goods rather than from the goods themselves. In the present context, consumers derive value from beef characteristics such as country of origin, food safety and other product certifications, rather than the beef per se. As such, models based on random utility theory assume that consumers select the bundle of product characteristics (or alternative) which provides them with the highest utility or value (Cascetta, 2009). In these experimental settings, consumers are asked to choose among a series of alternative attribute bundles. More formally, suppose that individual n faces K alternatives contained in ψ . We can define an underlying latent variable V_{njs}^* that denotes the indirect utility function associated with individual n choosing option $j \in \psi$ during choice task s . Given a budget constraint, individual n will choose alternative j so long as $V_{njs}^* > V_{nks}^* \forall k \neq j$. The researcher does not directly observe V_{njs}^* , but instead directly observes the actual utility maximizing choice V_{njs} , where:

$$V_{njs} = \begin{cases} 1 & \text{if } V_{njs}^* = \max(V_{n1s}^*, V_{n2s}^*, \dots, V_{nks}^*) \\ 0 & \text{Otherwise} \end{cases} \quad (1)$$

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