Chinese consumer's perceptions of beef

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Abstract. China has experienced rapid economic growth over the last 26 years. As per capita income has increased, household consumption has become greatly diversified, and many food new products have entered the market. Beef is slowly gaining ground relative to the more traditional pork products.

This research examined factors affecting beef purchasing decisions in China. The effect of socioeconomic and demographic characteristics, together with other influences on preferences, was analysed using probit regression analysis. Compared with other meats, the relatively high price of beef (34%) and consumers' unfamiliarity with its cooking method (26%) are the main limitations for beef consumption. These are followed by 'don't like the taste and smell' which shows that compared with pork, beef is still relatively new to Chinese consumers and some of them are not used to the flavour of beef products. Han Chinese are more ready to accept beef than Non-Han Chinese. The characteristics of target consumers who show a preference towards beef are: residents of urban areas, a small family or a family with more males over 16 years old, the young (below 45 years old) and well educated, possessing a good income and who considered safety, price and ease of preparation as important purchasing criteria.

Keywords: beef, consumer's perception, Chinese beef consumption

Introduction

The People's Republic of China, the most populous country in the world, has experienced rapid economic growth over the last two decades. With the subsequent rise of personal income levels, household consumption has become greatly diversified. With respect to food consumption, many new products have entered the market. In meat products, beef is slowly gaining ground relative to the more traditional pork products. Chinese beef consumption is of great importance for market analysis and strategic business planning for various industries both in and outside China. The newly emerging changes in consumer preference and the introduction of Western ideas about beef consumption may require higher quality beef. The quantities, variety, and quality specifications for beef and their likely changes in the future are crucial to those who are involved in long-term livestock industry planning (Wang *et al.* 2004).

It is imperative for the policy makers of China to have a better understanding of the current increase of beef consumption and its likely change in the future when they are making decisions on nutrition planning and managing meat supply (Tian 2003).

Chinese beef consumption will have a great impact on world beef trade. On the one hand, if China chooses to import more beef directly from other countries, simply because of the huge volume demanded, it would change world beef trade patterns. On the other hand, if China chooses to produce beef itself, the relationship between beef consumption and production will decide the level of China's participation in the world beef market.

In addition, the development of domestic beef production, stimulated by the increasing beef consumption in China, would require more feed grains. An increase in feed grains production will lead to a decrease in food grains production as China's land resources are quite limited, and vice versa. China may import either more food grains or feed grains, if beef consumption rises. The quantity of grains consumed by the Chinese has been a great food security concern for the Chinese government. This also may be a major factor influencing world grain trade, which may impact on the price of grain and the income of grain farmers both in China and overseas.

Thus, the development of the Chinese livestock industry is likely to have a great influence on world grain trade (Tian 2003). Subsequently, trends in Chinese beef consumption have attracted the attention of international beef trading agencies.

The objective of this study is to examine the rising consumption of beef in China, with a focus on consumer perceptions and purchasing behaviour. The remainder of the paper is organised into five sections. The next section contains a review of previous research followed by sections describing the methodology, and results and discussion. The last section contains implications of the study.

Previous research

During the transitional period of the last two decades, substantial research has been carried out on various issues related to the Chinese economy. In the initial stage, China's national food security had been a topic of interest to both politicians and academics (Brown 1995). Later, research topics focused on more diversified subjects, such as household consumption patterns (Fan *et al.* 1995; Gao *et al.* 1996; Wu 1999), market development (Huang 1998), food demand (Halbrendt *et al.* 1994; Huang 2001) and animal product consumption (Zhou and Tian 2004; Wang *et al.* 2004; Bean and Zhang 2005). Many studies relevant to food consumption changes revealed that meat consumption growth in China was closely linked to rises in consumer incomes (Lewis and Andrew 1989; Fan, Wailes and Cramer 1995; Huang 1999; Wang *et al.* 2004, Ma *et al.* 2006).

Longworth *et al.* (2001, p. 298) believed that the consumption of ruminant meat in China, "was greater the higher the level of income". They also found that there was a strong seasonal pattern in consumption of beef and beef offal in China, with throughput being greater in winter than other times of year. Hu (2000) identified the gender imbalance in beef consumption. He explained it as a Chinese belief that beef was a hot and aggressive food that was good for males according to the Chinese traditional medicine theory. Wang *et al.* (2004) indicated a significant gap in animal products consumption between urban and rural regions of China. Zhang (2002) showed that higher variety-seeking consumers tend to be younger, better educated and more affluent. In a report on consumer behaviour towards meat in Germany, Becker *et al.* (1998) pointed out that meat consumption was expected to decline with age. It has been remarked in the literature that differences in consumer decision making and aging may impact on age-related lifestyle, taste and preference patterns (Burton *et al.* 1994; 1996).

Jarvis and Wilcox (1973) discussed the evoked set method, which investigates consumer decision behaviour when confronted with choices of alternative goods or services. They justified this method of analysis, above various other theoretical frameworks, by addressing the importance of consumer's experience, socioeconomic background and preferences in purchasing decisions. The empirical results also supported the use of the method. Foltz, Dasgupta and Devadoss (1999) applied this method to investigate consumer purchasing behaviour towards trout products in the US. They gave insight into consumer demand for trout products by investigating consumer perceptions of trout and explaining their purchasing decisions from the standpoint of their socioeconomic / demographic background, rural / urban experiences and personal preferences.

After two decades of economic expansion, a temporary surplus supply of agricultural products has occurred in China (Zhang 2002). In addition, the Chinese consumer's role and position have become increasingly more important as living standards have improved. Consumer research related to China includes analyses of consumers' purchasing behaviour (Samuel *et al.* 1996), segmentation of consumers' food consumption patterns (Veeck *et al.* 2000), and consumers' dietary patterns (Chen 1995) and cultural issues (Shono *et al.* 2000; Zhang 2002). All the studies provide general information about Chinese food consumption issues, but until now little attention had been paid to investigating the consumers' perceptions towards a specific food item such as beef. This is important for business planning and policy making.

Methods of analysis

As noted above, the purpose of the study was to provide a better understanding of consumer purchasing behaviour towards beef in the Chinese market. In accordance with this purpose, data were collected and analysed to investigate consumer attitudes towards beef. Theoretical and empirical studies of consumer behaviour suggested that a consumer's socio-economic and demographic characteristics affect beliefs, which in conjunction with product attributes, impact product perceptions (Engle and Kouka 1995; Foltz, Dasgupta and Devadoss 1999). Socio-economic factors, rural and urban experience, product attributes and marketing

methods employed by sellers have a certain impact on purchasing behaviour (Engle and Kouka, 1995; Nauman *et al.* 1995). Hence, respondents to our survey were required to recall their beef consumption and other issues during the previous week.

Two types of dependent variables were developed in the analysis: binary choice variables and multi-choice variables. Accordingly, a binary choice model and a multi-choice model were used to explain these two types of variables, respectively.

Binary choice model (Probit)

Binary choice variables indicate whether a consumer wants to buy a product or not.

Assumptions:

1. Variable=1 the consumer wants to buy beef product

2. Variable=0 the consumer doesn't want to buy beef product

3. Error term ε in the regression of latent dependent variable follows a standard normal distribution.

The probability that a binary choice variable (y1) =1, i.e. a consumer is willing to buy beef is given by:

P [consumer i wants to buy beef] = $\phi(\beta X_i)$

Where P is the probability ;

β is a (k×1) vector of regression coefficients;

X_i is a (k×1) vector of k regressors for the i_{th} consumer; and

ϕ denotes the standard normal cumulative distribution function (CDF)

Independent variables are shown in Table 1. Given a sample of n observations, a likelihood function can be developed from the above design and maximized with respect to β in order to obtain the maximum likelihood estimates (MLE) $\hat{\beta}$.

Multi-choice model (Ordered probit)

Multi-choice variables give different degrees of willingness to purchase products. The multi-choice variables are developed from survey questions in which respondents had the opportunity to indicate on a Likert scale to show how frequently (never, rarely, sometimes or often) they buy the beef product. An ordered probit model is conceptualised around a regression model such as:

$$Y^* = \gamma X + \varepsilon$$

where,

Y^* is the dependent variable, that represents a consumer's expressed frequency of purchase (y2=0, 1, 2, or 3);

γ is a (k×1) vector of regression coefficients;

X is a (k×1) vector of k regressors for the ith consumer; and

ε is a standard normal error term.

Data

Information about consumer perceptions of beef and consumption data was obtained through a consumer survey in the winter of 2005 in China. The questionnaire contained questions on the weekly frequency of beef consumption, its market outlets, purchase behaviour, product perceptions regarding different attributes, and some questions about other meats consumed in China. The questionnaire was first designed in English and discussed intensively with different sector experts and consumer researchers. It was then translated into Chinese. The translated questionnaires were pre-tested. Consumers from different age, gender and income categories were asked to answer the questions and then give their comments on the contents and design of the questionnaire. Valuable comments were received concerning the length and the structure of the questionnaire that led to a redesign to make it more concise and friendlier. Based on this feedback, some products, such as duck and fish were deleted; the questionnaire was restructured and finalised for the survey.

A stratified data collection method was applied to draw samples. One thousand questionnaires were sent out, of which 340 were completed and returned, resulting in a response rate of 34%. A sample of 340 is sufficient to ensure validity in this kind of exploratory study. Jiangsu, Shandong, Liaoning, Sichuan and Inner Mongolia provinces were chosen to form our urban samples. Jiangsu, Liaoning and Inner Mongolia provinces were chosen to form our rural samples. The sample size of each province exceeded 30 to enable us to draw small-sample conclusions effectively.

Respondents differed considerably in age, education, income and ethnic group. Demographic characteristics of the sampled consumers, disaggregated by urban and rural residents, are reported in Table 2. Han Chinese in our sample accounted for 92.9%, Whereas it is 90.6% according to the 2005 Chinese 1% population census. Moreover, the

average household size is 3.03 and 3.13 respectively in our survey and in the population census respectively, indicating that our sample data are quite representative.

Table 1 contains definitions of the independent variables used in the regression models that were developed from the survey questionnaire. The regressors were classified into three categories that were assumed to explain consumer perceptions, i.e. consumer's socio-economic/demographic background, urban and rural experience and personal preferences. The regressor selection procedure in each model was based on choosing variables from each of the three categories that maximised a regression Likelihood Ratio Index as per Green (2002).

Results and discussion

Descriptive Results

Information on the reasons for not purchasing beef both in urban and rural areas is provided in Table 3. Compared to other meats, the relatively high price of beef (34%) and consumers' unfamiliarity with its cooking method (26%) are the main perceived limitations for beef consumption. These are followed by '*don't like the taste and smell*' and '*other reasons*' which shows that compared with pork, beef is still relatively new to Chinese consumers and some of them are not used to the flavour of beef products.

Table 4 presents the consumers' responses to the eight main attributes of beef, based on their importance of perception. It shows that most consumers rank safety and freshness as the most important attributes for beef, followed by smell and taste, nutrition and colour. Consumers' deep concern about safety shows that China at present lacks the ability to implement quality controls; unsafe food has partly dampened consumers' confidence. In addition, Chinese consumers prefer fresh, even live products and enjoy the smell and taste of the foods.

According to the survey, '*price*' and '*easy to cook*' appear not very important attributes among beef consumers, especially in urban areas. This is mainly because more and more consumers are inclined to eat beef away from their homes (Ma, Huang and Rozelle 2006), or just buy processed beef products regardless of the higher price. It was confirmed by previous studies that much busier lifestyles and rising incomes would generate market segments for food-away-from-home and convenience foods (Veeck 2000; Ma, Huang and Rozelle 2006).

Table 5 indicates that among beef consumers both in urban and rural areas, fresh beef ranks highest as a product type (urban 26%, rural 10% and all 21%), followed by pre-cooked beef (urban 20%, rural 5% and all 15%). These results are in agreement with the previous literature on Chinese consumers' preference in relation to freshness of meats (Zhang 2002). Frozen beef is the least popular type. Chilled beef is a rather new concept to Chinese consumers. It is offered mostly at supermarkets with good refrigerator facilities.

Consumers' preferences on market outlets for beef product are listed in Table 6. The wet markets and supermarkets were the main market outlets for beef. Though the wet markets retained their dominant position for selling meats, the supermarket is becoming an increasingly important market outlet in urban areas, as the market development brings convenient access to modern supermarkets and more consumers are aware of food safety that the supermarket can more easily guarantee. Specialty markets are not very popular for household purchases, but it is common for restaurants to purchase their produce for meat dishes from this source.

Regression Results

The results of a Probit regression where the dependent variable is the binary choice of purchasing beef are presented in Table 7. The LR statistic (5 df) value of 119.41 and McFadden R-squared of 0.60 indicates joint significance of all the regressor coefficient estimates.

The estimated coefficient of the dummy variable of urban/rural experience has a positive and significant value of 0.779, indicating that there is difference between urban and rural consumers, with respondents in rural areas less inclined to purchase beef. The positive sign for ethnic groups shows the Han Chinese are more ready to accept beef than Non-Han Chinese. The estimated coefficients of the two dummy variables for '*safety*' and '*easy to prepare*' suggest that these are important criteria in purchasing decisions. The estimated coefficient of '*income*' has a positive sign at just below the 10% significant level. This is suggestive of beef consumption increasing with income.

Results from an Ordered Probit regression where the dependent variable represents frequency of consuming beef are shown in Table 8. The LR index value of 0.198 indicates joint significance of all the regressor coefficient estimates.

Like the result of the Binary Probit regression, the estimated coefficient of the dummy variable of urban/rural experience from the Ordered Probit regression shows that urban residents are more inclined to

consume beef. However, the results from Ordered Probit regression tell us more about the target consumers. The negative sign of family size indicates that the bigger the family is, the lower the probability of consuming beef. This is because on the one hand it is hard to coordinate different tastes in a big family, and on the other hand it costs more than other meats to a big family. As we had mentioned above, beef is relatively expensive. The regression results also indicate that the number of males in a household who are older than 16 years has a positive effect on beef consumption, which is in line with the previous literature that beef is regarded as a male food under Chinese culture. The positive sign for income indicates that increasing income stimulates higher beef consumption consistent with the proportion of meat in household diets increasing with income (Ma *et al.* 2006). The negative effect of age on beef consumption agrees with the conclusions of Burton (1994) and Becker *et al.* (1998) that meat consumption is expected to decline with age. Education has a positive influence on beef consumption since higher education might enrich the nutrition knowledge by identifying beef as a nutritious food item and good for health. The remaining regressors in Table 8 are dummy variables for '*safety*', '*price*' and '*easy to prepare*', which have statistically significant coefficient estimates, implying they are important criteria in consumers' decision-making processes.

Hence, according to the regression results, the characteristics of target consumers who show a preference towards beef are: residents of urban areas, smaller families or families with more males over 16 years old, young (below 45 years old) and well educated people, possessing a good income and who consider safety, price and ease of preparation as important purchasing criteria.

Conclusions

This study gives an insight into consumer demand for beef products by investigating consumer perceptions of beef and explaining their purchasing decisions from the standpoint of their socio-economic / demographic background, rural / urban experiences and personal preferences. It also draws significant conclusions regarding characteristics associated with consumers that show a tendency toward purchasing beef. Such information provides a valuable basis for developing efficient marketing strategies and equipping the sellers with ideas for beef products for which there is a potential high demand.

Several key findings were obtained from the survey data. First, a large segment of consumers purchase beef because they perceive that it is good for their health, due to its nutritional value. Second, pre-cooked beef is in higher demand according to our survey. Third, non-buyers dislike beef because of its perceived relatively high price and lack of product and preparation information. Hence, an initial step to increasing consumer demand for beef could involve disseminating positive information about beef products to persuade them that it is worth buying, and developing recipes that give variety to the methods of beef preparation. The focus should be on recipes that are healthy and relatively easy to prepare.

Several marketing implications of these results are as follows:

(a) currently beef sellers should focus on urban areas;

(b) it is much easier for the sellers to market beef in communities with a large proportion of Han Chinese, for our results show that the Han Chinese are more ready to accept beef than Non-Han Chinese.

(c) advertising campaigns should highlight the healthiness of beef. Such advertisements could also feature beef as being good for women and children because it is rich in iron.

As Longworth, Brown and Waldron (2001, p. 300) pointed out, the strong seasonal pattern in beef consumption may lead to errors in predicting the situation for the whole year. Our survey was carried in winter, therefore indicating a limitation to our survey. Further research also needs to study the beef consumption issues related to consumption away from home, since it is becoming a more important part of Chinese food consumption, especially in urban areas.

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Appendix

Table 1 Categories and definitions of independent variables used in the regression models

Socio-economic Category	
Age	Decision maker's age
Number of males	Number of males over 16 in survey family
Family size	Consumer's household size
Income level	Consumer's household income level
Education	Decision maker's education level
Ethnic Group	Dummy variable; 1 if consumer's ethnic group is Han Chinese
Urban / Rural Experience	
Urban / Rural	Dummy variable; 1 if consumer is in urban areas
Consumer Preferences Category	
Smell and Taste	Dummy variable; 1 if smell and good taste is important to the consumer
Freshness	Dummy variable; 1 if freshness is important to the consumer
Safety	Dummy variable; 1 if cleanliness and safety is important to the consumer
Cooking Method	Dummy variable; 1 if cooking method is important to the consumer
Nutrition	Dummy variable; 1 if nutrition is important to the consumer
Health Concern	Dummy variable; 1 if health concern is important to the consumer
Price	Dummy variable; 1 if price of beef product is important to the consumer
Market Outlets	Dummy variable; 1 if market outlet is important to the consumer

Table 2 Demographic characteristic of the surveyed consumers

	Survey sample			2005 1% population census
	Urban	Rural	All	
Average	3.06	3	3.03	3.13
Average age of	45	44.6	44	
Maximum (minimum) age	79 (22)	77 (20)	79 (20)	
Education level of decision makers (% of the samples)				
Less than primary	10.78	33.33	17.9	
Middle school	17.24	42.59	25.3	
High school	32.33	24.07	29.7	
College graduate	38.79	0	26.5	
Advanced degree	0.86	0	0.59	
Ethnic group				
Han Chinese	93.5	91.67	92.9	90.6
Non-han Chinese	6.5	8.33	7.06	9.4
Annual family income				
Less than RMB	2.16	28.7	10.6	
RMB6000-10000	3.02	28.7	11.2	
RMB10001-20000	21.98	26.85	23.5	
RMB20001-30000	28.45	9.26	22.4	
More than RMB 30001	44.4	6.48	32.4	
Total number of	232	108	340	

Table 3 Reasons for not purchasing beef

Reasons	Percentage of respondents (%)		
	Urban	Rural	All
Relatively expensive	33	35	34
Difficult to cook	31	17	26
Don't like the taste	17	21	18
Don't like the smell	11	16	12
Other reasons	8	11	10

Table 4 Consumers' attitude towards beef attributes

Importance in consumers minds (%)			Safety	Freshness	Smell and taste	Nutrition	Colour	Tenderness	Price	Easy to cook
Very important		U	84	82	59	54	50	46	33	20
		R	79	74	47	54	29	34	31	21
		A	83	79	55	54	44	42	33	20
Important		U	8	14	30	33	30	34	40	26
		R	15	18	37	26	55	35	43	33
		A	10	15	32	31	37	34	41	28
Unimportant		U	8	4	11	12	20	20	25	45
		R	3	4	8	11	11	16	19	24
		A	6	4	10	13	17	19	23	39
Very unimportant		U	0	0	0	1	10	0	1	9
		R	3	4	8	9	5	15	7	22
		A	1	2	3	2	2	5	3	13

Table 5 Beef product preferences among beef consumers

Beef product			Fresh	Pre-cooked	Dried	Chilled	Frozen
Frequency of purchase (%)	Often buy	U	26	20	13	3	1
		R	10	5	3	0	3
		A	21	15	10	2	2
	Sometimes buy	U	34	33	30	17	7
		R	37	25	27	3	1
		A	35	31	29	13	5
	Rarely buy	U	25	17	30	22	27
		R	33	27	27	22	21
		A	27	21	29	22	25
	Not likely to buy	U	15	30	27	58	65
		R	20	43	44	75	75
		A	17	33	32	63	68

Table 6 Consumers' decisions on market outlets

Market outlets			Wet market	Super-market	Specialty market
Frequency of purchase (%)	Often	U	26	21	15
		R	29	1	1
		A	26	15	11
	Some-times	U	29	27	19
		R	38	14	5
		A	32	24	15
	Rarely	U	18	20	16
		R	22	26	7
		A	19	22	13
	Never	U	27	32	50
		R	11	58	87
		A	23	39	61

Table 7 Probit regression results with dependent binary variable

Independent variable	Coefficient
Intercept	-3.549*
Urban/Rural	0.779*
Income	0.257*
Ethnic groups	1.657*
Safety	3.256*
Easy to prepare	0.920*

Note: McFadden R-squared=0.60, LR statistic (5 df) =119.41, Probability (LR stat)=0.00 implying joint significance of all regressor coefficient estimates.

'*'Signifies that the estimated coefficient is significantly different from zero with α=10%.

Table 8 Ordered probit regression results explaining consumer beef consuming frequency

Regressor	Coefficient estimate
Urban/Rural	0.397*
Family size	-0.272*
Number of Male over 16	0.597*
Income	0.216*
Age	-0.027*
Education	0.134*
Safety	1.614*
Price	-0.309*
Easy to prepare	-0.323*
μ1	0.952*
μ2	2.645*

Note: LR index (Pseudo-R2) = 0.198, LR statistic (9 df) =164.49, Log likelihood = -332.359, and Restr. log likelihood = -414.606 implying joint significance of all regressor coefficient estimates.
'*'Signifies that the estimated coefficient is significantly different from zero with α=10%.