

**Shanghai consumer studies:**  
With attention to livestock, dairy and horticulture  
products

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# Contents

	Page
<b>Preface</b>	7
<b>Summary</b>	9
<b>1. Introduction</b>	11
1.1 Research Plan	11
1.2 Field work	11
1.3 Demographic Information	12
<b>2. Descriptive analysis</b>	13
2.1 Frequency of consumption	13
2.2 Market outlet choice	13
2.3 Consumption trend	14
2.4 Product portfolio analysis	15
<b>3. Livestock products</b>	17
3.1 Importance of meat attributes	17
3.2 Chicken purchasing habit	17
<b>4. Dairy products</b>	19
4.1 Consumption of dairy products in Shanghai	19
4.2 Composition of fresh milk consumption	20
4.3 When fresh milk is drunk	20
4.4 Origin of milk or milk powder	21
<b>5. Horticultural products</b>	22
5.1 Supermarket purchase of vegetables	22
5.2 Consumption of cut flowers and potted plants	22
<b>6. Knowledge of imported food products</b>	23
<b>7. Dutch products in China</b>	24
<b>8. Frequency of consumption and income level</b>	25
<b>9. Variety-seeking tendency</b>	28

	Page
<b>10. Product consumption variables</b>	30
10.1 CATREG regression	30
10.2 Model fit	31
10.3 Relative importance of each factor in influencing product consumption	31
<b>11. Major research findings</b>	33
<b>References</b>	35
<b>Appendix</b>	
1. Questionnaires	37
2. CATREG Regression	44

## Preface

Within the framework of the research project 'Agribusiness and Food Industry in the Yangtze Delta and the Netherlands', also referred to as 'The Experience of Dutch Agricultural Development and its Importance to China', a survey was carried out on Shanghai consumers. Little knowledge is currently available about their preferences and perceptions of food products, so that this exploratory study contributes to a better understanding of consumers in the Shanghai area. This report aims to provide Dutch agribusiness and food industry as well as Dutch policy makers with insights that they may use for their own strategy or policy development towards China, in particular towards the Shanghai area.

The consumer study was executed by LEI researcher Dr. Xiaoyong Zhang. In May 2000, she visited Shanghai to supervise the field interviews. The interviews were carried out by experienced graduate students from four local universities. Their support was indispensable. We would also like to extend our gratitude to Mr. H. van der Kooi (LNV), Mr. Li Weimin (IAE-CAAS), Mr. Gan Jingtian (SAAS), Mr. H.J.M. Hansman and Mr. T.H. Jonker (LEI) for their co-operation and commitment.

The Managing Director,



Prof. Dr. L.C. Zachariasse





## Summary

This report aims to provide Dutch agribusiness and food industry as well as Dutch policy makers with insights that they may use for their own strategy or policy development towards China, in particular towards the Shanghai area. It falls within the framework of the research project 'Agribusiness and Food Industry in the Yangtze Delta and the Netherlands', also referred to as 'The Experience of Dutch Agricultural Development and its Importance to China'.

Although consumers in Shanghai are experiencing dramatic changes, very little is known about their behaviour, attitudes and awareness. The objective of this study is to better understand Shanghai consumers' consumption, patterns, their use and perception of livestock, dairy and horticultural products, as well as their knowledge of foreign products. Food consumption and consumer behaviour trends in Shanghai can be considered as indicative for the development of food consumption patterns in China.

A consumer survey with a formal questionnaire in Chinese was used to collect primary data. Stratified data sampling was used to draw samples. Local graduate students carried out the interviews with 300 people in-home on a face-to-face basis. Interviews were held with people in each of Shanghai's districts. Eleven products were included in this survey, namely pork, beef, lamb, chicken, duck, fresh milk, milk powder, yoghurt, eggs, vegetables and cut flowers. The questionnaire measures the frequency with which these products are consumed, market outlets, purchase behaviour, consumption trend, perceptions of products according to different attributes and the consumer's image of foreign products.

The main conclusions are as follows:

- Of the eleven products studied, vegetables, fresh milk and eggs are the most frequently consumed in Shanghai.
- The products are mainly purchased in open markets. However, supermarkets are the primary market outlets for dairy products.
- According to classification the product portfolio matrix, fresh milk and beef are star products (i.e., high-growth market leaders with a continuing growth potential). Yoghurt and cut flowers are question mark products, which means they currently have a low market penetration but with growth potential. Chicken, egg and pork are cash cow products, because they have a high existing market share and a low growth potential. Milk powder is a dog product for its low market share in combination with little chance for further growth.
- The two most important variables with respect to meat attributes are 'freshness' and 'hygiene'.
- Shanghai consumers prefer live chickens to frozen or refrigerated chicken.
- 91% of the households consume fresh milk, and 65% say that they drink milk everyday. Milk consumption normally occurs both in the morning and in the evening.

- Only 15% of the households report that they have ever consumed cheese. The profile of cheese consumers is younger, higher income, well educated and more variety - seeking.
- Consumers buy vegetables in the supermarket primarily because of its convenience.
- Half of consumers bought cut flowers during the last half year. The profile for flower purchasing consumers is younger, higher income, well educated and more variety seeking.
- The most popular imported fruits are from the United States, Thailand, New Zealand and Japan; the most popular imported milk powder are from the Netherlands, New Zealand and the United States. The principal image of imported products is expensive.
- 'Dutch Cow' is the most famous Dutch brand name in Shanghai; the most frequently purchased Dutch food product is milk powder.
- The consumption of flowers, yoghurt, beef and chicken are highly correlated with consumers' income level, while the consumption of vegetables, eggs and fresh milk are not significantly connected with income level.
- Consumers' variety-seeking tendencies are correlated with their age, education and income level.
- Market strategy for each product should be formulated based on the most important factors influencing their consumption. The most important factor affecting for pork and chicken consumption is market availability. The most important factor affecting beef consumption is price. Consumers' primary concern about fresh milk is its taste. The primary factor influencing the purchase of flowers is consumers' education level.

# 1. Introduction

One of the objectives of this research project is to analyse the developments in the Yangtze Delta with special attention to market opportunities for Dutch agribusiness. Though consumers in this region are experiencing dramatic changes, very little is known about their behaviour, attitudes, and awareness. The objective of this study is to better understand Shanghai consumers' consumption, patterns, their use and perception of livestock, dairy and horticultural products, as well as their knowledge of foreign products.

## 1.1 Research plan

Given the limited knowledge currently available about Shanghai consumers, this study takes an exploratory approach to provide insights and a better understanding. A direct consumer survey with a formal questionnaire was used to collect primary data. Stratified data sampling was used to draw samples. A sample of 300 is sufficient for this kind of exploratory study. Local graduate students carried out the interviews in-home on a face-to-face basis.

The questionnaire was first designed in English in the Netherlands and discussed intensively with sector experts and consumer researchers. After being revised several times, it was then translated into Chinese by a Chinese marketing researcher under consultation with two Chinese economists. Eleven products were included in this survey: pork, beef, lamb, chicken, duck, fresh milk, milk powder, yoghurt, eggs, vegetables and cut flowers. The questionnaire measures the frequency with which these products are consumed, market outlets, purchase behaviour, consumption trend, perceptions of products according to different attributes, the consumer's image of foreign products, etc. Details can be seen in Appendix 1.

## 1.2 Field work

Pre-test: The translated questionnaires were first pre-tested. Four consumers of both sexes from different age and income level were asked to answer the questions and then give their comments regarding the content and design of the questionnaire. After considering their suggestions, the questionnaire was revised and finalised for field interview.

Sampling: The total Shanghai urban population is administratively divided into 12 districts. These mutually-exclusive districts formed our sample sub-population, also called 'stratum' in sampling. The total sample of 300 people was allocated to each district in proportion to its population. The sample size of each district varies from 21 to 30. At the second stage, 4 to 7 streets were chosen for each district based on their geographic

coverage by the help of a large Shanghai map. (The Shanghai map clearly identifies different districts by colour). In the end, around 70 streets were selected.

30 graduate students from four universities in Shanghai were selected and trained as field interviewers, several of whom already had previous interview experience. They were assigned to the selected streets in 12 districts, with four or five households on each street selected for interview. The interviewers were free to choose a starting point along this street and then systematically select each fifth household for interview. The person in charge of household work was asked to agree to the interview and a small gift was given at the end. Feedback from the interview indicates that the questionnaire is a bit long (taking more than 30 minutes to complete). The interviewers were also required to keep records on the total number of people contacted and the number who refused to participate. The reported refusal rate ranged from 20 to 50%.

### **1.3 Demographic information**

The average age of the interviewee was 39, with the youngest 19 and the oldest 74. 65% of those interviewed were female while 35% were male. 70% of the families were 3-person households, a direct result of China's one child policy. Interviewers were asked regarding the highest education attained by a member of the household. 53% of households had members with a high level of education (including both technical institute and university). 40% of the households had income per month between 1,500 yuan and 3,000 yuan, followed by 32% between 3,000 yuan and 5,000 yuan. Finally, interviewees were asked which ethnic group the family belonged to. All households except for one were Han Chinese, accounting for 99.7% of the sample.

## 2. Descriptive analysis

### 2.1 Frequency of consumption

The frequency of product consumption was separated into five categories from daily consumption to never. Table 2.1 presents consumption patterns according to product. Vegetables are by far the most frequently consumed product: 99% of Shanghai consumers have vegetables everyday. Fresh milk ranks second with around 70% of Shanghai consumers drinking fresh milk everyday while only 14% of consumers do not drink it (or seldom). Eggs and pork are also among the most popular products, followed by yoghurt and chicken. The least consumed products are sheep and duck. Another dairy product, milk powder, is becoming less attractive for Shanghai consumers, but a niche market can still be found. The market for flowers is less developed in Shanghai compared with food products; almost half of the people never purchase flowers.

Table 2.1 Frequency of product consumption or use (%)

Products	Everyday	One or twice a week	One or twice a month	Several times a year	Seldom or never
Pork	52.3	39.9	5.7	0.0	2.0
Beef	1.0	24.6	45.5	16.2	12.8
Sheep	0.7	5.1	19.3	36.1	38.9
Chicken	3.7	49.3	43.0	2.3	1.7
Duck	0.3	27.2	45.6	16.0	10.9
Fresh milk	69.9	10.5	3.7	2.0	13.9
Milk powder	10.2	6.3	7.7	14.0	61.8
Yoghurt	14.7	34.6	12.0	7.9	30.8
Eggs	63.0	34.7	1.0	0.3	1.0
Vegetables	99.0	0.3	0.3	0.3	0.0
Flowers	1.0	7.1	15.5	28.0	48.3

### 2.2 Market outlet choice

Consumers were asked to recall how many times they had purchased each product in different market outlets within a month. Five market outlets were presented: supermarket, open market, wholesale market, department store and grocery shops. Table 2.2 shows the number of times consumers purchased each products at different outlets during the last month. The last column indicates the number of consumers visiting the most popular outlet during the last month. The a) indicates the most popular market outlet for each product. For example, consumers bought pork in the supermarket on average 4.2 times last month.

The most popular market outlet for pork is the open market since 191 out of 298 consumers purchased pork at an open market during the last month.

Table 2.2 *Number of purchases made at different outlets over the last month (by product) (total sample 298)*

Products	Supermarket	Open market	Wholesale market	Department store	Grocery shops	Shoppers at most popular outlet
Pork	4.2	7.1 a)	5.5	0	0	191
Beef	1.8	2.3 a)	2	1.3	2	86
Lamb	1.6	2 a)	1	0	1	46
Chicken	2.3	2.8 a)	4.6	0	4	189
Duck	2.27	1.9 a)	3	0	4	106
Fresh milk	11 a)	6	0	3	5	145
Milk Powder	1.3 a)	0	1.5	1.5	1.6	50
Yoghurt	5.5 a)	9.2	0	1	1	140
Eggs	4.8	6.3 a)	3.3	0	9	177
Vegetables	16	23 a)	2	0	0	205
Cut flowers	1.6	2.2 a)	2.4	0	1.2	40

#### a) Most popular market outlet

As we can see, vegetables are the most frequently purchased products (average 23 times per month), followed by pork, fresh milk, yoghurt and eggs. The remaining products are only purchased once or twice a month. Supermarkets are the favourite market outlet for all three dairy products. The rest of the products are all most frequently purchased at the open markets. One should bear in mind that another important distribution channel for fresh milk, namely home delivery, is not included here.

### 2.3 Consumption trend

Consumers were asked to recall changes in their consumption of the various products during the preceding five years, as well as to make a forecast for the following five years. Table 2.3 summarises the changes during the last five years (1995-2000). As can be seen, the greatest increase in consumption is with fresh milk. Almost 80% of respondents say that their fresh milk consumption has increased between 25 and 75% during this period. Another dairy product, milk powder, shows a significantly smaller increase. Only 30% of respondents reported increased milk powder consumption, whereas more than 60% reported a significant increase in egg, yoghurt and chicken consumption. The changes for beef and flowers are moderate while a large proportion (20%) reported consuming less pork.

Table 2.3 *Percentage of consumption changes of different products in the past five years (total samples =298)*

Trend	Pork	Beef	Chicken	Fresh milk	Milk powder	Yoghurt	Eggs	Flowers
No change	27.9	49.7	30.0	19.8	62.6	34.9	20.1	54.9
Increase 25%	36.9	33.1	42.1	27.2	18.3	31.1	36.9	23.7
Increase 50%	13.4	9.5	16.8	30.9	6.9	15.6	26.8	7.8
Increase 75%	2.7	1.7	2.0	18.5	4.5	15.2	8.4	7.5
Decrease 25%	13.4	5.4	7.7	2.0	5.9	2.4	4.7	3.4
Decrease 50%	5.0	0.7	0.3	1.7	1.4	0.0	2.3	1.4
Decrease 75%	0.7	0.0	1.0	0.0	0.3	0.7	0.7	0.3

Table 2.4 *Percentage of consumption changes of different products in future five years (total samples =298)*

Trend	Pork	Beef	Chicken	Fresh milk	Milk powder	Yoghurt	Egg	Flower
No change	53.7	46.8	57.6	38.5	69.4	42.0	52.7	41.4
Increase 25%	18.8	39.9	26.6	33.8	19.8	37.2	29.5	39.7
Increase 50%	3.0	8.2	5.1	16.8	1.7	13.9	10.7	11.3
Increase 75%	0.7	1.7	1.3	7.8	0.7	3.8	3.0	5.1
Decrease 25%	19.8	3.4	8.4	2.4	5.2	1.7	3.4	0.3
Decrease 50%	2.3	0.0	0.3	1.0	1.7	1.4	0.7	0.7
Decrease 75%	1.7	0.0	0.7	0.0	1.4	0.0	0.0	0.3

Table 2.4 reports predicted consumption changes over the next five years. In the future, the most promising markets appear to be fresh milk, flowers, and yoghurt since more than half the consumers (58.2, 56.1 and 54.9% respectively) forecast various degree of increasing consumption of these products. Beef and eggs consumption are expected to increase considerably while the consumption of chicken and milk powder are not expected to change much. The largest decline will be in pork consumption since 24% of consumers predict a lower consumption over the next five years.

## 2.4 Product portfolio analysis

If we classify the various products according to the two dimensions consumption frequency and consumption trends, we can produce a four-category product matrix: stars, question marks, cash cows and dogs. Stars are high-growth market leaders with a continuing growth potential. Cash cows are net providers of cash and are characterised as having a high existing market share but a low growth potential. Question marks are products which currently have a low market penetration but with growth potential. They may become stars because the business is promising. Dogs are products with low market share positioned in low-growth situations with little potential for further growth.

Combining the information we obtained regarding frequency of consumption (Table 2.1) and the development trend of several products (Table 2.3 and Table 2.4), we assigned them to one of four categories as presented in figure 2.1.

		Consumption Frequency	
		High	Low
Consumption Trend	High	STARS Fresh milk; Beef	QUESTION MARKS Yoghurt, Cut flowers
	Low	CASH COWS Chicken, Egg, Pork	DOGS Milk powder

Figure 2.1 Product portfolio matrix

Fresh milk and beef are in the Star category given their strong growth trend and high penetration at the current market. Yoghurt and flowers belong in the Question Marks category in view of their current low market share but with promising future demand. There is great potential for both products becoming stars in the future. Chicken, eggs and pork are the net Cash Cows due to their already saturated markets. Milk powder is in the category Dogs due to both its low consumption level and low growth potential. The challenge for the milk powder market is to find niche markets, such as baby milk powder.



### 3. Livestock products

#### 3.1 Importance of meat attributes

Eight meat attributes were presented to consumers, such as freshness, hygiene, nutrition, product originality, quality, price, convenience and green food label. Consumers were asked to rank each attribute from '1' to '5', with '1' indicating the most important and '5' the least important. Table 3.1 compiles the rankings consumers made of different meat attributes, showing the percentage who placed each attribute at a certain rank. The bottom row indicates the average score given each attribute by the respondents. The table shows that consumers rank 'Freshness' as by far the most important attribute for meat products, with more than 60% ranking it as most important. 'Hygiene' ranks second while the least important attribute is 'Convenience' followed by 'Product origin'. This is consistent with the average scores presented in the bottom row, with 1.6 for 'Freshness' and 4.5 for 'Convenience'. Generally speaking, Chinese consumers prefer fresh, even live, products and do not care much about the time which has to be spent on the food preparation. Somewhat surprisingly, the traditional concern about 'price' is becoming less important among Shanghai consumers. The 'Green Food' label is issued by the Ministry of Agriculture in collaboration with other legal institutes; however, the survey shows that consumers are not generally aware of it yet.

Table 3.1 Consumers' choices with respect to meat attributes (%)

Importance	Fresh	Hygiene	Quality	Nutrition	Green label	Origin	Price	Convenience
First	61.8	19.6	14.7	6.5	10.3	6.1	3.0	1.1
Second	21.9	40.4	23.5	8.0	8.8	16.3	10.9	2.3
Third	11.5	21.1	36.0	25.9	11.8	10.2	13.9	9.1
Fourth	4.2	14.4	21.0	30.3	26.5	18.4	32.6	18.2
Fifth	0.7	4.6	4.8	29.4	42.6	49.0	39.6	69.3
Total	100	100	100	100	100	100	100	100
Mean	1.6	2.4	2.8	3.7	3.8	3.9	3.9	4.5

#### 3.2 Chicken purchasing habits

During the interview, we asked Shanghai consumers how often they purchase frozen, fresh cooling and live chickens respectively given a total of 10 purchases. The results are presented in Table 3.2. It shows that live chickens account for 6 out of 10 purchases, whereas frozen chicken account for only 1 out of 10, and fresh refrigerated chickens (the remaining) 3. This result indicates that Shanghai consumers prefer live chickens and purchase fewer frozen and refrigerated chickens. As almost all Shanghai households have

refrigerators, this result does not have to do with lack of freezer facilities; rather, it confirms the importance placed on the freshness of products. Similarly, the concept of fresh fish in Chinese is 'the fish can swim'.

*Table 3.2 Chicken purchasing habit in Shanghai, given a total of 10 times (% , sample = 294)*

Purchase frequency	Frozen chicken	Fresh cooling chicken	Live chicken
Zero times	56	27	4
Less than 5 times	42	61	34
More than 5 times	2	12	62
Total	100%	100%	100%
Average	1	3	6

To determine consumer preferences for different part of chicken, we asked respondents to say how often they might purchase different parts given a total of 100 purchases. It turns out that whole chickens are most frequently purchased (47%), followed by chicken wings (23%), chicken legs (18%), breast meats (8%), chicken heart and chicken liver.

## 4. Dairy products

### 4.1 Consumption of dairy products in Shanghai

Five categories of dairy products were selected and respondents were asked whether their families had ever consumed them in the past. These products included fresh milk, milk powder, cheese, ice cream and butter. The results are presented in Table 4.1. The most frequently consumed dairy product is fresh milk, consumed by 91% of respondents, followed by ice cream (81%). The least touched dairy products are cheese and butter with 85 and 71% consumers saying that they had never consumed cheese and butter respectively. Slightly more than half had used milk powder.

Table 4.1 Percentage of households consuming different dairy products

Products	Have consumed (%)	Have never consumed (%)
Fresh milk	91	9
Milk powder	53	47
Cheese	15	85
Ice cream	81	19
Butter	29	71

Though only 15% of respondents consume cheese, it would be interesting to know the characteristics of this group in order to identify market opportunities. Table 4.2 presents the test results for several demographic variables. Though sex appears to be insignificant, we found that cheese consumers are younger and enjoy a higher income and education, in addition, they are more variety seekers than the remaining consumers.

Table 4.2 Who are the cheese consumers

Demographic Variables	Chi-Square value	P value
Age	13.61	0.001
Sex	0.473	0.492
Income	9.571	0.008
Education	5.800	0.055
EBBT a)	2.987 (F test)	0.085

a) Exploratory buying behaviour tendency

## 4.2 Composition of fresh milk consumption

Figure 4.1 shows that 56% of respondents report that everybody drinks milk in their households, while only 9% report that nobody drinks milk at their home. In around 22% of households, only children drink milk.

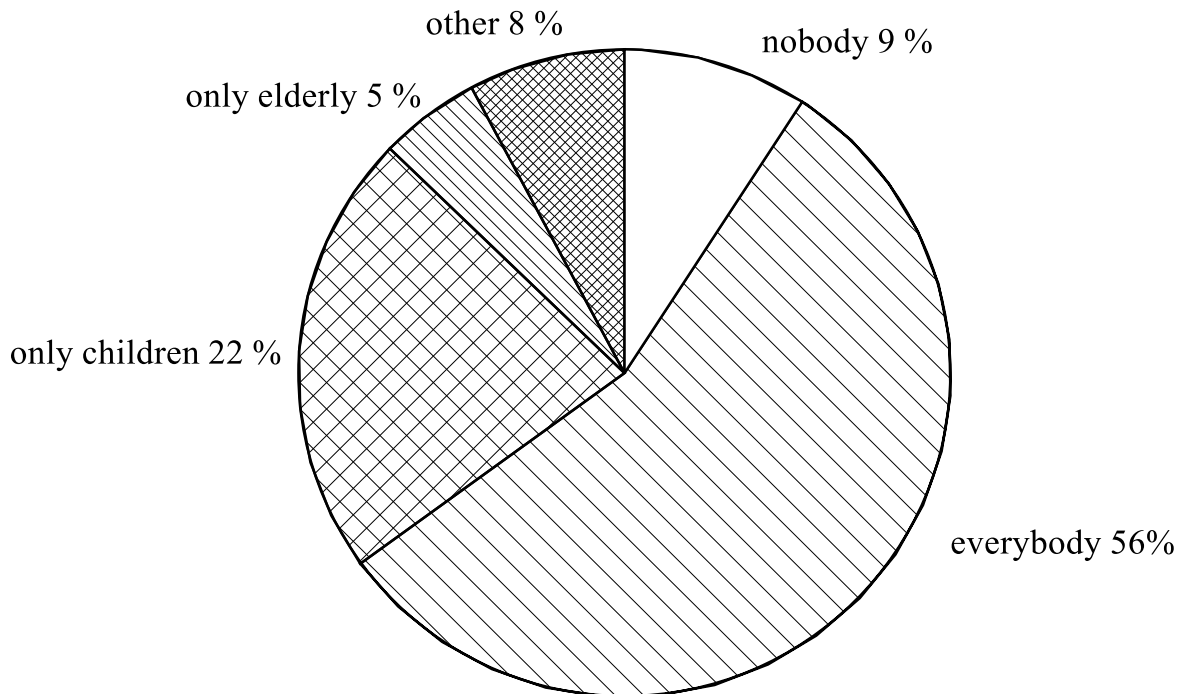


Figure 4.1 Composition of fresh milk consumption

## 4.3 When fresh milk is drunk

Milk can be drunk in different situations, such as in the morning for breakfast, in the evening (most Chinese believe that milk helps one to sleep), at school, at the office lunch, etc. Table 4.3 shows that milk is most commonly consumed in the morning and in the evening, 69 and 61% respectively.

Table 4.3 Milk consumption behaviour

	Yes (%)	No (%)
In the morning	69	31
In the evening	61	39
At school	5	95
In the office	3	97
Other situations	2	98

**4.4 Origin of milk or milk powder**

The survey shows that 88% of milk or milk powder consumed in Shanghai is manufactured in Shanghai locally while 2% is imported from other provinces of China. 8% of milk products is imported from other countries, mainly milk powder from Holland.

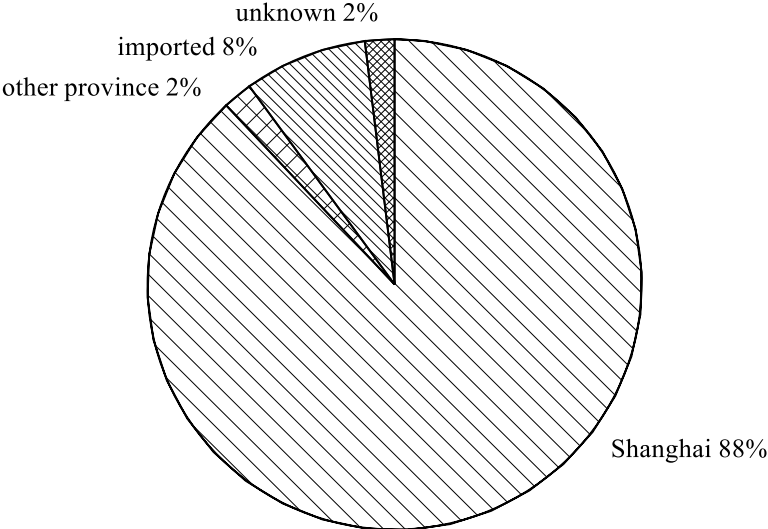


Figure 4.2 Origin of milk or milk powder

## 5. Horticultural products

### 5.1 Supermarket purchase of vegetables

As was seen in Table 2.2, the traditional open markets (known to the Chinese as 'free markets') still dominate the vegetable market. Supermarkets have only recently emerged as market outlets and some of them do not have perishable product sections yet. The main reason given for buying vegetables in the supermarkets is convenience (51%), followed by product cleaning (31%). Only 5% of consumers report that vegetables in the supermarkets are cheaper.

### 5.2 Consumption of cut flowers and potted plants

The main season for floral products is around festivals, particularly during the Chinese New Year (normally in February). Therefore, we asked respondents whether they had bought any cut flowers, potted plants or bonsai during the last half-year period (December 1999 to May 2000). Half of the respondents reported that they had purchased cut flowers during this period, followed by 16% who had purchased potted plants or bonsai, while 35% did not buy any floral products. When asked about the purpose of the purchase, 70% for home decoration while 30% was for gifts. By analysing the results for demographic variables, we find that the cut flower consumers are younger, higher income and well-educated, and more variety-seeking when compared with the remaining consumers (Table 5.1).

Table 5.1 Who buys cut flowers

Demographic Variables	Chi-Square value	P value
Age	10.808	0.004
Sex	0.203	0.652
Education	12.538	0.002
Income	53.72	0.000
EBBT	4.133 (F test)	0.043

## 6. Knowledge of imported food products

34% of consumers acknowledge that they have bought imported food products in the past while the majority have not. The most popular imported products consumers bought were fruits, milk powder, chocolate and coffee. The fruits are generally imported from the United States, while milk powder is mainly imported from the Netherlands, New Zealand and the United States. Germany and Switzerland are strong in China's chocolate markets. More details can be seen in table 6.1.

*Table 6.1 The most popular imported food and their countries of origin*

Products	Countries
Fruits (apples, oranges, etc.)	USA, Thailand, New Zealand, Japan, Philippines
Milk Powder	The Netherlands, New Zealand, USA
Chocolate	German, Switzerland, Belgium
Coffee	Brazil, Columbia, Denmark, Switzerland

Six attributes were selected to measure the image of imported food products by using a 5 point Likert scale from totally agree (1) to totally disagree (5). Table 6.1 presents the perception results. The lowest score is for the attribute 'expensive', which indicates the fact that imported food is more expensive than domestic food products. The other five attributes are quite neutral, particularly suggesting no problems as far as market access, taste and quality.

*Table 6.1 Perception of imported food products*

Attributes	Mean	Minimum value	Maximum value
Expensive	1.8	1	4
Not safe	3.1	1	5
High quality	2.6	1	5
Not fresh	3.2	1	5
Good taste	2.5	1	5
Easy to buy	2.4	1	5

## 7. Dutch products in China

The most famous Dutch brand name in Shanghai is 'Dutch Cow', used for Campina-Melkunie's milk powder. More than 30% of Shanghai consumers are familiar with 'Dutch Cow', followed by other brand names such as Dutch Lady (used by Friesland Coberco), Philips, Windmill, etc. Details are presented in Table 7.1.

*Table 7.1 Dutch brand name recognition in Shanghai (sample: 298)*

Brand names	Products	Frequency mentioned	Percentage
Dutch Cow	Milk powder	106	35
Dutch Lady	Milk powder	18	6
Philips	Electricity appliance	10	3
Windmill	Food stuff	3	1
Shell	Raw oil	2	0.6
Heinken	Beer	2	0.6
Unilever	Food	1	0.3

The actual purchase of Dutch products is much more widespread than brand recognition would suggest. As presented in Table 7.2, the most frequently purchased product is still milk powder, followed by Philips products, such as TVs, razors, etc. No milk and yoghurt are directly imported from Holland, but Friesland Coberco has a joint venture in Tianjin and produces UHT milk and yoghurt.

*Table 7.2 Dutch products purchased by Shanghai consumers (Sample: 298)*

Products	Frequency	Percentage
Milk powder	78	26
TVs	25	8
Bikes	14	5
Razors	11	4
Milk	3	1
Food Starch	3	1
Beer	2	0.6
Yoghurt	2	0.6



## 8. Frequency of consumption and income level

Family incomes were divided into three levels: 1 (less than 1,500 yuan), 2 (1,500-3,000) and 3 (above 3,000). The percentage of sampled households falling into these three categories is 15, 40 and 45% respectively. We try to explore how income level is related to the frequency of consumption as indicated in Table 2.1. The cross tabulation for each product with respect to consumers' income level is summarised in Table 8.2. The Chi-Square values used to measure their associations are presented in Table 8.1. The table shows that the frequency of consumption for flowers, yoghurt, beef and chicken is significantly associated with income level, while consumption of eggs, vegetables and fresh milk is not significantly correlated with income level. The correlation for pork is only significant at a 10% level. The results indicate that consumers with higher income more frequently consume/purchase flowers, yoghurt, beef and chicken compared with those with low income level. The explanation for low correlation between consumption of fresh milk, eggs and vegetables and income level could be their high consumption frequency. As Table 2.1 presented, more than 60% of consumers consume all three products (eggs, vegetables and fresh milk) on a daily basis, which indicates that these products are part of the average daily diets and their consumption is not significantly influenced by income level.

*Table 8.1 Chi-Square test for frequency of product consumption and income level*

Product	Chi-Square value	Significant
Pork	10.946	0.09
Beef	25.076	0.002
Chicken	24.656	0.002
Fresh milk	12.641	0.125
Yoghurt	33.615	0.000
Eggs	8.001	0.433
Vegetables	4.627	0.592
Flowers	37.813	0.000

Table 8.2 Frequency of product consumption by income level (Cross tabulation)

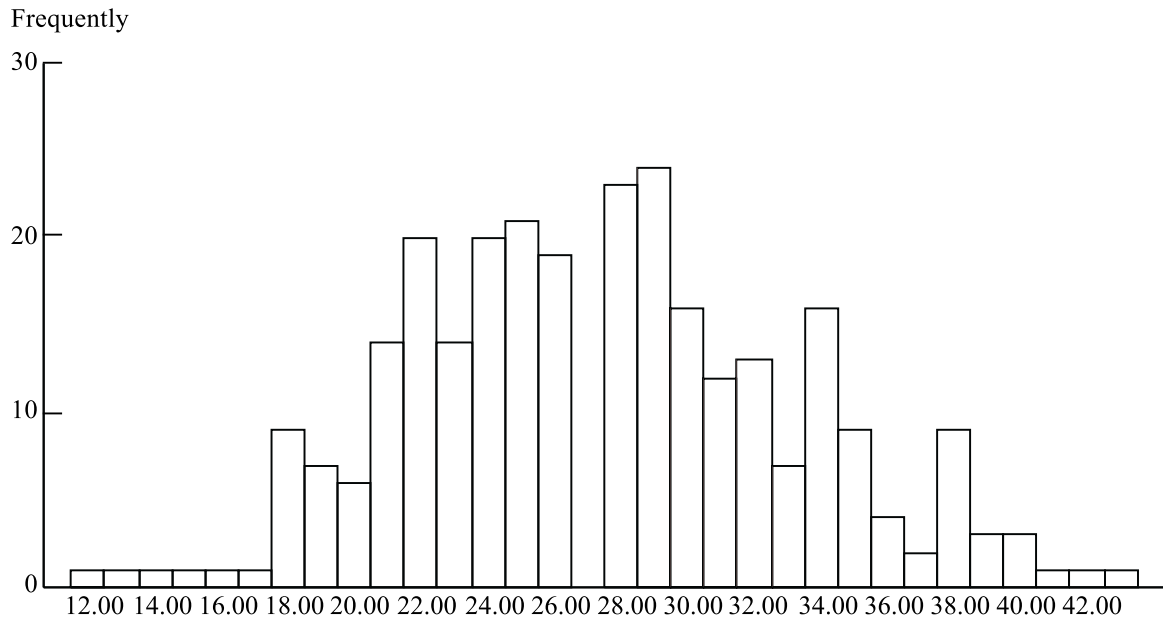
Product	Consumption Frequency	Income Category			Total
		level 1	Level 2	Level 3	
Pork	Everyday	20	51	79	150
	Once/twice a week	19	54	44	117
	Once/twice a month	5	6	5	16
	Several times a year	0	0	0	0
	Seldom or never	0	3	2	5
Beef	Everyday	0	0	1	1
	Once/twice a week	5	25	41	71
	Once/twice a month	15	60	56	131
	Several times a year	10	17	19	46
	Seldom or never	14	12	12	38
Chicken	Everyday	0	5	6	11
	Once/twice a week	10	61	70	141
	Once/twice a month	30	42	53	125
	Several times a year	2	4	0	6
	Seldom or never	2	2	1	5
Fresh milk	Everyday	28	84	89	201
	Once/twice a week	3	13	14	30
	Once/twice a month	0	2	9	11
	Several times a year	1	2	2	5
	Seldom or never	11	13	15	39
Yoghurt	Everyday	2	13	24	39
	Once/twice a week	8	39	52	99
	Once/twice a month	3	16	14	33
	Several times a year	2	9	12	23
	Seldom or never	28	35	25	88
Eggs	Everyday	29	70	80	179
	Once/twice a week	14	41	46	101
	Once/twice a month	0	0	3	3
	Several times a year	0	1	0	1
	Seldom or never	1	2	0	3
Vegetables	Everyday	44	111	130	285
	Once/twice a week	0	1	0	1
	Once/twice a month	0	1	0	1
	Several times a year	0	1	0	1
Flowers	Everyday	1	1	1	3
	Once/twice a week	1	1	16	18
	Once/twice a month	4	12	27	43
	Several times a year	9	28	45	82
	Seldom or never	29	70	41	140

## 9. Variety-seeking tendency

Variety seeking is a kind of exploratory behaviour expressed when consumers face many alternative choices. This kind of novel purchase behaviour is especially strong in the domain of food given its low switching risk. It has been found that different consumers have various degrees of variety-seeking tendency (Van Trijp and Steenkamp, 1992; Van Trijp, 1995). We use the Exploratory Buying Behaviour Tendency (EBBT) scale developed by Baumgartner and Steenkamp (1996) to measure Shanghai consumers' tendency in exploratory buying behaviour. The EBBT scale consists of 10 items of Exploratory Acquisition of Products and 10 items of Exploratory Information Seeking. Only the first 10 items of product acquisition are applied here as the other 10 information seeking items are not applicable to the current Chinese situation.

The distribution of the 10 items of the EBBT score is presented in Figure 9.1. Since the items are measured on five point scales, the theoretical scores could be anywhere between 10 and 50. The actual mean score is 27.43 with a minimum 12 and a maximum of 50.

Further tests have been carried out in order to check the relationship between variety-seeking behaviour and demographic variables, including age, sex, education and income level. A one-way ANOVA test has been applied and the results are presented in Table 9.1. The table indicates that three factors (age, education and income) are significant while sex is not. This implies that men and women are not significantly different in variety-seeking behaviour, while consumers with high variety seeking tendencies are generally younger and often enjoy higher education and higher income. These results are in line with earlier findings in other parts of China (Zhang, X. 1999).



Total scores Mean=27.43 median=27 min.=12 max.=50

Figure 9.1 Distribution of EBBT scores

Table 9.1 Relationship between variety seeking tendency and demographic variables

Demographic Variables	N	EBBT scores	F-value	Significance
Sex				
Female	187	27.14	1.32	0.252
Male	102	27.96		
Age				
Below 30	81	28.91	3.88	0.022
31-45	124	26.67		
Above 45	84	27.11		
Education				
Lower	17	24.82	3.58	0.029
Middle	118	26.75		
Higher	154	28.07		
Income (yuan)				
< 1,500	42	24.69	3.89	0.010
1,501-3,000	112	27.82		
3,001-5,000	93	27.78		
Above 5,000	34	28.38		

# 10. Product consumption variables

## 10.1 CATREG Regression

In a highly competitive market environment, it is vital to employ accurate market strategies for selected markets. It is therefore interesting to identify the major factors that influence consumption choices. In other words, we would like to find out how consumption choice is related to product perception, pinpointing relevant demographic variables. Given the limited number of cases and non-metric data, standard linear regression analysis has its shortcomings in dealing with categorical variables. An alternative approach is called categorical regression with optimal scaling (CATREG), which treats nominal, ordinal and numerical variables simultaneously. The procedure is to quantify categorical variables in order to maximise the squared correlation between the quantified response and a linear combination of the quantified predictors. The CATREG approach accounts for a wide range of nonlinear relationships and offers more flexibility than the standard approach.

We would like to examine the influence of several factors on the frequency of consumption of different products. Table 10.1 displays all variables used in the CATREG with their scales and labels. The consumption frequencies of five interesting products were selected as dependent variables and their scale measurements can be seen from Table 2.1. The demographic variables are sex, education level and variety-seeking scale (EBBT). Four perception variables (price, market availability, taste and smell) were also included. In fact, more demographic and perception variables were included at the beginning. However, as there is a large correlation between predictors, this could lead to a multicollinearity concern. Therefore, several highly correlated variables (such as age, income, product smell) are omitted from the model.

Table 10.1 Variables used in CATREG with their scales and labels

Variables	Scale	Value labels
Frequency of different product consumption a)	Ordinal	1, 2, 3, 4, 5
sex	Nominal	1, 2
Education level	Nominal	1, 2, 3, 4, 5
EBBT scale	Ordinal	1, 2, 3
Price	Ordinal	1, 2, 3, 4, 5
Taste	Ordinal	1, 2, 3, 4, 5
Market availability	Ordinal	1, 2, 3, 4, 5
Smell	Ordinal	1, 2, 3, 4, 5

a) Dependent variables, which include pork, beef, fresh milk, chicken and flowers, corresponding to five regression models

## 10.2 Model fit

Regression with optimal scaling yields  $R^2$ , indicating the amount of variance is explained by the optimally transformed predictors. The F statistic with corresponding p value also indicates how well the model is performing. Table 10.2 summarises the model fit results of five CATREG models for different products. The models for pork, beef and fresh milk have a p value less than 0.001 indicating that these models are performing quite well, while models for chicken and flowers have relatively large p values of 0.008 and 0.09 respectively. A complete model output for fresh milk is presented as an example in Appendix 2.

Table 10.2 Model fit of CATREG Regression

Models	R Square	F value	P value
Pork	0.190	10.756	0.000
Beef	0.105	5.298	0.000
Fresh milk	0.159	10.402	0.000
Chicken	0.062	2.995	0.008
Flower	0.029	2.017	0.092

## 10.3 Relative importance of each factor in influencing product consumption

CATREG also reports standardised regression coefficients (Beta) and F value for each variable. However, the regression coefficients cannot fully describe the impact of the predictors since the original variables have been transformed. For example, a change in the quantification of a predictor needs not correspond directly to a change in the original variable. This implies that these tests must be interpreted conservatively. Alternative statistics used to fully explore predictor effects are the relative importance of each variable. CATREG reports each predictor's importance with a sum of one. A large importance score indicates that this predictor is crucial to the regression. Table 10.3 displays the standardised coefficients and the importance of each variable for the five models. Every model has slightly different variables included in view of the multicollinearity. Importance values are calculated for each variable, and the two most important variables for each product are selected in Table 10.4. As can be seen in Table 10.4, market availability and taste account for around half of the factors relating to pork consumption. Thus, improved market availability and taste could further improve pork consumption. Price and gender account for 80% of the factors influencing beef consumption. A low market price and a more female-focused consumer strategy could boost sales of beef. Consumption of fresh milk is primarily influenced by taste, which indicates that a pleasant taste is far more important for milk sales than other factors such as price and market availability. Chicken consumption is also dominated by one factor, namely market availability, while education is the most important factor for cut flower consumption, followed by price. This implies that, in order to stimulate flower consumption, a proper market strategy should be focused on high-educated consumers with special attention to price.

Table 10.3 Standardised coefficients and relative importance of each variables

Predictors	Pork Model		Beef Model		Fresh milk Model		Chicken Model		Flower Model	
	Beta	I a)	Beta	I	Beta	I	Beta	I	Beta	I
Sex	0.22	0.21	0.21	0.39	-5.4E-02	0.01	5.2E-02	0.02	-3.4E-02	0.04
Education	-0.21	0.19	7.2E-02	0.04	-0.14	0.13	-5.6E-02	0.06	-0.14	0.66
EBBT	-9.7E-02	0.05	-0.12	0.13	-0.11	0.06	-4.9E-02	0.05	4.1E-02	0.04
Price	-0.13	0.11	-0.21	0.41	9.2E-02	0.03	-6.7E-02	0.09	8.7E-02	0.27
Market availability	0.21	0.23	6.1E-02	0.03			0.22	0.78		
Taste	0.19	0.22			0.36	0.77	-1.22E-02	0.01		
Smell			5.3E-02	0.01						

a) Importance values

Table 10.4 Two most important variables per product

Products	First Important Variable	Second Important Variable
Pork	Market (0.23)	Taste (0.22)
Beef	Price (0.41)	Sex (0.39)
Fresh milk	Taste (0.77)	Education (0.13)
Chicken	Market Availability (0.78)	Price (0.09)
Flowers	Education (0.66)	Price (0.27)

## 11. Major Research Findings

1. Of the eleven products studied, vegetables, fresh milk and eggs are the most frequently consumed in Shanghai.
2. Supermarkets are the primary market outlets for dairy products while the rest of the products are mainly purchased in open markets.
3. Fresh milk and beef are STAR products; Yoghurt and cut flowers are QUESTION MARK products; Chicken, egg and pork are CASH COW products; and milk powder is a DOG product.
4. The two most important variables with respect to meat attributes are 'freshness' and 'hygiene'.
5. Shanghai consumers prefer live chickens to frozen or refrigerated chicken.
6. 91% of consumers consume fresh milk, and 65% say that they drink milk everyday, while only 15% of consumers report that they have ever consumed cheese. The profile of cheese consumers is younger, higher income, well educated and more variety seeking.
7. Milk consumption normally occurs both in the morning and in the evening.
8. Consumers buy vegetables in the supermarket primarily because of its convenience.
9. Half of consumers bought cut flowers during the last half year. The profile for flower purchasing consumers is younger, higher income, well educated and more variety seeking.
10. The most popular imported fruits are from the United States, Thailand, New Zealand and Japan; the most popular imported milk powder are from the Netherlands, New Zealand and the United States. The principal image of imported products is expensive.
11. 'Dutch Cow' is the most famous Dutch brand name in Shanghai; the most frequently purchased Dutch product is milk powder.
12. The consumption of flowers, yoghurt, beef and chicken are highly correlated with consumers' income level, while the consumption of vegetables, eggs and fresh milk are not significantly connected with income level.
13. Consumers' variety-seeking tendencies are correlated with their age, education and income level.
14. Market strategy for each product should be formulated based on the most important factors influencing their consumption. The most important factor affecting for pork and chicken consumption is market availability. The most important factor affecting beef consumption is price. Consumers' primary concern about fresh milk is its taste. The primary factor influencing the purchase of flowers is consumers' education level.



## References

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# Appendix 1 Questionnaires

Code: -----

## Consumer Survey Regarding the Livestock and Horticulture Products in Shanghai

Hello,

I am an interviewer of SAAS and we are conducting a livestock and horticultural product survey in Shanghai. We sincerely hope you can accept our interview, which will take about 30 minutes. If you have any suggestion during our operation, please call number: 62208660-3170.

Street names :

Interviewer name :

Interview time :

Interview time : Month----- Day-----Hour-----

### 1. How often do you consume or use the following products (including both home consumption and eating out)? (Using Card 1)

Products	1. Almost everyday	2. About once or twice a week	3. About once or twice a month	4. A few times per year	5. Seldom/ almost never
Pork					
Beef					
Mutton					
Chicken					
Duck					
Fresh milk					
Milk powder					
Yoghurts					
Eggs					
Vegetable					
Flowers					

**2. Please indicate that in last month, how many times have you bought these products in different market outlets. (using Card 2)**

Products	Supermarket	Open markets	Wholesales markets	Department store	Grocery	Others (name it)
Pork						
Beef						
Mutton						
Chicken						
Duck						
Fresh milk						
Milk powder						
Yoghurt						
Eggs						
Vegetables						
Flowers						

**3. Comparing with five years ago, what are the consumption changes of following products? (using Card 3)**

**4. When looking at five years ahead, what do you expect your consumption changes? (using Card 3)**

- |                             |                                     |
|-----------------------------|-------------------------------------|
| 0. Does not change;         | 1. Increased less than 25%;         |
| 2. Increased around 50%;    | 3. Increased more than 75%;         |
| 4. Decreased less than 25%; | 5. Decreased around 50%;            |
| 6. Decreased more than 75%. | 7. Other changes (please indicate). |

Products	In the years 1995-2000	In the years 2001-2005
Pork		
Beef		
Mutton		
Chicken		
Duck		
Fresh milk		
Milk powder		
Yoghurts		
Eggs		
Vegetable		
Flowers		

**4. Please indicate a number from 1 to 5 for the following statements of different products. (Using Card 4)**

Strongly agree 1	Agree 2	Neutral 3	Disagree 4	Strongly disagree 5
---------------------	------------	--------------	---------------	------------------------

1. Price

---

Pork is expensive	1	2	3	4	5
Beef is expensive	1	2	3	4	5
Mutton is expensive	1	2	3	4	5
Poultry is expensive	1	2	3	4	5
Milk is expensive	1	2	3	4	5
Eggs are expensive	1	2	3	4	5
Vegetable is expensive	1	2	3	4	5
Flowers are expensive	1	2	3	4	5

---

2. Taste

---

Pork tastes good	1	2	3	4	5
Beef tastes good	1	2	3	4	5
Mutton tastes good	1	2	3	4	5
Poultry tastes good	1	2	3	4	5
Milk tastes good	1	2	3	4	5
Eggs taste good	1	2	3	4	5

---

3. Smell

---

Pork has appealing smell	1	2	3	4	5
Beef has appealing smell	1	2	3	4	5
Mutton has appealing smell	1	2	3	4	5
Poultry has appealing smell	1	2	3	4	5
Milk has appealing smell	1	2	3	4	5
Egg has appealing smell	1	2	3	4	5

---

4. Cook procedure

---

Pork is easy to cook	1	2	3	4	5
Beef is easy to cook	1	2	3	4	5
Mutton is easy to cook	1	2	3	4	5
Poultry is easy to cook	1	2	3	4	5
Milk is easy to cook	1	2	3	4	5
Egg is easy to cook	1	2	3	4	5

---

5. Product image

Pork is the product for high income	1	2	3	4	5
Beef is the product for high income	1	2	3	4	5
Mutton is the product for high income	1	2	3	4	5
Poultry is the product for high income	1	2	3	4	5
Milk is the product for high income	1	2	3	4	5
Egg is the product for high income	1	2	3	4	5
Vegetable is the product for high income	1	2	3	4	5
Flower is the product for high income	1	2	3	4	5

6. Market availability

Pork is always available in the markets	1	2	3	4	5
Beef is always available in the markets	1	2	3	4	5
Mutton is always available in the markets	1	2	3	4	5
Poultry is always available in the markets	1	2	3	4	5
Milk is always available in the markets	1	2	3	4	5
Egg is always available in the markets	1	2	3	4	5
Vegetable is always available in the markets	1	2	3	4	5
Flower is always available in the markets	1	2	3	4	5

**6. Please rank the first five most important criteria when you choose meat products**

1: Most important

5: Least important

1            2            3            4            5

Fresh	-----	Quality	-----
Hygienic	-----	Price	-----
Nutrition value	-----	Convenient	-----
Produce of origin	-----	Green label	-----

**7. Please give your opinion by marking a number from 1 to 5 in the following box for each sentence. ( Using Card 4)**

1: Totally agree;    2: Agree;    3: Neutral;    4: Disagree;    5: Completely disagree

EBBT items:

- 1. Even though certain food products are available in a number of different flavours, I tend to buy the same flavour.
- 2. I would rather stick with a brand(product) I usually buy than try something I am not very sure of.
- 3. I think of myself as a brand(product)-loyal consumer.
- 4. When I see a new brand(product) on the shelf, I'm not afraid of giving it a try.
- 5. When I go to a restaurant, I feel it is safer to order dishes I am familiar with.

- 6. If I like a brand(product), I rarely switch from it just to try something different.
- 7. I am very cautious in trying new or different products.
- 8. I enjoy taking chances in buying unfamiliar brands just to get some variety in my purchases.
- 9. I rarely buy brands(product) about which I am uncertain how they will perform.
- 10. I usually eat the same kinds of foods on a regular basis.

**9. Assuming you buy 10 times of chicken, how often do you buy in following cases?**

1. Frozen chicken                      2. Fresh (from cooling)                      3. Alive  
 (                      )                      +                      (                      )                      +                      (                      )                      = 10

**10. Assuming you shop 100 times of chicken, how often do you buy following parts?**

1. Legs,    2. Wings,    3. Liver,    4. Heart,    5. Breast meat,    6. Whole chicken,  
 (                      ) + (                      ) + (                      ) + (                      ) + (                      ) + (                      ) = 100

**11. Does your family consume following dairy products?**

1. Yes                      2. No  
 Fresh milk-----,    Milk power-----,    Cheese-----,    Ice cream-----,    Butter-----

**12. Who drinks milk at your home?**

1. Nobody,    2. Every body,    3. Only children,    4. Only olders,    5. Others (indicate)

**13. When do they drink milk? (multiple choices)**

1. In the morning for breakfast                      2. In the evening  
 3. At school ( school milk)                      4. At work  
 5. Other situation (name it)

**14. Where the milk or milk powder you consumed is produced?**

1. Shanghai Locally                      2. Other provinces  
 3. Imported; (name the countries)                      4. Do not know

**15. Have you ever bought pre-packaged vegetable from the supermarket and why?**

1. Yes                      2. No  
 Reason for Yes:    1. Clean                      2. Convenience,    3. Cheap,    4. Others(indicate)

**16. Have your family member ever bought any flowers, plant in the last half year?**

1. Yes, cut flowers,                      2. Yes, Bonsai,                      3. Yes, plants,                      4. Not at all.

**17. What is the objective of your above purchase?**

1. Own home decoration,                      2. Gift for friends,                      3. Others(name it).

**18. In the last year, have you ever bought any imported food products from any foreign country? If yes, please name the products and countries?**

1. Yes,                      2. No.                      3. No idea                      3. Products                      4. Country  
 -----  
 -----  
 -----  
 ---

**19. To what extent that you agree with following statement? (using Card 4)**

1. Totally disagree      2. Disagree      3. Neutral      4. agree      5. completely agree

- Imported food is expensive
- Imported food is not safe
- Imported food has high quality
- Imported food is not fresh
- Imported food tastes good
- Imported food is easy to find

**20. Do you know any Dutch brand name?**

1. No                      2. Yes, such as \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

**21. Have you ever bought any Dutch products?**

1. No                      2. Yes, (Please name it)

-----  
 -----  
 -----

**22. Please indicate the age and sex of your household members'.**

Member	Age	Gender: 1. Female, 2: male
Yourself		
Member 2		
Member 3		
Member 4		
Member 5		

**23. What is the highest education level your FAMILY enjoyed?**

- Illiterate
- Elementary school
- Secondary school
- High school
- University and above



**24. Please indicate the combined monthly income of your family. These data will be kept strictly confidential.**

- Less than 800 yuan.
- 800 --- 1,500 yuan.
- 1,501 --- 3,000 yuan.
- 3,000 --- 5,000 yuan.
- Above 5,000 yuan.

**25. What is your ethnicity?**

-----

(Thanks for your co-operation, this is a gift for you.)

Card 1:

1. Almost everyday,
2. Once or twice a week
3. Once or twice a month
4. Several times a year
5. Seldom/almost never

Card 2:

1. Supermarket
2. Open market
3. Wholesale market
4. Department store
5. Grocery store
6. Others

Card 3:

0. Do not change
1. Increased less than 25%;
2. Increased around 50%;
3. increased more than 75%;
4. Decreased less than 25%;
5. Decreased around 50%;
6. decreased more than 75%
7. Other changes (please indicate)

Card 4:

1. Totally agree
2. Agree
3. Neutral
4. Disagree
5. Completely disagree

## Appendix 2 CATREG Regression

### Case Processing Summary

Valid Cases	282
Cases with Missing Values(a)	16
Total	298
Cases Used in Analysis	282
a Excluded case(s): 35 124 138 139 143 144 145 164 182 221 222 226 253 262 281 294.	

### Descriptive Statistics

	Transformation Type	Number of Missing Values	Mode	Categories				
				1	2	3	4	5
FMCONSUM(a)	Ordinal	2	1	197	31	11	6	37
FMPRICE	Ordinal	2	4	12	63	54	124	29
FMTASTE	Ordinal	4	2	62	171	37	10	2
ebbt group 3	Ordinal	7	2	72	131	79		
SEXSELF	Nominal	2	1	182	100			
EDUCATIO	Nominal	2	5	0	1	13	117	151
a Dependent variable								

### Correlations of Transformed Predictors

	FMPRICE	FMTASTE	ebbt group 3	SEXSELF	EDUCATIO
FMPRICE	1.000	-.055	.086	-.050	.111
FMTASTE	-.055	1.000	.064	.051	-.024
ebbt group 3	.086	.064	1.000	-.077	.120
SEXSELF	-.050	.051	-.077	1.000	-.032
EDUCATIO	.111	-.024	.120	-.032	1.000

### Model Summary

Multiple R	R Square	Adjusted R Square
.398	.159	.143

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	44.714	5	8.943	10.402	.000
Residual	237.286	276	.860		
Total	282.000	281			

Coefficients

	Standardized Coefficients		F	Correlations			Importance	Tolerance	
	Beta	Std. Error		Zero-Order	Partial	Part		After Transformation	Before Transformation
FMPRICE	9.216E-02	.056	2.724	.051	.099	.091	.030	.978	.971
FMTASTE	.355	.056	40.975	.344	.360	.353	.771	.989	.983
ebbt group 3	-.111	.056	3.914	-.092	-.118	-.109	.065	.970	.968
SEXSELF	-5.397E-02	.056	.945	-.028	-.058	-.054	.009	.989	.993
EDUCATIO	-.136	.056	5.923	-.146	-.145	-.134	.125	.975	.976

*Quantifications*

		Quantification	Frequency
FMCONSUM (Ordinal)	everyday	-.401	197
	one or twice a week	-.401	31
	one or twice a month	-.401	11
	several times a year	.141	6
	seldom or never	2.565	37
FMPRICE (Ordinal)	totally agree	-1.528	12
	agree	-1.528	63
	neutral	-.219	54
	disagree	.826	124
	totally disagree	.826	29
FMTASTE (Ordinal)	totally agree	-.852	62
	agree	-.188	171
	neutral	.993	37
	disagree	4.025	10
	totally disagree	4.025	2
ebbt group 3 (Ordinal)	12 until 23	-1.708	72
	24 until 30	.586	131
	31 until 50	.586	79
SEXSELF (Nominal)	1.00	.741	182
	2.00	-1.349	100
EDUCATIO (Nominal)	illiterate	.	0
	primary school	-16.223	1
	secondary	-.192	13
	high school	-.216	117
	university above	.292	151