

# Consumption of Salmon: A Survey of Supermarkets in China

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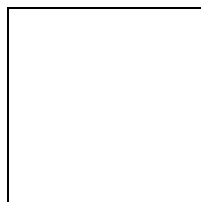
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**MSc. Thesis**

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Degree of Master of Science in International Fisheries Management

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Lingling Wang

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# **Consumption of Salmon: A survey of supermarkets in China**

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## **Abstract**

To keep up with the recent trends in consumer demand for salmon product in supermarkets, an understanding of the relationship between consumption and variation of lifestyle is needed. The present paper seeks to address this question by hypothesizing that consumption is strongly influenced by consumers' socio-demographic status, experience of salmon, beliefs with salmon's attributes and preference for the preferred type of salmon. Understanding the main lifestyle factors influencing consumer behaviour is important for marketers who want to increase demand of Norwegian salmon in supermarkets. A recursive sequential model of decision making process is used to evaluate the effect of socio-demographic, experience, preference, belief variables on salmon demand in supermarkets in China. The important findings lead to suggestions for the marketers, such as, 'try taste' activity could be carried out through in store promotion; marketing campaign should be taken around fish counter; promotion should be taken in supermarkets that have consumers of middle and high income; making salmon into nicely packed sashimi with kinds of sauce could possibly increase demand; cooking skill should be demonstrated in store or through media; Marketing activities should be carried out more frequently in Shanghai and Guangzhou. Moreover, the impact of hygienic standard of the supermarket and advertisement are suggested to be investigated and evoked set to be applied in the further studies.

# **1. Introduction**

## **1.1 Chinese Fish Consumption and Market**

China has long history of consuming seafood and rich culture in the traditional diets of fish. Consuming fish at the end of Chinese lunar year is considered as to bring luck and prosperity in the coming year. Most of Chinese enjoy seafood as good meal and good protein intake, especially in populated coastal regions.

China had never been an important market for the global fish exporters until twenty years ago when Chinese leadership began moving the economy from a centrally planned sluggish economy to a more market-oriented economy. Hence, China has been undergoing tremendous changes during the past twenty years. The economic growth is much faster than other developing countries. With improving living standard, the seafood consumption per capita annually increased from 4kg in 1979 to 20kg in 1997, and about 25kg in 2000.

China owns abundant fishery resources with 18,000 km coastline and over 3,000 marine species and around 709 freshwater species and 58 subspecies, excluding 64 species migrating between sea and inland waters. China is one of the major fish production countries in the world with aquaculture production accounts for 71 percent of the total volume and 49.8 percent of the total value (FAO country report 2003). During the past ten years, China has achieved rapid development of its fisheries industry. According to FAO statistics, its total aquatic output increased from 12,37 million mt in 1990 to 41.22 million mt (algae production included in 1999 with an average annual rate of increase of 23.3 percent per year. In 2000, China experienced a sharp increase in its export performance to reach \$3.7 billion and now is the second largest seafood exporter in the world. Although China has abundant fishery resources, it is still a resource scarcity country due to large population. At the same time, environment deterioration and continued increasing fishing activities pose big pressure on the declining fishery resources. The fishery industry is obliged to follow the strict rule of zero increase and to reduce its fishing activities by carrying out an overall moratorium in coastal waters for two to three months each year. The development of fishery industry is mainly focused on sustainable utilization, environmental protection and human health. The people involved in the industry choose to enhance communications and cooperation with the outside world and to merge into global economy. In recent years, more attention is paid to the development

and adoption of fishery technology, to enhance the combination of techniques with producing and marketing and to make more contact with enterprises. In the exportation sector, China has also started to produce high value or value added product for exportation. In the aquaculture sector, successful experiences are applied in polyculture, intensive culture and culture for exotic species.

## **1.2 Norwegian seafood in China**

Norway is one of the world's leading seafood exports and seafood is after petroleum, the second biggest export commodity, bringing in earning in 2002 of NOK 30,6 billion (USD 3,5 billion).

After 1994, there has been expanded exportation of Norwegian seafood to China. According to NTC statistics, the value increased from 17 million NOK in 1994 to 637 million NOK in 2002. Seafood is now the most important export product from Norway to China after petroleum and machine. At the same time, seafood trading enjoyed steadily increase compared to the other commodities exported to China according to the statistics of NTC. China is seen as a nation with a growing market for Norwegian seafood. Currently, the major seafood products exported to China are Atlantic salmon, Atlantic trout, Atlantic cod, cold water shrimp, mackerel and recently capelin. While, according to the statistics of NTC, salmon accounts for the highest percentage in terms of value and volume in the trading and salmon is the major seafood product exported to China during the past ten years.

Previously, catering market was the major market for imported salmon. But, it started to become a popular item in the people's diets category since its appearance in the supermarkets during the recent five years, ranging from simply whole fish or fish fillet to ready-to-eat sushi, sashimi or fried salmon cake. Consumers started to consume salmon not only in the restaurants, but also at home. Increased demand of salmon in supermarkets is predicted and marketing efforts can not be omitted. During the past five years, there have been many marketing activities cooperating with supermarkets for Norwegian salmon organized by the NSEC<sup>1</sup>, for instance, demonstrations of cooking salmon, 'try taste' promotion.

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NSEC<sup>1</sup> is the Norwegian Seafood Export Council.

### **1.3 Objective, hypothesis and research questions**

During the past two decades, market economy has been playing a major role in China's society and people's living standard has been improved continuously. Consequently, changes are impressively observed in the social life, including culture, lifestyle, beliefs and preferences.

Over the past decade, supermarkets have been tremendously developed and become a major power in the retailing market in big cities, especially for food products with high hygienic standard, high quality, convenient access, diversified commodities and good shopping environment compared to traditional free or local markets. During the recent years, there has been an increased demand for salmon at the consumer level in supermarket. This may, in part, be a consequence of introduction of Japanese cuisine, changing in consumers' liking and consciousness of nutrition. It is predicted that there will be potential expansion in demand for salmon in supermarkets. However, salmon is a new and special product compared to other seafood products in the supermarkets and it needs understanding the consumers' behavior towards salmon. Previously, there were considerable researches on catering market, but less attention has been paid to supermarket and its consumer. To keep up with the recent trends in consumer demand for salmon products, an understanding of the associated consumer characteristics as well as consumer experience, preference and beliefs are needed. Therefore, a survey was implemented sponsored by <sup>1</sup>NSEC and study is made for the interest of marketers.

In this study, it is expected to uncover how lifestyle factors influence consumption of Norwegian salmon, which is supposed to provide information for directing marketing activities to expand demand in the supermarkets. The present paper seeks to address this question by hypothesizing that consumer' decision is affected by consumer's demographic profile, experience about salmon, beliefs of salmon and preference for the type of salmon. Demographic factors are interviewee's age, gender, social status, income and type of occupation. Experience factors are measured as cooking skill and knowledge of salmon. Belief factors are measured as liking, price and nutrition evaluation. Preference factors are measured as type of salmon that consumer prefer. The ultimate choice related to salmon consumption is measured as the frequency of consuming salmon, the last place and the last time to consume salmon. These factors are also assumed to have interaction between each other. Experience is assumed to be influenced by demographic factors. Preference is

assumed be affected by demographic and experience factors. And belief is assumed to be influenced by experience and demographic factors. Finally, choice, which is the decision for the purchase of salmon, is assumed to be affected by demographic factors, experience, beliefs and preference.

Econometric methodology of multiple regression is used to evaluate these factors, including multiple linear regression, logistic regression and ordinal regression. In total, ten equations were estimated in this study. SPSS and Excel software is used as tools to analyse survey data.

The survey data was collected in nine randomly picked supermarkets in the three of the biggest cities in China, namely Shanghai, Beijing, Guangzhou. Altogether, 601 interviews were recorded and used as sample data in this study. The survey was conducted from the middle of July to the middle of August, 2002.

The following sections of this thesis will be a literature review and a lay out of the conceptual framework, followed by a description of data collecting and analysis methods. The analysis part includes results and discussion of the findings. Conclusions and recommendations for further research will be the last part to end up the study.



## 2. Literature Review and Conceptual Framework

### 2.1 Literature review

There is no single, universally agreed definition of marketing and a selection of those in common currency underlines the diversity of perspectives adopted by different authors e.g., Marketing is the process of determining consumer demand for a product or service, motivating its sale and distributing it into ultimate consumption at a profit (E.F.L. Brech, Principles of Management, 1953). There is a general consensus in these definitions but there is no single definition. An explanation of this is to be found in Halbert, The Meaning and Sources of Marketing Theory (1965): '*Marketing, however, has no recognized central theoretical basis such as exists for many other disciplines, notably the physical sciences and, in some cases, the behavioural sciences.*' Despite the absence of a central theoretical core there are clear indications that marketing, like medicine and engineering before it, is emerging as a practical, synthetic and applied discipline in its own right.

It is mentioned above that marketing is related to the behavioural sciences. The theory of consumer behaviour is a complex, multidisciplinary approach with contributions of different social sciences such as economics (microeconomic theory of the demand), psychology (motives, attitudes, perception, learning), sociology (consumer socialization, reference groups), anthropology (culture, tradition), geography (regional factors), and nutritional sciences and medicine (nutritional needs, physiological regulation, sensory factors, etc.).

The explanation of demand in the basic model of microeconomic theory is as a function of product prices, consumer income and preferences. Since preference changes are difficult to measure, therefore the microeconomic demand theory mainly focus on the analysis of the prospective effects of income and price changes on demand, assuming preferences do not change.

In the study of the causes of changing patterns of food product consumption in the UK, Ritson and Hutchins (1991) found out that, during the 1960s and 1970s, most of the changes in patterns of food consumption were caused by changes in prices and incomes, but since 1980, it were mostly influenced by tastes and preferences. Similar developments have also been observed in other industrialized countries (von Alvensleben, 1989). So, conclusion was drawn that with rising consumer income, the relative influence of prices and income on food demand is decreasing while the

influence of preferences is increasing. In the affluent societies, future changes in food demand will be more and more caused by preference changes rather than by price and income changes.

Therefore, the demand theory in the microeconomics is not enough to explain the consumer behaviour, since it does not explain how consumer preferences are determined (why do they change?); does not explain how consumer decisions evolve (decision is a process rather than a discrete act); and does not take into account that preferences may be influenced by income and prices, too.

Due to the above reason, the major aim of marketing effort should be focused on how to influence consumer preferences. Consequently, in the study of consumer behaviour, it is important to understand the consumer about how individuals make decisions to spend their available resources (time, money, efforts) on consumption-related items, about why they buy, how products are perceived, how the buying decision is taken, where they buy, what they buy and, last but not least, how buying decisions can be influenced by marketing measures.

While, most of the marketing research can not cover all the social sciences involved in the theory of consumer behaviour. But, most of them are looking at the basic variables and their interrelations.

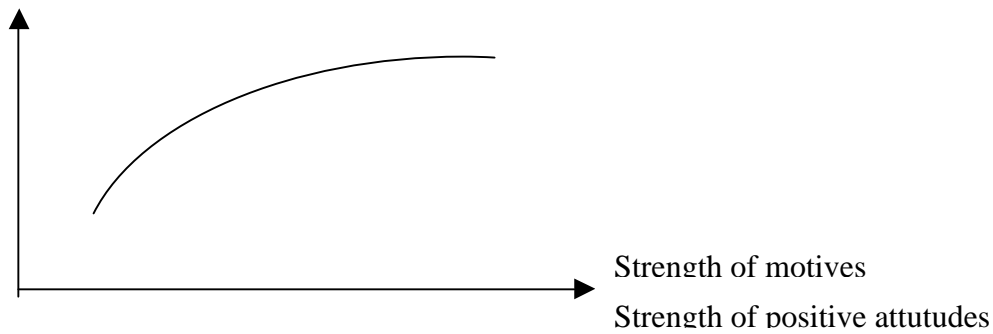
The basic forces of consumer behaviour are emotions, motives and attitudes (Kroeber-Riel,1992). They are defined as following:

Emotion is Internal tension, which may be felt as pleasant or unpleasant, and may be more and less conscious to the consumer.

Motive is internal tensions combined with a certain activity as objective (activity oriented).

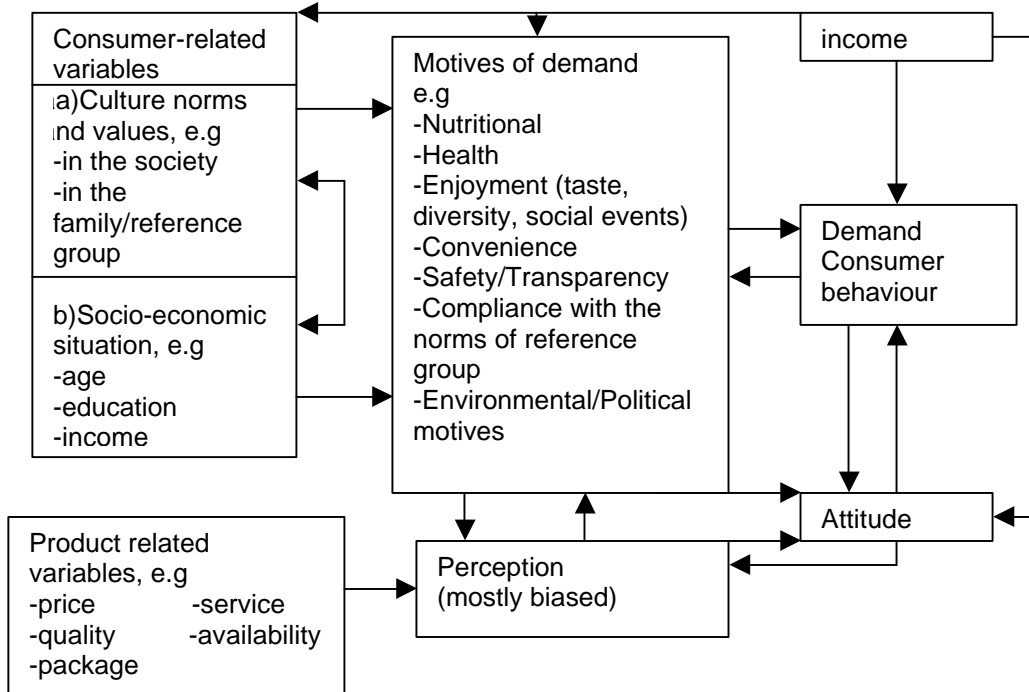
Attitude is willingness or predisposition of the consumer to react positively or negatively to a stimulus pattern of a product offer: the consumer's evaluation or image of a product (object oriented).

There is interaction between the above-mentioned basic forces, which leads to the final purchase decision or behaviour. Emotion is the base for motive, and motivation leads to attitude towards a product. The stronger the emotion the stronger the motive, the more positive (negative) is the attitude towards the product and the higher (lower) is the probability of purchase. The relation between attitudes and behaviour could be explained as following figure 1:



**Figure 1.** The relation between attitudes and behaviour

There are some major variables that influencing food demand. The relationship among these variables can be showed as the following figure 2. It may be interpreted as an extension of the microeconomic demand model.



**Figure 2.** Some major variables influencing food demand

Figure 2 shows the basic concept that consumer behaviour is determined by motives and attitudes. The general model of seafood choice is based on the above model. However, the relationship between motives and attitudes are not unilateral. Consumption leads to experience with the product, and vice versa this affects attitudes.

The major motives for food demand are nutritional needs, health, enjoyment, convenience, environmental motives etc. The motives depend on some consumer-

related variables, which may interfere with each other. The variables are: a) the general norms and values of the society and of the family/ reference group; and b) the socio-economic situation of the consumer. For example, the education of the consumer may influence the motive (e.g. the nutritional motive) and this affects demand. In many marketing research, the socio-economic variables are used as independent variables to explain consumer behaviour.

The attitudes towards a product are not only determined by the motives and the consumption experience, but also by the consumer's perception of the product and its properties. Perception is most likely to be distorted. The more there is a positive (negative) attitude towards a product, the more that consumer prefers the selective perception of positive (negative) properties of the product, resulting into a stabilization of the attitude towards the product.

The effect of the income on demand is divided into two categories: one as a demand restriction according to the microeconomic theory; the other as a factor among the socio-economic variables, which influences motives, attitudes, and perception. While, micro-economic theory also explains that income has influence on the preference of the consumer.

In the growing economy, the better understanding of consumer behaviour, the evolvement of attitudes, the perception and the decision process, is supplying the basis for market research and marketing measures such as product development, pricing and promotion.

In this study, consumer behaviour theory is being used to complete the analysis and to guide interpretation of my research data. A structural model is constructed based on the theory of consumer behaviour with major variables influencing food demand.

Kinnucan , Nelson, and Hiariey (1993) introduced the concept of evoked-sets for the analysis of consumer preferences for fresh fish and seafood products, including shrimp, lobster, catfish, scallops, flounder, and salmon. To estimate consumer preferences for these products, a modified lens model was employed. The specific brands or products that a consumer will consider for purchase in a given situation is called his/her evoked set. The evoked set concept is widely used to understand the decision behavior of consumers when confronted with a number of alternative solutions to a particular question.

In the past, there are many researches studying consumers' decision behavior of certain food products. In a study by Fayyaz, Corrado, Bacon, Alberto, (1995), a

modified evoked set framework along with logit techniques is used to evaluate how consumer' experiences, perceptions and preferences influence the ultimate choice to purchase fresh hybrid striped bass, trout, and salmon products in the northeastern region of the United States. The model is formed in a manner suggested by the following four equations describing the individual models of experience, perception, preference, and choice, Fayyza et al. (1995). The model can be seen as the general model for seafood choice, since in several other studies for seafood choice, e.g., the study by Gempesaw, Bacon, Wessells and Manalo (1995) and the study by Engle and Kouka (1995), similar conceptual models can be found. The structural model can be showed as following:

- (a) Experience = f (demographic factors)
- (b) Perception = f (demographic, experience)
- (c) Preference = f (demographic, experience, perceptions)
- (d) Choice = f (demographic, experience, perceptions, preference)

Demographic factors is defined as factual characteristics which define the composition of a population such as age, sex, marital status, family or household composition, income, education, occupation etc.

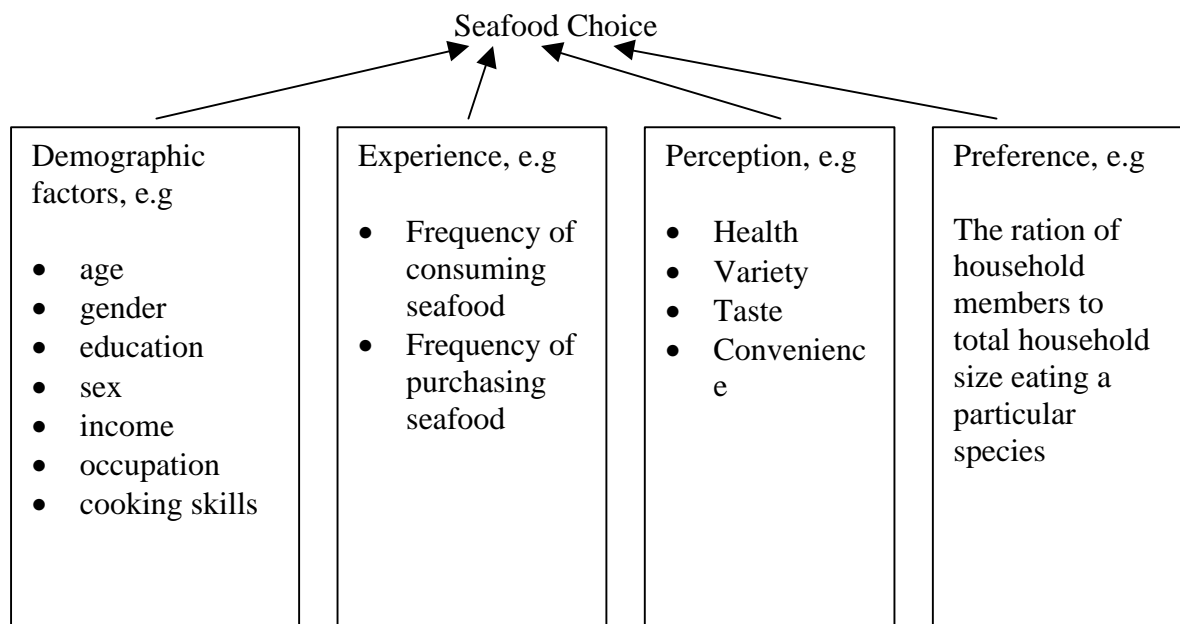
Experience is defined as how is the consumer being familiar with product.

Perception is defined as the process by which an individual selects, organizes, and interprets stimuli into a meaningful and coherent picture of the world. A stimulus is any unit of input to any of the senses.

Preference is the consumer's inclination to select or choose a specific of product in preference to any other brand/ product that having similar composition and cost/performance characteristics.

Choice, which is the end decision for the purchase of salmon, is assumed to be explained by experience, perception, and preference, along with the socio-economic and demographic factors.

The above-mentioned general model can be illustrated as following:



**Figure3.** General Model of Seafood Choice

In figure 3, we can see that seafood purchase decision or seafood choice could be affected by many factors in four perspectives. Although the model does not include all the factors affecting seafood choice, it is the most commonly used and comprehensive for analysing seafood consumption. The model structure is based on a recursive system and starts with the assumption that experience influenced by demographic characteristics. The perception of the consumer is then assumed to be affected by the experience variable along with the demographic factors. In the preference model, the experience, perception and demographic characteristics were then included as explanatory variables. Choice, which is the end decision for the purchase of a particular product, was assumed to be explained by experience, perception, preference along with the socio-economic and demographic variables.

In the study, all the variables had been coded as binary variables. The binary variable of ‘Choice’ was used as the dependent variable and the variables experience, perception and preference are used as explanatory variables.

The research found out that among the three finfish products, hybrid striped bass was the least known followed by trout and salmon. Also it is found out that among all the explanatory variables, experience, and knowledge that finfish products are farm-raised play a significant role in influencing perceptions, preferences and choice of these products. At the same time, it was also found out that if consumers were aware that finfish product produced from an aquaculture farm, the perceptions and preferences of these consumers were positively affected. The third finding is that it is

important to use various media outlets such as press releases and advertising campaigns to promote the attributes of finfish products. The fourth finding is that it is crucial for the aquaculture industry to adopt strategies that will change the image of finfish products among the white population. It was concluded in the study that the demand for finfish products suffers not from the lack of interest on the product but from the lack of awareness of the product, so marketing campaign should be focused on increase the awareness of finfish product, at least it can be included in the consumer's evoked set.

## **2.2 Conceptual framework**

Since the present study is relatively a small-scale student survey, it is difficult to develop the questionnaire including many variables for short-term interview. Moreover, salmon is a relatively new and particular fish product in supermarkets in China in terms of price and taste, cooking skill, variety to diet etc., it is difficult to find other alternative species to make an evoked set matching it at present. Thus, evoked set will not be applied in this study. Except it, there are similarities between my study and prior study by Fayyaz et al. (1995) in terms of research questions. Therefore, the model in this study can be constructed on the base of the general model of seafood choice. The variables in the present study can be classified as demograhic, experience, belief and choice, which can also be developed on a recursive model and starts with the assumption that experience factors are to be explained by demograhic factors; preferences are to be explained by experience and demograhic factors; beliefs are to be explained by experience, preference and demograhich factors; and choice, which is the decision for purchase salmon, is assumed to be explained by experience, perception, preference along with the demograhic factors.

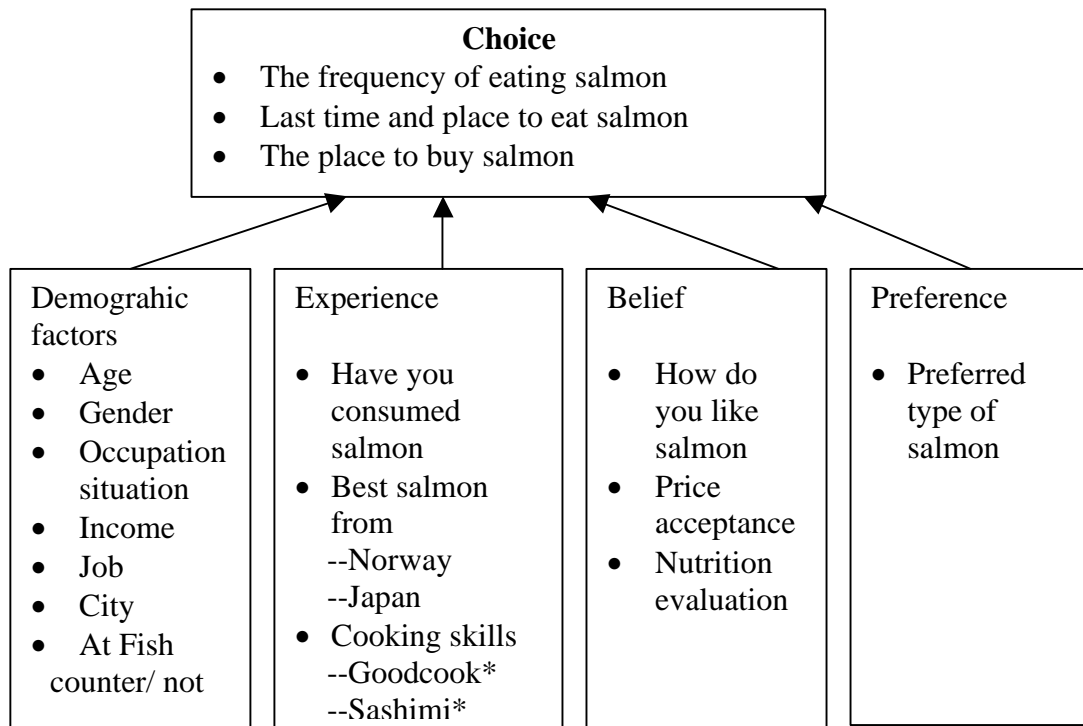
The model of this study is constructed based on the general model of seafood choice:

- (1) Experience = f ( Demographic factors)
- (2) Preference = f (Demograhic, Experience)
- (3) Belief = f (Demographic, Experience, Preference)
- (4) Choice = f (Demographic, Experience, Preference, Belief)

Belief is mental or verbal statements that reflect a person's particular knowledge and assessment about some idea or things.

The other terms have been explained in the above context.

The conceptual model can be illustrated as following



**Figure 4.** Choice Model of salmon

In this study, belief model will look into the individual's belief of price, nutrition and personal liking and how these related to

consumption. Two most important factors are included in the liking in terms of salmon: taste and colour. But, due to the short time of interview, it is only measured as liking instead of investigating into these two details. Experience model will look into the individuals' knowledge of cooking salmon and knowledge of the best salmon from and how these related to consumption. 'Norway' and 'Japan' are used both as dependent variable and explanatory variable through the choice models; while, Knowledge of cooking skill- 'Goodcook' and 'Sashimi' will be used only as explanatory variable. Preference model will look into the individuals' favour for the type of salmon. The final decision, choice model will look into the frequency of eating salmon, the latest time and place to eat salmon.

### **2.3 Logit and probit model and an ordered probit model**

The assumptions underlying the multivariate linear model require interval level measurement of the dependent variable. Therefore, the linear model is not appropriate for dependent variable that is dichotomous or ordered.

In sociological research, logit and probit models are often used in order to relate a dichotomous dependent variable to a set of independent variables. Usually, there are



two important measures used in reporting results from above mentioned models: (a) the predicted probabilities of belonging to one of the categories on the dependent variable; (b) the predicted changes in probabilities resulting from changes in independent variables. These measures help convey the social significance of the reported results. The logit model, which uses the cumulative logistic probability function can be designated by:

$$(5) L = \ln [P/(1-P)]$$

$P_i$  = probability of belonging to category 1 on the dependent variable.

$L$  = the logarithm of the odds-ratio

$\ln$  = natural logarithm

The logit is often decomposed into the effects of a set of covariates. So as in a linear regression model, the decomposition is given by

$$(6) L = \beta X$$

From (1) and (2), we can easily obtain the probability (conditional on  $x$ ) of belonging to category 1 on the dependent variables as

$$(7) P(Y=1 | \beta X) = \exp(\beta X) / [1 + \exp(\beta X)]$$

Many researchers find it difficult to think in terms of odds and log-odds. Sometimes researchers therefore convert the logit coefficients into probabilities and changes in probabilities. In the American Sociological Review (1995), Leo Goodman mentioned the correct way for calculating the relative change in the probability resulting from a unit change in an independent variable is

$$(8) \Delta P = P(Y=1 | L_1) - P(Y=1 | L_0) = \exp(L_1) / [1 + \exp(L_1)] - \exp(L_0) / [1 + \exp(L_0)]$$

where  $L_0$  is the logit before the unit change in  $x$ , and  $L_1 = L_0 + \beta$  is the logit after the unit change in  $x$ .

Ordered Probit model is also often used in sociological research which has ordinal dependent variable. It is an extension of the dichotomous probit model, and assumes that the ordinal nature of the observed dependent variable is due to methodological limitations in collecting the data. The model assumes a linear effect of each independent variable as well as a series of break points between categories for the dependent variable. Maximum likelihood estimators are found for these parameters, along with their asymptotic sampling distributions, and an analogue of  $R^2$  (the coefficient of determination in regression analysis) is defined to measure goodness of fit. This model has similar explanation for calculating the change in the probability resulting from a unit change in an independent variable.

### 3. Materials and Methods

#### 3.1 Data collection and coding

To accomplish the objectives of this research, a consumer survey was done in three of the biggest cities in China, namely are Shanghai, Beijing and Guangzhou. A questionnaire was developed focusing on salmon product, which consists of 15 questions related to the consumption experience, beliefs, preference, consumer's choice and demographic factors. The questionnaire was developed taking account of the practicality of interview and the objective of the survey. The survey was done by personal interviews with consumers in 9 randomly picked supermarkets in the three above-mentioned cities, which respectively are Carrefour Shanghai shops (4 branch shops), Hualian Shanghai shop, Jusco Guangzhou shop, Makro Guangzhou shop, Carrefour Fangyuan Beijing shop and Ito-Yokado Beijing shop. The sample size was determined as 200 for each city for the confidence level was chosen as 95% and confidence interval as 0,10. The total sample consists of 601 respondents. Among all the samples, 25% was collected at the fish counter, and the rest was collected at other places in the supermarket. Each interview with one respondent lasted about 5 minutes covering 15 questions for their opinion of salmon and their social economic and demographic factors. Afterwards, the respondent was given a small gift as appreciation. The survey lasted from middle July until middle August, year 2002. Table 1 explains the collection of data.

The survey was sponsored by the NSEC. They also provided contacts for these supermarkets in order that I could enter into the supermarkets to have personal interviews with respondents.

**Table 1.** Data Collection

Place	Date	Supermarket		Records
SH	Jul.15-.31,2002	Carrefour Wunin Shop	middle-high income	40
		Carrefour Gubei Shop	high income	41
		Carrefour Nanfang Shop	low-middle income	40
		Carrefour Jinqiao Shop	low-middle income	40
		Hualian Shop	middle income	40
				<b>Subtotal 201</b>
GZ	Aug.05-26, 2002	Jusco Shop	middle-high income	100
		Makro Shop	low-middle-high income	100
				<b>Subtotal 200</b>
BJ	Aug.13-26, 2002	Carrefour Fangyuan Shop	middle-high income	100
		Ito-Yokado Shop	middle income	100
				<b>Subtotal 200</b>
				<b>Subtotal 601</b>

In this study, the gender ratio of respondents is 58,1% female and 41,9% male. 25% of the respondents were sampled at fish counter and 75% of the respondents were sampled in the shop but not at the fish counter.

In the data set, data are classified into three types, scale or interval data, ordinal data and nominal data. Nominal variables are variables whose values fall into some category, indicating a quality or property of an object. In this study, nominal variables are recoded into dummy variables. Dummy variables are used extensively for respecifying nominal variables. The definition of variables are showed in table 2:

**Table 2a.** Definition of variables, property and corresponding means

Variable name	Description	property	Range	Mean
Non-consumer	1, if the consumer hasn't consumed salmon yet; otherwise 0.	Dummy	0-1	0.14
Location	1, if the interview is taken at fish counter; otherwise 0.	Dummy	0-1	0.25
SH	1, if the interview is taken in Shanghai; otherwise 0.	Dummy	0-1	0.33
BJ	1, if the interview is taken in Beijing; otherwise 0.	Dummy	0-1	0.33
GZ	Set as base, if the interview is taken in Gangzhou.	base	0-1	0.33
Age 15-24	Set as base, if age=15-24.	base	0-1	0.18
Age 25-34	1, if age= 25-34; otherwise 0.	Dummy	0-1	0.44
Age 35-49	1, if age= 35-49; otherwise 0.	Dummy	0-1	0.30
Age 50-68	1, if age= 50-68; otherwise 0.	Dummy	0-1	0.08
Male	1, if male; 0, if female.	Dummy	0-1	0.42
Ocp_full	1, if the respondent has full time job; otherwise 0	Dummy	0-1	0.73
Income_1	Set as base, if respondent's income per month is <=RMB 2,000	base	0-1	0.43
Income_2	1, if the respondent's income per month is RMB 2,000-5,000; otherwise 0.	Dummy	0-1	0.46
Income_3	1, if the respondent's income per month is >= RMB 5000; otherwise, 0.	Dummy	0-1	0.11
Job_1	Set as base, if the respondent is unemployed or part-time, or housewife, student, retired.	base	0-1	0.23
Job_2	1, if the respondent is blue collar; otherwise 0.	Dummy	0-1	0.27
Job_3	1, if the respondent is white collar, or teacher, or civil servant, or doctor; otherwise 0.	Dummy	0-1	0.45
Job_4	1, if the respondent is middle manager, or executive, or entrepreneur, or equivalent; otherwise 0.	Dummy	0-1	0.058
Liking	Respondent's belief scaling from dislike most to like most.	Interval	1-10	6.52
Price	Respondent's belief scaling from too expensive to not expensive at all.	Interval	1-10	4.85
Nutrition	Respondent's belief scaling from non-nutrition to very nutritious.	Interval	1-10	6.91
Goodcook	1, if the respondent know some or quite a lot for cooking salmon; otherwise 0.	Dummy	0-1	0.27
Sashimi	1, if the respondent only know sashimi; otherwise 0.	Dummy	0-1	0.67
Nocook	Set as base, if the respondent do not know how to cook salmon	base	0-1	0.06
Norway	1, if respondent choose Norway as the best salmon from; otherwise 0.	Dummy	0-1	0.32
Japan	1, if the respondent choose Japan as the best salmon from; otherwise 0.	Dummy	0-1	0.33
Fresh	1, if respondent's prefer fresh salmon for the type of salmon; otherwise 0.	Dummy	0-1	0.82
Choice1 (How often do you eat salmon?)	0, never or seldom 1, 1 time every 2 month or 3 month 2, once a month	Ordinal	0-4	1.84

**Table 2b.** Definition of variable, property and corresponding means

	3, 2-3 times a month 4, once a week or less			
Choice2 (When is your last time to eat salmon?)	0, never or more than half a year ago 1, 2-5 month ago 2, 1 month ago 3, 2-3 weeks ago 4, 1 week ago or less	Ordinal	0-4	2.26
Choice3 (Where is your last time to eat salmon)	1, if last time consume at home, 0, consume in the restuarant	Dummy	0-1	0.31
*Choice4 (If you eat salmon at home, where do you buy usually)— Descriptive study	0, never buy salmon for home consumption 1, free or local market or other places 2, small-medium supermarket 3, big supermarket	-----	-----	-----

### 3.2 Construct models with available techniques

To investigate how dependent variable is affected by independent variables, econometric analysis is used, including logit regression model, multiple linear regression model and ordinal regression model. In all the subsequent models, the error term is labeled as ‘*e*’.

#### 3.2.1 Logit Model for incidence of consuming salmon

To identify the consumer group for incidence of consuming salmon, logit model is applied. The response of whether consumer has eaten salmon before was converted into a binary variable with value 1 for have never consumed before and 0 otherwise. The binary variable is used as dependent variable and demograhic factors are applied as explanatory variables. The first experience model is showed as following:

$$(1a) \text{ Non-consume} = f(\text{demograhic factors})$$

$$\text{Non-consume} = \beta_0 + \beta_1 * \text{SH} + \beta_2 * \text{BJ} + \beta_3 * \text{AGE25\_34} + \beta_4 * \text{AGE35\_49} +$$

$$\beta_5 * \text{AGE50} + \beta_6 * \text{Male} + \beta_7 * \text{Income\_2} + \beta_8 * \text{Income\_3} + \beta_9 * \text{Occ\_full} + \beta_9 * \text{Location} + e$$

#### 3.2.2 Logit Model for experience

A logit technique is applied to figure out the possible relationship between consumer’s social economic status and their knowledge about the country of the best salmon from. Norway and Japan are used as dependent variable in separate model and demograhic factors are used as explanatory variable. The last two experience models are showed as following:

$$(1b) \text{ Norway} = f(\text{demograhic factors})$$

$$(1c) \text{ Japan} = f(\text{demograhic factors})$$

The corresponding equation (e.g., Norway) is specified as:

$$\text{Norway} = \beta_0 + \beta_1 * \text{AGE25\_34} + \beta_2 * \text{AGE35\_49} + \beta_3 * \text{AGE50\_68} + \beta_4 * \text{Location} + \beta_5 * \text{Ocp\_full} + \beta_6 * \text{Income\_2} + \beta_7 * \text{Income\_3} + \beta_8 * \text{Job\_2} + \beta_9 * \text{Job\_3} + \beta_{10} * \text{Job\_4} + \beta_{11} * \text{Male} + \beta_{12} * \text{SH} + \beta_{13} * \text{BJ} + e$$

### 3.2.3 Logit Model for preference

In order to evaluate the preference of salmon consumers, preferred type of salmon is investigated. Since 81.6% of valid responses choose 'fresh' as their preferred type of salmon, binary variable is used for evaluation by coding 1 for choosing fresh and 0 otherwise. Therefore, logit technique is applied to determine how consumer's social economic status and experience influence consumer's preference. The preference model is showed as following:

$$(2) \text{ Fresh} = F(\text{demographic, experience})$$

The corresponding equation is specified as:

$$\text{Fresh} = \beta_0 + \beta_1 * \text{AGE25\_34} + \beta_2 * \text{AGE35\_49} + \beta_3 * \text{AGE50\_68} + \beta_4 * \text{Location} + \beta_5 * \text{Ocp\_full} + \beta_6 * \text{Income\_2} + \beta_7 * \text{Income\_3} + \beta_8 * \text{Job\_2} + \beta_9 * \text{Job\_3} + \beta_{10} * \text{Job\_4} + \beta_{11} * \text{Male} + \beta_{12} * \text{SH} + \beta_{13} * \text{BJ} + \beta_{14} * \text{Norway} + \beta_{15} * \text{Japan} + \beta_{16} * \text{Sashimi} + \beta_{17} * \text{Goodcook} + e$$

### 3.2.4 Multiple Linear Regression Model for Belief

Multiple Linear regression model is used to determine the effect of demographic factors, experience and preference on belief variable. The Belief variables includes Liking, measuring how the respondent likes salmon; Price, measuring how the respondent feels the price of salmon; Nutrition, measuring how the respondent feels the nutrition of salmon. All of them are interval variables measured by scale from 1 to 10. The The three belief models are showed as following:

Multiple linear regression

$$(3a) \text{ Liking} = f(\text{Demographic, Experience, Preference})$$

$$(3b) \text{ Price} = f(\text{Demographic, Experience, Preference})$$

$$(3c) \text{ Nutrition} = f(\text{Demographic, Experience, Preference})$$

The corresponding equation (e.g., Liking) is specified as:

$$\text{Liking} = \beta_0 + \beta_1 * \text{AGE25\_34} + \beta_2 * \text{AGE35\_49} + \beta_3 * \text{AGE50\_68} + \beta_4 * \text{Location} + \beta_5 * \text{Ocp\_full} + \beta_6 * \text{Income\_2} + \beta_7 * \text{Income\_3} + \beta_8 * \text{Job\_2} + \beta_9 * \text{Job\_3} +$$

$$\beta_{10} * \text{Job\_4} + \beta_{11} * \text{Male} + \beta_{12} * \text{SH} + \beta_{13} * \text{BJ} + \beta_{14} * \text{Norway} + \beta_{15} * \text{Japan} + \beta_{16} * \text{Sashimi} + \beta_{17} * \text{Goodcook} + \beta_{18} * \text{Fresh} + e$$

### 3.2.5 Ordinal and Logit Model for Choice

The choice variable of the salmon consumers was investigated using ordered regression technique. For example, the response regarding the consumption frequency was converted into ordered values from 0 to 4 indicating ordered but different time interval of consuming salmon. The ordered variable of consumption frequency was used as the dependent variable and demographic, experience, preference, beliefs are included as explanatory variables. In this study, ordinal choice variables include frequency of consuming salmon and last time of consuming salmon

The choice model is showed as following:

$$(4a) \text{ Choice1} = f(\text{Demographic, Experience, Preference, Belief})$$

\*Choice 1 measures level of consumption

$$(4b) \text{ Choice2} = f(\text{Demographic, Experience, Preference, Belief})$$

\*Choice 2 as a complementary model, measuring frequency of consumption

The corresponding equation (e.g., frequency of consuming salmon) is specified as:

$$\begin{aligned} \text{Choice1} = & \beta_0 + \beta_1 * \text{AGE24\_34} + \beta_2 * \text{AGE35\_49} + \beta_3 * \text{AGE50\_68} + \beta_4 * \text{Location} + \\ & \beta_5 * \text{Ocp\_full} + \beta_6 * \text{Income\_2} + \beta_7 * \text{Income\_3} + \beta_8 * \text{Job\_2} + \beta_9 * \text{Job\_3} + \beta_{10} * \text{Job\_4} + \\ & \beta_{11} * \text{Male} + \beta_{12} * \text{SH} + \beta_{13} * \text{BJ} + \beta_{14} * \text{Norway} + \beta_{15} * \text{Japan} + \beta_{16} * \text{Sashimi} + \\ & \beta_{17} * \text{Goodcook} + \beta_{18} * \text{Fresh} + \beta_{19} * \text{Liking} + \beta_{20} * \text{Price} + \beta_{20} * \text{Nutrition} + e \end{aligned}$$

Except ordinal technique, logit technique is used in choice model. Response of the place of last time to consume salmon was converted into a binary variable with a value of 1 if the respondent consumed at home and 0 otherwise. The binary variable of 'place' is used as the dependent variable and demographic, experience, belief, preference are included as explanatory variable.

The Location model is showed as:

$$(4c) \text{ Home} = f(\text{Demographic, Experience, Preference, Belief})$$

The corresponding equation is specified as:

$$\begin{aligned} \text{Home} = & \beta_0 + \beta_1 * \text{AGE24\_34} + \beta_2 * \text{AGE35\_49} + \beta_3 * \text{AGE50\_68} + \beta_4 * \text{Location} + \\ & \beta_5 * \text{Ocp\_full} + \beta_6 * \text{Income\_2} + \beta_7 * \text{Income\_3} + \beta_8 * \text{Job\_2} + \beta_9 * \text{Job\_3} + \beta_{10} * \text{Job\_4} + \end{aligned}$$

$\beta_{11} * \text{Male} + \beta_{12} * \text{SH} + \beta_{13} * \text{BJ} + \beta_{14} * \text{Norway} + \beta_{15} * \text{Japan} + \beta_{16} * \text{Sashimi} +$   
 $\beta_{17} * \text{Goodcook} + \beta_{18} * \text{Fresh} + \beta_{19} * \text{Liking} + \beta_{20} * \text{Price} + \beta_{20} * \text{Nutrition} + e$

## 4. Results and Discussion

### 4.1 Experience Model

#### 4.1.1 Non-consumer Model--Who has not consumed salmon yet?

There are 87 cases out of 601 that haven't eaten salmon yet, accounting for around 15% of total samples. Before we exclude them out of the analysis as invalid responses in the later context, it is interesting to know who have not consumed salmon yet. To fulfill such requirement, a logit model is constructed with binary dependent variable: 1, if have never consumed salmon; 0 otherwise. Independent variable is demographic factors. The first experience model is as following:

#### (1a) Non-Consumer= f (Demographic factors)

Based upon statistically significant coefficients, the likelihood of having already consumed salmon is significantly influenced by the variables SH, OCP\_Full, Income\_2, Income\_3, Location at 0.15 level or lower. The other factors are not found have significant impact on the dependent variable. (table 3)

**Table3.** Estimated coefficients and relative changes for the logit model of the likelihood that consumer have not consumed salmon yet.

Variables	Coefficient	P-value	ΔP
Constant	-1.061	0.002	-10.5 %
SH	0.582**	0.065	6.2 %
BJ	0.274	0.377	2.8 %
AGE25_34	0.445	0.204	4.5%
AGE35_49	-0.447	0.259	-4.1 %
AGE50+	0.317	0.470	3.5 %
MALE	0.358	0.161	3.6 %
OCP_FULL	-0.895***	0.002	-10.5 %
INCOME_2	-1.281***	0.000	-12.6 %
INCOME_3	-1.558***	0.005	-9.9 %
LOCATION	-0.503*	0.142	-0.45 %
Log likelihood	-213.9		
χ <sup>2</sup> -value	61.6		
Prob (ChiSq>critical value)	0.000		
Pseudo R <sup>2</sup>	0.126		
Percentage right predictions	86.0%		

Note: \*\*\*\*p<=0.01, \*\*\*p<=0.05, \*\*P<=0.1, \*P<=0.15

The estimated coefficient indicates negative relationship between non-consumer and variable OCP\_Full. The decreased relative change in the probability of not having consumed salmon for full time job holder is 10.5%. It suggests that consumers who do not have full time job are less likely to have consumed salmon.



The estimated coefficient also indicates the negative relationship between income and non-consumer. The decreased relative change in the probability of not having consumed salmon for income\_2 is 12.6% compared with income\_3 is 9.9%. It appears that consumers with monthly income above RMB 2,000 are more likely to have consumed salmon.

City Shanghai is found be positively related to dependent variable non-consumer. The increased relative change in the probability of not having consumed salmon for Shanghai is 6.2%. It indicates that among all the cities, consumers in Shanghai are relatively less likely to have consumed salmon.

Since it is proved later in the choice model that those consumers at fish counter are frequent salmon purchaser, it is assumed that those consumers at fish counter are frequent seafood purchaser. Consumers at fish counter is also found be negatively related to non-consumer. It decreased 0.45% of relative change in probability of not having consumed salmon. Hence, it means consumers who are not frequent seafood purchasers are slightly less likely to have consumed salmon.

So, conclusion can be drawn that consumers' income, occupation, city and location do matter with the incidence of consuming salmon. Consumers that have income below RMB 2,000, without full time occupation and not purchase seafood frequently are less likely to have consumed salmon. And the consumers living in Shanghai have relatively lower level of having consumed salmon compared with Beijing and Guangzhou.

#### 4.1.2 Norway Model

It is showed in table 4 that Japan owns the highest percentage, 32.9% of the total responses believe it to be the country of the best salmon comes from. Norway is the second to Japan with 32.5%. We could also observe that 'No idea' accounts for 18.8% of the responds

**Table 4.** Where is the best salmon from?

Country	Valid Percent %
Norway	32,5
Canada	7,6
America	4,3
Chile	,8
Japan	32,9
No idea	22,0
Total	100,0

In recent years, Japanese food is becoming very popular in China, especially Japanese sashimi. Sashimi is made from raw fish, in which of it fish can be enjoyed raw if they are fresh and prepared correctly. Japanese restaurant also becomes popular with its clean, quite environment and good service. Although different levels of restaurants have different prices, the common price for a set of sushi or sashimi in an ordinary sushi restaurant or sushi bar only costs RMB 50 to 100. It is quite acceptable by middle income consumers. Many people get to know and eat salmon because of introduction of Japanese Sashimi. Thus, many people have such idea that the best salmon is from Japan.

While, in recent years, NSEC is making tremendous efforts to make consumers have more awareness of Norwegian salmon.

Analysis for what matter with consumers' opinion for where is the best salmon from.

#### **Norway Model--Who think of Norway as the best salmon from?**

It is showed in table 9 that 32.5% of the responded population among those who have consumed salmon chose Norway as the country of the best salmon from. It is obvious that Norway is significant in terms of experience. It is interesting to find out the certain demograhic groups that chose Norway as the country of the best salmon from. Bearing such purpose in mind, a logit model was created as following with Norway as the binary dependent variable, defining that Norway=1, if respondent chose Norway as the country for the best salmon from; 0 otherwise. Independent variables are demograhic factors. The model is showed as following:

#### **(1b) Norway= f (Demograhic factors)**

Based upon the statistically significant coefficients, the results indicate that the likelihood of choosing Norway as the country of the best salmon from is significantly influenced at 0.15 level or lower by the variables BJ, Age25\_34, Male, Income\_2, Income\_3 and Location. The other Factors are not found having significant impact on Norway. (table 5)

**Table 5.** Estimated coefficients and relative changes for the Logit Model of the Likelihood that consumer choose Norway as the country of the best salmon from

Variable	Estimated coefficient	P-value	$\Delta P$
Constant	-2.671	0.000	-56.3 %
SH	0.366	0.168	7.9 %
BJ	0.674****	0.010	14.7 %
AGE25_34	0.491*	0.150	10.4 %
AGE35_49	0.355	0.318	7.7 %
AGE50+	-0.075	0.888	-1.6 %
MALE	0.335*	0.117	7.1 %
OCP_FULLL	0.284	0.536	5.8 %
INCOME_2	0.530***	0.041	11.1 %
INCOME_3	1.064****	0.005	24.9 %
JOB_3	0.034	0.947	0.7 %
JOB_4	0.392	0.431	8.3 %
JOB_5	0.550	0.376	12.5 %
LOCATION	0.651****	0.003	14.4 %
Log likelihood	-284.7		
$\chi^2$ -value	64.8		
Prob (ChiSq>critical value)	0.000		
Pseudo R <sup>2</sup>	0.102		
Percentage right predictions	71.9%		

Note: \*\*\*\*p<=0.01, \*\*\*p<=0.05, \*\*P<=0.1, \*P<=0.15

The estimated coefficient indicates that City Beijing is positively related to the likelihood of choosing Norway as the country of the best salmon from. The increased relative change in the probability of choosing Norway as the best salmon comes from for City Beijing is 14.7%, which indicates that Beijing consumers are more likely to choose Norway as the country of the best salmon from than Shanghai and Guangzhou. This may be due to the important role played by NSEC of doing marketing campaign through media and marketing promotion for Norwegian salmon in supermarkets in Beijing.

Income is also found to have positive relationship with variable Norway. The increased relative change in the probability of choosing Norway as the best salmon comes from for income between RMB2,000 and 5,000 is 11.1% compared with income group RMB 5,000+ is 24.9%. It indicates that the impact of income\_3 on Norway is more distinct than income\_2. Thus, consumers having income more than RMB 5,000 are the most likely to choose Norway as the best salmon from. This result suggests that higher income individuals are more likely to choose Norway as the country of the best salmon from.

Consumers at fish counter is positively related to the likelihood of choosing Norway as the country of the best salmon from, which indicates that the consumers that are frequent seafood purchasers are more likely to choose Norway as the best salmon from.

Age25\_34 is found to have positive relationship with Norway. The increased relative change in probability of choosing Norway as the best salmon from for Age 25\_34 is 10.4%. The finding indicates that consumers between 25 and 34 are the most likely to choose Norway as the best salmon from. It is interesting to notice that although variable Age50+ is not significant, it is negatively related to Norway. It may suggest there is nonlinear relationship between age and the likelihood of choosing Norway as origin of the best salmon. Age35\_49 is also positive in the model although it is not significant. Thus, individuals between the ages of 25 and 49 are more likely to choose Norway than the other two age groups.

Male has positive impact on variable Norway. The increased relative change in probability of choosing Norway as the best salmon comes from for Male is 7.1%, which indicates that males are more likely to choose Norway as the best salmon from. It is not surprising since males are paying more attention on media than females.

#### **4.1.3 Japan Model--Who think of Japan as the best salmon from?**

32.9% of the consumers responded Japan as the country of the best salmon comes from, which is the highest among all the countries. It is not so surprising since the introduction of Japanese cuisine and following popularity of Japanese restaurants created such image that Japan is the country of the best salmon from. In order to investigate certain demograhic groups that consider Japan as the country of the best salmon from, a logit model was constructed as following with Japan as the binary dependent variable, given value of 1, if respondent chose Japan as the country for the best salmon from; 0 otherwise. Independent variables are demograhic factors. The model is showed as following:

##### **(1c) Japan= f (Demograhic factors)**

Based upon the statistically significant coefficients, the likelihood of choosing Japan as the country of the best salmon from is significantly influenced at 0.05 level or lower by the variables Age25\_34, Age 35\_49, Age50+. The other factors are not found having significant impact on variable Japan. (table 6)

**Table 6.** Estimated coefficients and relative changes for the Logit Model of the Likelihood that consumer choose Japan as the country of the best salmon from

Variable	Parameter estimate	P-value	$\Delta P$
Constant	0.529	0.074	11.6 %
SH	-0.249	0.317	-5.4 %
BJ	-0.142	0.557	-3.1 %
AGE25_34	-0.613***	0.031	-13.2 %
AGE35_49	-0.912****	0.003	-18.6 %
AGE50+	-0.923***	0.033	-16.9 %
MALE	-0.215	0.304	-4.7 %
OCP_FULL	0.065	0.878	1.4 %
INCOME_2	-0.251	0.299	-5.5 %
INCOME_3	-0.116	0.758	-2.5 %
JOB_2	-0.294	0.525	-6.3 %
JOB_3	-0.368	0.425	-8.0 %
JOB_4	-0.663	0.299	-12.8 %
LOCATION	-0.138	0.547	-3.0 %
Log likelihood	-305.3		
$\chi^2$ -value	26.5		
Prob (ChiSqd>critical value)	0.015		
Pseudo R <sup>2</sup>	0.042		
Percentage right predictions	67.7%		

Note: \*\*\*\*p<=0.01, \*\*\*p<=0.05, \*\*P<=0.1, \*P<=0.15

The output indicates that Age 35\_49, Age 25-34 and Age50+ have negative relationship with Japan. The decreased relative change in the probability of choosing Japan as the best salmon comes from for Age 35\_49 is 18.6% compared with Age 25\_34 is 13.2% and Age50+ is 16.9%, which also indicates there is nonlinear relationship between age and the likelihood of choosing Japan as the origin of the best salmon. The consumers between 35 to 49 years old are the least likely to choose Japan as the best salmon from. This might due to that the individuals between ages of 35 and 49 have more knowledge accumulation and pay more attention on media.

## 4.2 Preference Model

In table10, fresh as the preferred type of salmon accounts for 81.6% of the valid response, owning the highest percentage. In order to discover what affects the consumer's preference for fresh salmon, a logit model was set up as the following by defining fresh as binary dependent variable, given value of 1, if fresh is responded as the preferred type of salmon; 0, otherwise. Independent variables are demographic and experience factors.

**Table 7** Percentage of preferred type of salmon

<b>The type of salmon preferred</b>	<b>Percentage</b>
smoked	5.1
fresh	<b>81.6</b>
frozen	5.9
Other kinds	6.2

Regarding to the cooking skill, it is showed in the table 8 that ‘only know sashimi’ owns the highest percentage, followed by ‘know some’ and ‘know quite a lot’. In order to ‘quantify’ categorical variable, ‘only know sashimi’ is transferred into dummy variable by given value of 1, if the respondent chose ‘only know sashimi’; 0, otherwise. ‘Know some’ and ‘know quite a lot’ are merged as one variable and designated as ‘goodcook’ by giving value of 1, if the respondent chose know quite a lot or know some about cooking salmon; 0, otherwise.

**Table 8** Percentage of cooking skill

<b>Cooking skill</b>	<b>Percentage</b>
know quite a lot	4.5
know some	22.2
only know sashimi	<b>66.9</b>
not easy to cook	2.1
don't know at all	4.3
Total	100.0

I assumed that there is interactions between sashimi, fresh and Japan. The preference model is showed as following:

**(2) Fresh= f (Demographic, Experience)**

Based on the statistically significant coefficients, the likelihood of choosing fresh as preferred type of salmon is significantly influenced at 0.1 level or lower by Age25\_34, Age35\_49, Japan and Sashimi. (table 9)

The increased relative change in the probability of choosing fresh as preferred type of salmon for Age25\_34 is 10.8% and 8.3% for Age35\_49, which indicates that the relationship of age on the likelihood of choosing fresh as preferred type of salmon is non-linear. The individuals between the ages of 25 and 49 are more likely than the other two ages groups to choose fresh as preferred type of salmon.

Sashimi and Japan are both found to be positively related to the likelihood of choosing fresh as preferred type of salmon, even salmon has the biggest impact among all the factors. It is consistent with the prior expectations that there is relationship between Japan, Sashimi and Fresh. Therefore, marketing campaign for

salmon should emphasize its freshness especially when promoting sashimi or sushi, both of which are typical Japanese food made of raw fish.

**Table 9.** Estimated coefficients and the relative changes for the Logit Model of the likelihood that consumer choose fresh as the preferred type of salmon for consumption

Variable	Parameter estimate	P-value	$\Delta P$
Constant	0.278	0.620	3.8 %
SH	0.060	0.842	0.8 %
BJ	0.394	0.210	5.2 %
AGE25_34	0.815***	0.025	10.8 %
AGE35_49	0.656**	0.079	8.3 %
AGE50+	0.531	0.309	6.2 %
MALE	-0.190	0.456	-2.6 %
OCP_FULL	-0.803	0.193	-9.5 %
INCOME_2	0.093	0.763	1.3 %
INCOME_3	0.099	0.839	1.3 %
JOB_2	0.555	0.397	6.9 %
JOB_3	0.342	0.595	4.6 %
JOB_4	0.307	0.704	3.8 %
LOCATION	0.239	0.396	3.1 %
NORWAY	0.025	0.934	0.3 %
JAPAN	0.694***	0.030	8.8 %
SASHIMI	0.837**	0.065	12.6 %
GOODCOOK	0.176	0.710	2.3 %
Log likelihood	-222.38		
$\chi^2$ -value	26.63		
Prob (ChiSq>critical value)	0.064		
Pseudo R <sup>2</sup>	0.056		
Percentage right predictions	82.0%		

Note: \*\*\*\*p<=0.01, \*\*\*p<=0.05, \*\*P<=0.1, \*P<=0.15

### 4.3 Belief model

#### 4.3.1 Liking model

Food products must appeal to the consumer's sense of taste, color and smell regardless of how nutritional, or inexpensive it may be.

Participants were asked to indicate how they like salmon by scale from one to ten ranging from dislike to like very much, which represents a combination of taste and color. To uncover what influence consumers' belief about salmon's taste and color, a multiple linear regression model is applied as following:

#### (3a) Liking = f (Demographic, Experience, Preference)

Liking is taken as the dependent variable, and demographic, experience, preference is included as independent variables.

Based upon the statistically significant coefficient, salmon's liking is significantly influenced at 0.1 level or lower by the variables SH, BJ, Location, Norway, Sashimi

and Goodcook. The other factors are found out not have significant impact on Liking.  
(Table 10)

**Table 10**  
Belief model: Estimated coefficients for Multiple Linear regression model  
consumer's liking of salmon

Variable	Coefficients	Standardized coefficients	t-ratio	P-value
Constant	5.703		10.928	0.000
SH	-0.623***	-0.134	-2.562	0.011
BJ	-1.115****	-0.239	-4.649	0.000
AGE25_34	-0.127	-0.029	-0.424	0.672
AGE35_49	-0.170	-0.035	-0.550	0.583
AGE50+	0.201	0.025	0.468	0.640
MALE	0.241	0.054	1.195	0.233
OCP_FULL	0.319	0.065	0.771	0.441
INCOME_2	-0.038	-0.009	-0.159	0.874
INCOME_3	0.089	0.013	0.241	0.809
JOB_2	-0.299	-0.060	-0.658	0.511
JOB_3	-0.193	-0.044	-0.426	0.671
JOB_4	-0.426	-0.045	-0.717	0.474
LOCATION	0.748****	0.148	3.415	0.001
NORWAY	0.481**	0.103	1.945	0.052
JAPAN	-0.174	-0.037	-0.729	0.466
SASHIMI	1.252****	0.268	3.006	0.003
GOODCOOK	1.382****	0.278	3.145	0.002
FRESH	-0.229	-0.040	-0.907	0.365
R <sup>2</sup>	0.120			
F (18,481)	3.66			
Prob value	0.000			

Note: \*\*\*\*p<=0.01, \*\*\*p<=0.05, \*\*P<=0.1, \*P<=0.15

There is negative relationship between Beijing and Liking, the same for Shanghai. Guangzhou has average score about 1.115 higher than Beijing and about 0.623 higher than Shanghai. From the standardized coefficient, a unit increase in standard deviation of Beijing, on average, leads to 0.239 decrease in standard deviation of Liking, compared with Shanghai that leads to 0.134 decrease in standard deviation of liking. Among all the three cities, Beijing has the lowest average score and Guangzhou has the highest average score. It indicates that good taste or nice appearance should be particularly stressed in the promotion activities in Gangzhou, and it might also be necessary to be involved in the promotion in Shanghai.

It is also indicated in the table 10 that Location, Norway, Sashimi and Goodcook have positive impact on Liking.



Respondents that are frequent seafood purchaser have average score 0.748 higher than those who are not. Therefore, good taste or nice colour should be stressed for salmon at fish counter.

Consumers who were aware of Norway as the best salmon comes from have average score 0.481 higher than those who were not. Hence, it appears that salmon from Norway enhance the image of salmon as a product that tastes good and therefore should be stressed in the promotion activities.

Consumers who had good knowledge of cooking salmon have 1.38 higher in average score than those who do not have any knowledge of cooking salmon. Consumers who only know sashimi have 1.25 higher in average score than those who do not have any knowledge. It is indicated by standardized coefficient that Goodcook and Sashimi have almost the same but the most explanatory power compared to the other factors. As a result, cooking skill should be demonstrated during the promotion; improving its image as well as reiterating good taste of sashimi should also be involved in.

#### **4.3.2 Price model-who can afford the price?**

Although salmon's price was decreasing during the past five years, it might still be sensitive to consumers since it is relatively an expensive product compared to other seafood products in supermarkets. With this in mind, respondents were asked to indicate their belief of salmon's price scaled from one to ten ranging from an expensive product to an inexpensive product. To discover what and how affects the consumers' belief about price, a multiple linear regression model is applied as following:

##### **(3b) Price = f (Demographic, Experience, Preference)**

Consumers' belief about price is dependent variable in the multiple linear regression model. The independent variables include demographic, experience and preference factors.

Based upon the statistically significant coefficients, price as a believed attribute of salmon is influenced significantly at the 0.15 level or lower by the variables SH, BJ, Age50\_64, Male, Income\_2, Income\_3, Norway and Sashimi. The other factors do not show significant impact on the dependent variable price. (Table 11 )

It appears that income have positive impact on the capability of affording salmon. It is showed that consumers with monthly income more than RMB 5,000 have around

average score of 1.84 higher than those with monthly income lower than RMB 2,000. And by the standardized coefficient, it has the most explanatory power compared to the other factors. For instance, Income 5,000+ has around 3.7 times higher explanatory power than Income 2,000-5,000, which also shows having positive impact. Information is generated that promotion of salmon should target consumers with middle to high income.

**Table 11**

Belief model: Estimated coefficients for Multiple Linear regression model  
belief of salmon's price

Variable	coefficients	Standardized coefficients	t-ratio	P-value
Constant	3.252		7.082	0.000
SH	0.419**	0.099	1.959	0.051
BJ	0.372**	0.088	1.763	0.079
AGE25_34	0.001	0.000	0.003	0.998
AGE35_49	-0.219	-0.050	-0.806	0.421
AGE50_64	-0.640**	-0.088	-1.696	0.091
MALE	0.323**	0.080	1.822	0.069
OCP_FULL	-0.305	-0.068	-0.838	0.403
INCOME_2	0.306*	0.076	1.460	0.145
INCOME_3	1.836****	0.284	5.666	0.000
JOB_2	-0.136	-0.030	-0.341	0.733
JOB_3	0.234	0.058	0.587	0.558
JOB_4	0.240	0.028	0.460	0.646
LOCATION	0.118	0.026	0.611	0.541
NORWAY	0.340*	0.079	1.562	0.119
JAPAN	0.053	0.012	0.254	0.799
SASHIMI	0.803***	0.189	2.190	0.029
GOODCOOK	0.490	0.108	1.266	0.206
FRESH	0.299	0.058	1.350	0.178
R <sup>2</sup>	0.164			
F (18,481)	5.23			
Prob value	0.000			

Note: \*\*\*\*p<=0.01, \*\*\*p<=0.05, \*\*P<=0.1, \*P<=0.15

Shanghai is 0.419 higher in average score than Guangzhou. Beijing has 0.372 higher score than Guangzhou, which appears to be slightly less significant. It may imply that consumers in Shanghai and Beijing are more affordable for salmon.

Also, consumers between the ages of 50 and 64 are 0.64 lower in average score than the consumers between the ages of 15-24. Although other age variables are not significant, we can still find out that the younger the consumer, the more he/she view salmon as affordable. Salmon is a relatively new and expensive seafood product in the supermarkets in China, young generation are more easy to accept and afford such

product. It is suggested that promotion should target generation between the ages of 20 to 49.

It is also interesting to notice that male consumers consider salmon more affordable than woman with 0.323 higher in average score, although female make purchase more often than male.

Knowledge of Norway played an important role in the consumers' belief about salmon price. The consumers acknowledging Norway as the best salmon comes from have 0.34 higher in average score, which shows its positive effect.

The last finding is that Sashimi has important interaction with belief of price. During the marketing research, some consumers stated that although salmon is expensive, they consider the taste of sashimi more than its price. It indicates that those consumers like sashimi think of salmon as an affordable product more than those that do not. It is suggested here that making salmon into sashimi could possibly increase the sales of salmon.

#### **4.3.3 Nutrition Model**

Nutrition plays an important role in the Chinese diets. Many consumers will be attracted to certain seafood product because of its health and nutritional attributes. With this in mind, respondents were asked to indicate their belief of salmon's nutrition level scaled from one to ten ranging from non-nutrition to very nutritious. To understand how and what affects consumers' belief about salmon, a multiple linear regression model is applied with dependent variables of experience, demographic factors, preference.

##### **(3c) Nutrition= f (Demographic, Experience, Preference)**

Based upon the statistically significant coefficients, nutrition as an important attribute of salmon is influenced significantly at 0.1 level or lower by the variables SH, Age35\_49, Job\_3, Job\_4, Norway and Goodcook. The other factors are not found having significant influence on the dependent variable Nutrition. (table 12)

The results shows that Shanghai is 1.342 higher in average score than Guangzhou and has the most explanatory power by standardized coefficients, which suggests that belief of salmon as a nutritious product gains more acknowledgements by consumers in Shanghai than Guangzhou. This may indicate that salmon promotion campaign in Shanghai should stress its nutrition attribute.

**Table 12**

Belief model: Estimated coefficients for Multiple Linear regression model  
belief of salmon's nutrition

Variable	Coefficient	Standardized coefficient	t-ratio	P-value
Constant	5.738		13.954	0.000
SH	1.342****	0.349	7.005	0.000
BJ	0.189	0.049	1.001	0.317
AGE25_34	-0.045	-0.012	-0.190	0.850
AGE35_49	-0.405**	-0.102	-1.663	0.097
AGE50_64	-0.156	-0.024	-0.462	0.644
MALE	-0.337***	-0.092	-2.121	0.034
OCP_FULLL	-0.462	-0.113	-1.419	0.157
INCOME_2	0.102	0.028	0.543	0.588
INCOME_3	0.257	0.044	0.886	0.376
JOB_2	0.933****	0.226	2.608	0.009
JOB_3	0.715***	0.196	2.003	0.046
JOB_4	0.356	0.045	0.761	0.447
LOCATION	-0.009	-0.002	-0.052	0.959
NORWAY	0.589****	0.152	3.025	0.003
JAPAN	-0.013	-0.003	-0.069	0.945
SASHIMI	0.140	0.036	0.425	0.671
GOODCOOK	0.638**	0.156	1.843	0.066
FRESH	0.239	0.051	1.204	0.229
R <sup>2</sup>	0.191			
F (18,481)	6.32			
Prob value	0.000			

Note: \*\*\*\*p<=0.01, \*\*\*p<=0.05, \*\*P<=0.1, \*P<=0.15

Consumers who are white collar or equality are found to have 0.715 higher in average score than unemployed or part time job holder. The similar finding is also found for consumers who are blue collar or equality, which shows 0.933 higher in average score. Therefore, it appears that the marketing campaign should stress nutrition value of salmon if the major consumers of certain supermarket are blue collar, white collar or equality.

Knowledge of Norway as the best salmon from also played an important role in viewing salmon as a nutritious product. Consumers indicated Norway produces the best salmon have around 0.59 points higher in average score for considering salmon as a nutritious product. Hence, it indicates there is interaction between Norway and belief of nutrition, which further suggests that emphasizing salmon's high nutrition value and Norway produces the best salmon should be taken at the same time in the promotion activities.

Whether consumers have good knowledge of cooking salmon has significant impact on consumers' belief of salmon's nutrition value. Those who have good

cooking knowledge shows 0.638 points higher in the average score in evaluating salmon's nutrition. Information is given that when showing cook skill of salmon, nutrition value of salmon should not be overlooked.

Consumers between the ages of 35 and 49 are found to have the lowest level in evaluating salmon's nutrition with 0.405 lower in average score than Age15\_24. In other words, it indicates younger generation has more awareness of nutrition as salmon's attribute.

Males have less awareness than women for salmon's nutrition attribute with 0.337 points lower in the average score. This finding is consistent with the findings of Nayga (1997), which suggested that males are less likely to perceive nutrition as important when food shopping than do woman.

#### **4.4 Choice model and descriptive study**

Choice, which is the decision of the consumer to purchase seafood is based on demographic, experience, preference, belief factors. To understand the role of these factors in the decision making procedure, questions regarding the frequency of consuming salmon, the latest time and place of consuming salmon were asked. To fulfill such requirement, ordered probit model showed as following is applied, which is an extension of logit model.

##### **4.4.1 Level of salmon consumption**

The level of consuming salmon is most interestingly to marketers to know what and how factors have effects on it. A logistic model is showed as following with demographic, experience, preference, belief factors as independent variables and the frequency of consuming salmon as ordered dependent variable.

##### **(4a) Choice1 = f (Demographic, Experience, Preference, Belief )**

Choice1: How often do you eat salmon? —Measure level of consumption

The factors that are found to have significant effect on level of consumption at 0.10 level or lower are Age25\_34, Age35\_49, Age50+, Income\_2, Income\_3, Location, Fresh, Liking, Price. Other factors are not found having significant impact. (table 13)

**Table 13.**  
Estimated coefficients and marginal effects for ordered model  
frequency of consuming salmon

Variable	Coefficient	P-value	Marginal effects				
			Prob(Y=0)	Prob(Y=1)	Prob(Y=2)	Prob(Y=3)	Prob(Y=4)
Constant	-1.265	0.000	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
SH	0.043	0.744	-0.9 %	-0.7 %	0.1 %	1.0 %	0.4 %
BJ	0.106	0.401	-2.1 %	-1.8 %	0.3 %	2.5 %	1.1 %
AGE25_34	-0.263**	0.082	5.5 %	4.4 %	-1.1 %	-6.2 %	-2.6 %
AGE35_49	-0.414****	0.009	9.2 %	6.5 %	-2.4 %	-9.6 %	-3.7 %
AGE50+	-0.581****	0.008	15.3 %	7.4 %	-6.3 %	-12.6 %	-3.9 %
MALE	0.132	0.204	-2.7 %	-2.2 %	0.4 %	3.1 %	1.4 %
OCP_FULL	-0.027	0.899	0.6 %	0.5 %	-0.1 %	-0.6 %	-0.3 %
INCOME_2	0.307***	0.012	-6.3 %	-5.1 %	1.1 %	7.3 %	3.1 %
INCOME_3	0.476***	0.014	-7.8 %	-8.5 %	-1.1 %	11.0 %	6.4 %
JOB_2	0.004	0.986	-0.1 %	-0.1 %	0.0 %	0.1 %	0.0 %
JOB_3	0.056	0.810	-1.2 %	-1.0 %	0.2 %	1.3 %	0.6 %
JOB_4	-0.121	0.690	2.6 %	2.0 %	-0.6 %	-2.9 %	-1.1 %
LOCATION	0.854****	0.000	-14.1 %	-14.6 %	-2.2 %	18.9 %	12.0 %
NORWAY	-0.049	0.700	1.0 %	0.8 %	-0.2 %	-1.2 %	-0.5 %
JAPAN	-0.184	0.132	3.9 %	3.0 %	-0.8 %	-4.4 %	-1.8 %
SASHIMI	0.071	0.747	-1.5 %	-1.2 %	0.3 %	1.7 %	0.7 %
GOODCOOK	0.315	0.175	-5.9 %	-5.5 %	0.4 %	7.5 %	3.6 %
FRESH	0.330***	0.012	-7.6 %	-5.1 %	2.3 %	7.6 %	2.8 %
LIKING	0.195****	0.000	-4.0 %	-3.3 %	0.7 %	4.7 %	2.0 %
PRICE	0.059***	0.026	-1.2 %	-1.0 %	0.2 %	1.4 %	0.6 %
NUTRITION	0.041	0.179	-0.8 %	-0.7 %	0.2 %	1.0 %	0.4 %
Log likelihood	-669.7						
$\chi^2$ -value	202.2						
Prob (ChiSq>critical value)	0.000						
Frequency			0.181	0.207	0.284	0.233	0.092

<sup>a</sup> Note: \*\*\*\*p<=0.01, \*\*\*p<=0.05, \*\*P<=0.1, \*P<=0.15

<sup>b</sup> Ordinal consumption categories. (y=0) never or seldom, (y=1) 1 time every 2 or 3 months, (y=2) once a month, (y=3) 2 or 3 times a month, (y=4) once a week or less.

Consider the age of the respondent. It appears to be negative relationship between the age of respondent and consumption level. There are significant decreases in consumption for increasing age groups. The decreased marginal probability of consuming salmon once a month or more for age group 50+ is 22.8% compared with age group 35 to 49 years is 15.7% and age group 25 to 34 is 9.9%. It suggests that the consumers between the ages of 50 to 64 are the least frequent consumers, while those between the ages of 35 to 49 are relatively infrequent consumers, as are, albeit to a lesser extent, respondents between the ages of 25 to 34. In the other word, it indicates that the younger generation consumes salmon more than the older generation. This may be due to younger generation are more easy to accept and try new product.

Income is also reported to have significant impact on consumption level. It appears to be positive relationship between income and consumption level. The increased marginal probability of eating salmon 2 or 3 times a month or more for monthly income above RMB 5,000 is 17.4%. The increased marginal probability of eating salmon once a month or more for monthly income between RMB 2,000 to 5,000 is 11.5%. The estimated positive relationship may reflect consumers with higher income consume more salmon than lower income. It is accordance with the previous finding that marketing promotion should target consumers with middle to high income.

Among all the factors, frequent seafood purchasers make the most significant difference. The increased marginal probability of consuming salmon 2-3 times a month or more for respondents at fish counter are 30.9%. It indicates that the frequent seafood purchaser consume more salmon. It coordinates with the previous finding that promotion activity should be carried out at fish counter.

The consumers prefer fresh salmon also played an important role in consumption level. The increased marginal probability of eating salmon 2 or 3 times a month for consumers preferring fresh salmon is 12.7%. It may be due to the larger role played by fresh in the traditional diets of East Asian. The explanation is consistent with prior finding that fresh salmon increased the likelihood that a respondent would purchase. It is also almost the same explanation with the study of Fayyaz A. N. (1995) that fresh fish played larger role in the diets of Asian.

Refer to consumers' belief, liking and price have important impact on consumption level. The increased marginal probability of eating salmon once a month for Liking is 7.4% and only 2.2% for Price. It is accordance with consumer behaviour theory mentioned in chapter 2 that in the growing economy, future changes in food demand will be more and more caused by preference changes rather than by price and income changes. Consumers that like salmon would probably consume more than other consumers.

To conclude, consumers that are young, have higher income, frequently purchasing seafood, prefer for fresh salmon, like salmon and being able to afford its price are more likely to purchase salmon.

#### **4.4.2 Frequency of salmon consumption**

A complementary question was asked to find out what and how factors affect frequency of consumption. Participants were asked to indicate the latest time to consume salmon. The roles of demographic, experience, preference and belief factors are to be found out regarding to consumer's latest time of consuming salmon. The results will be discussed associating with the prior finding. The ordered probit model is showed as following:

**(4b) Choice2= f (Demographic, Experience, Preference, Belief)**

Choice2: When is your last time to consume salmon? –Measure consumption frequency

**Table 14.**  
Estimated coefficients and marginal effects for ordered model  
The latest time of consuming salmon

Variable	Coefficient	P-value	Marginal effects				
			Prob(Y=0)	Prob(Y=1)	Prob(Y=2)	Prob(Y=3)	Prob(Y=4)
Constant	-0.754	0.029	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
SH	-0.162	0.223	2.1 %	3.5 %	0.6 %	-1.4 %	-4.8 %
BJ	0.091	0.474	-1.1 %	-2.0 %	-0.5 %	0.8 %	2.8 %
AGE25_34	-0.080	0.596	1.0 %	1.7 %	0.4 %	-0.7 %	-2.4 %
AGE35_49	-0.196	0.213	2.6 %	4.2 %	0.7 %	-1.8 %	-5.8 %
AGE50_64	-0.193	0.377	2.7 %	4.2 %	0.5 %	-1.8 %	-5.5 %
MALE	0.090	0.387	-1.1 %	-2.0 %	-0.5 %	0.8 %	2.7 %
OCP_FULL	0.070	0.743	-0.9 %	-1.5 %	-0.3 %	0.6 %	2.1 %
INCOME_2	0.287***	0.018	-3.6 %	-6.2 %	-1.3 %	2.4 %	8.7 %
INCOME_3	0.359**	0.067	-3.6 %	-7.6 %	-3.0 %	2.3 %	11.9 %
JOB_2	-0.335	0.155	4.7 %	7.2 %	0.8 %	-3.2 %	-9.5 %
JOB_3	-0.224	0.340	2.8 %	4.9 %	1.0 %	-1.9 %	-6.8 %
JOB_4	-0.248	0.422	3.6 %	5.3 %	0.4 %	-2.4 %	-6.9 %
LOCATION	0.719****	0.000	-7.1 %	-14.7 %	-6.2 %	4.1 %	23.9 %
NORWAY	-0.076	0.555	1.0 %	1.6 %	0.3 %	-0.7 %	-2.3 %
JAPAN	-0.168	0.166	2.2 %	3.6 %	0.7 %	-1.5 %	-5.0 %
SASHIMI	0.164	0.441	-2.1 %	-3.5 %	-0.6 %	1.5 %	4.8 %
GOODCOOK	0.243	0.278	-2.8 %	-5.2 %	-1.5 %	1.9 %	7.7 %
FRESH	0.383****	0.003	-5.7 %	-8.1 %	-0.5 %	3.8 %	10.5 %
LIKING	0.146****	0.000	-1.8 %	-3.2 %	-0.7 %	1.2 %	4.4 %
PRICE	0.026	0.332	-0.3 %	-0.6 %	-0.1 %	0.2 %	0.8 %
NUTRITION	0.098****	0.001	-1.2 %	-2.1 %	-0.5 %	0.8 %	3.0 %
Log likelihood	-706.04						
$\chi^2$ -value	142.67						
Prob(ChiSqdc							
ritical value)	0.000						
Frequencies			0.098	0.218	0.260	0.160	0.264

<sup>a</sup> Note: \*\*\*\*p<=0.01, \*\*\*p<=0.05, \*\*P<=0.1, \*P<=0.15

<sup>b</sup> Ordinal consumption categories. (y=0) never or more than half a year ago, (y=1) 2-5 month ago, (y=2) 1 month ago, (y=3) 2-3 weeks ago, (y=4) one week ago or less.



The factors that are found having significant effect on consumption frequency at 0.1 level or lower are Income\_2, Income\_3, Location, Fresh, Liking, Price and Nutrition. The other factors are not found having significant impact. (table 14)

Different from choice1 model, age is not found having significant impact. But, income is found to have significant impact on both choice1 and choice2. It may confirm the assumption that income influences the frequency of consuming salmon. The increased marginal probability of consumed salmon 2-3 weeks ago or less for Income\_3 is 14.2% compared with Income\_2 is 11.1%. Marketing campaign should target these consumers that have middle to high income, and should be carried out in the supermarkets having such consumers. For instance, Jusco shop in GZ, which is funded by Japanese firm, was targeting mainly for consumers having income from middle to high level.

Frequent seafood purchaser is also found to have significant effect. The frequent seafood purchaser increased 28% of the marginal probability of consuming salmon 2-3 weeks or less time ago. It is consistent with the previous finding that it is important to have marketing activities around fish counter.

Fresh appears to be more significant here according to the statistically significant coefficients, which confirms its importance of increasing the likelihood of purchasing salmon. I suggest that measures could be taken to highlight freshness in the marketing promotion.

Liking also shows significant positive impact on consumption frequency, which is identical with the Choice1 model. I suggest, the same as before, that stressing or improving consumers' perception of taste and appearance of salmon in the marketing promotion, for instance, improving the package of fresh salmon into more colorful or more attractive to consumers could be quite effective in expanding demand, especially in Guangzhou.

Price is not found to be significant here, but Nutrition is found be positively related to consumption frequency. Those consumers considering nutrition as important when making their purchase decision was found to increase the marginal probability of eating salmon 2-3 weeks or less time ago as 3.8%. Thus, nutrition might be reiterated in the marketing activities to improve the consumers' perceive about the high nutrition of salmon, especially in Shanghai.

#### 4.4.3 Location of the latest time to consume salmon

In order to expand salmon consumption in the retailing marketing, it is important to know what influences consumers to consume salmon at home instead of restaurant. Participants were asked to indicate the place of the latest time to consume salmon.

It is interesting to notice that among all the respondents that have consumed salmon before, around 30.7% answered they consumed the salmon at home the latest time; the rest 69.3% answered in the restaurant.

Assume that those who answered at home are the consumers mainly consume salmon at home. A logit model is applied with binary dependent variable Home given value of 1, if the respondent said he/she consumed salmon at home the last time; 0, otherwise. Explanatory variables include demographic, experience, preference and belief factors. The model is showed as following:

**(4c) Home= f (Demographic, Experience, Preference, Belief )**

Dependent variable Home is equal to 1, if consumed at home last time; otherwise, 0.

Choice 3: Where is your last time to eat salmon?

The factors that have a significant effect at the 0.15 level or lower on the dependent home are BJ, Age25\_34, Age35\_49, Age50+, Income\_2, Income\_3, Location, Goodcook, Liking and Nutrition. The other factors are not found to have significant impact on the dependent variable. (table 15)

Considering the age of respondent, there appears to be negative relationship between age and home. The older generation tended to consume at home rather than restaurant. The increased relative change in probability of home for Age50+ is 24.1%; for Age35\_49 is 21.7%; for Age25\_34 is 13.8%. This may indicate that younger generation are more likely to eat salmon in the restaurant, while the older generation are more likely to eat salmon at home. But, it is possible to attract younger generation by more marketing efforts, for instance, change the package of salmon or make it more convenient for consumers.

Refer to the city, citizens living in Beijing are more likely to consume at home due to the increased relative change in probability of home for Beijing is 17.1%. Shanghai is the least likely to consume at home, although it is not significantly different from Guangzhou. This may suggest that more efforts for marketing activities should be made in Shanghai and Guangzhou.

**Table 15.**  
Estimated coefficients and marginal effects for ordered model  
The latest place of consuming salmon

Variable	Parameter Estimate	P-value	ΔP
Constant	-5.270	0.000	-103.2 %
SH	-0.098	0.742	-1.9 %
BJ	0.830****	0.003	17.1 %
AGE25_34	0.694***	0.049	13.8 %
AGE35_49	1.036****	0.004	21.7 %
AGE50+	1.060***	0.025	24.1 %
MALE	-0.003	0.989	-0.06 %
OCP_FULL	-0.270	0.553	-5.4 %
INCOME_2	-0.747****	0.005	-14.6 %
INCOME_3	-1.370****	0.004	-20.2 %
JOB_2	-0.033	0.948	-0.64%
JOB_3	0.033	0.948	0.64%
JOB_4	-0.205	0.767	-3.84 %
LOCATION	0.839****	0.001	17.7 %
NORWAY	0.292	0.298	5.84 %
JAPAN	0.078	0.779	1.53 %
SASHIMI	1.042	0.126	18.5 %
GOODCOOK	1.704***	0.014	37.2 %
FRESH	0.117	0.688	2.25 %
LIKING	0.245****	0.000	4.79 %
PRICE	0.036	0.548	0.70 %
NUTRITION	0.099*	0.134	1.94 %
Log likelihood	-263.3		
χ <sup>2</sup> -value	-307.6		
Prob (ChiSqd>critical value)	0.000		
Pseudo R <sup>2</sup>	0.144		
Percentage right predictions	75.4%		

<sup>a</sup> Note: \*\*\*\*p<=0.01, \*\*\*p<=0.05, \*\*P<=0.1, \*P<=0.15

Income appears to have negative relationship with home. Both Income\_2 and Income\_3 decreased the relative change in probability of consuming at home, respectively, 14.6% and 20.2%. An intuitive explanation can be provided that salmon is a relatively new product in the supermarket, consumers are still used to consume salmon in the restaurant more than at home. Thus, more efforts are required to increase salmon consumption at home, or in other words, to make salmon more common for home consumption.

It is not surprising that frequent seafood purchaser contributes positively to the last time to consume at home, which further proves that the consumers at fish counter are frequent salmon purchasers. It significantly increased 17.7% of relative change in probability of consuming salmon at home. It may suggest that consumers that are frequent seafood purchaser are more likely to consume salmon at home. Suggestion

can be made the same as above-mentioned that promotion activities should be made at fish counter.

Having knowledge of cooking salmon also played an important role. Goodcook significantly increased 37.2% of relative change in probability of eating salmon at home. Thus, information can be provided that respondents that knowing how to cook salmon are more likely to eat salmon at home. Further suggestion is put forward in accordance with the previous that cooking skills is necessary to be demonstrated to the consumers.

Finally, belief factors liking and nutrition have positive impact on consuming at home. While, variable liking is more significant than nutrition, with increased relative change in probability of 4.79% and 1.94% respectively. It may provide information in accordance with previous finding that marketing campaign should target those who like salmon, for instance, the consumers in Guangzhou, consumers at fish counter and consumers like sashimi or have good knowledge of how to cook salmon etc.

#### 4.4.4 Descriptive study of the choice of place to buy salmon

Since the limitation of analysis skills as far as I know, it is difficult to deal with the choice of places to buy salmon. But, it is possible to have descriptive study. From table 16, big supermarkets accounts for the highest percentage for the choice of places to buy salmon. It may be due to the high hygienic standard, the varieties of supply, the freshness of salmon of big supermarket.

**Table 16.** Choice of the place to buy salmon

<b>Choice of the place to buy salmon</b>	<b>Valid percent</b>
small and medium supermarket	3.3 %
big supermarket	59.5 %
free market or local market	2.9 %
others	0.19 %
never buy salmon for home consumption	33.1 %
no idea	0.97 %
Total	100.0 %

## 5. Conclusions

This paper has tried to give a detailed picture on how lifestyle factors influence consumption of salmon in the three big cities in China. Several important observations were found based on the survey and model results. Such knowledge is important for marketers who want to increase demand of Norwegian salmon in supermarkets in China.

Consumers having income less than RMB 2,000 are the least likely to have consumed salmon. By contrast, consumers having income more than RMB 5,000 are the most likely to have consumed salmon. Consumers without full time job are much less likely to have consumed salmon compared to full time job holder. Consumers in Shanghai and non-frequent seafood purchasers are slightly less likely to have consumed salmon. Marketing efforts are still needed to encourage the above-mentioned consumers to try salmon, for example, 'try taste' activity could be carried through the in store promotion, especially around fish counter, in order to give consumers chances to 'experience' the product.

Marketing activities should be carried out at fish counter since several results in the study indicates that frequent seafood purchaser has positive impact on the consumption of salmon and related elements. Frequent seafood purchasers are more likely to consider Norway as origin of the best salmon and consume salmon more frequently. Moreover, they have more belief that salmon is a tasty and nice food and are more likely to consume it at home.

I suggest that promotions should be taken in the supermarkets that have consumers of middle and high income, for example, Carrefour Gubei shop and Carrefour Wuning shop in Shanghai; Jusco shop and Pakson shop in Guangzhou; Ito Yokado shop and Carrefour Guozhan shop in Beijing. Several results indicates that income have positive impact on the consumption of salmon and related elements. The higher income the consumer has, the more frequent he/she consumes salmon. The higher income the consumer has, the more he/she believes he can afford salmon products. Consumers with monthly income above RMB 5,000 are the most likely to consider Norway as the origin of the best salmon. But, according to the results of the latest place of consuming salmon, income shows negative effect on it that most of the higher income consumers eat salmon in the restaurant instead of home. Therefore,

efforts are still required to make more middle and high consumers belong to the salmon consumers in the supermarkets.

Sashimi played an important role in promoting demand of salmon, which is indicated in the results from choice model and liking model. I advise that it is possible to expand demand by making salmon into packed ready-to-eat sashimi or sushi with kinds of sauce. Transparent cover can be used to create better image; date of production and the origin of salmon should be marked on the package. Marketing campaign for salmon should also stress its freshness. The results proved that fresh, Japan and sashimi have interactions. Marking the date of production on the pack could make consumers clearly aware of salmon's freshness and furthermore, its quality. The origin of production is also suggested to be marked on the pack, since misunderstanding the origin of salmon could be partly due to lack of information on the pack. Furthermore, it might help consumers find out more positive attributes of Norwegian salmon, for example, consumer might find out that farmed salmon from Norway has higher hygienic standard. Another reason for promoting sashimi is that in the 'price' and 'liking' model, consumers that only know sashimi have more belief that salmon is an affordable product and that it has good taste and appearance. Thus, it is assumed that nicely packed sashimi could possibly make consumers consider less about its price and pay more attention on its taste and appearance.

Cooking skill could be demonstrated around fish counter by video or by chef. It could also be broadcasted through media. It is proved in this study that those consumers who know a lot or some about cooking salmon are more likely to consume it at home. In addition, such consumers have more awareness for its nutrition attribute and more belief that salmon is a tasty and nice food.

Marketing activities should be carried out more frequently in Shanghai and Guangzhou, especially in Guangzhou. Many results show that Guangzhou is positively related to the consumption of salmon. Consumers in Guangzhou are more likely to have consumed salmon and believe salmon is a tasty and nice food. Guangzhou possesses geographic advantage of being adjacent to Hongkong and becomes economic center in South China with high economic growth in the latest decade. It is expected that there will be potential expansion of salmon consumption in Guangzhou. Another important reason is that individuals in Guangzhou have habit and tradition to eat raw fish.

Shanghai is located in the east coast of China, named as 'economic center of China'. Shanghai has a population of over 14 million people, and still, there are many people coming from all over the country and all over the world, which gives better chances of expanding demand of salmon in Shanghai. It is important to develop a marketing mix strategy in Shanghai, which combines many kinds of marketing activities. Results also show that nutrition value should be especially stressed when launching marketing activity in Shanghai. This might be due to the fact that it is the tradition for Shanghainese to pay attention on food's nutrition attribute. However, Beijing can't be overlooked regarding to marketing activities.

Age is the factor that is difficult to explain in some ways. While, in general, the consumers between the ages of 20 to 49 are more likely to consume more salmon in the future. Marketing activities should be directed in the orientation of how to attract these consumers.

It is assumed that male consumers are more likely to consume more salmon since they have more belief that salmon is an affordable product, which links to consumption frequency. Males are also more likely to be aware of Norway as the origin of the best salmon.

Besides what was mentioned, I also suggest that convenient package or ready-to-eat set could be created for salmon products. More varieties for salmon can be developed to suit Chinese taste and Chinese dishes.

Finally, although hygienic standard and shopping environment of the supermarket are not included in this survey, I observed its influence on consumer's perception of salmon. If the supermarket has high hygienic standard of processing salmon and other food products with neat shopping environment, it will probably create better image to consumers and consequently increase demand for salmon. Thus, I suggests hygienic standard to be investigated in the similar study in the future. In addition, the impact of advertisement is usually included in the marketing study. I advises to apply it in the future study to investigate the responses from consumers that have seen the advertisement and haven't seen advertisement. In the growing economy, we will find more and more food products that can be compared with salmon, it is suggested that evoked set can be used to evaluate salmon with other food products in the further study.

While this study made a start in explaining how the lifestyle factors influences consumer behavior related to salmon, a more comprehensive study could be made in the future.



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Appendix 1:

*Marketing Research in Supermarkets in China*

Questionnaire (25% of the interview is conducted at fishcounter, and 75% of the interview is conducted in the supermarkets and not at fishcounter)

Location: In Shop (not at fishcounter)=0 At Fishcounter=1

**Question 1:** Have you ever eaten Salmon? Yes.... No....

**Question 2:** How do you like Salmon? (from 1 to 10 is scale, 1 is dislike very much and 10 is like very much)

Dislike very much Like very much

1	2	3	4	5	6	7	8	9	10
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**Question 3:** What do you think of Salmon's price? (from 1 to 10 is scale, 1 is too expensive, can't afford, 10 is can accept at all)

Too Expensive, can not afford Not expensive at all

1	2	3	4	5	6	7	8	9	10
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**Question 4:** What do you think about nutrition of Salmon? (from 1 to 10 is scale, 1 is non-nutrition, 10 is very nutritious)

Non-nutrition Very nutritious

1	2	3	4	5	6	7	8	9	10
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**Question 5:** Do you know how to cook Salmon?

1. know quite a lot
2. know some
3. Only know Sashimi
4. Not easy to cook
5. Don't know at all

**Question 6:** Which country do you think is the best Salmon from?

1. Norway
2. Canada
3. America
4. Chile
5. Japan
6. No idea

**Question 7:** What kind of Salmon do you like best?

1. Smoked
2. Fresh
3. Frozen
4. Marinated
5. Other kinds
6. Don't know

**Question 8:** How often do you eat Salmon

- 0). Never
- 1). very seldom
- 2). 2-3times/year
- 3). 1 time every 3 month
- 4). 1 time every 2 month
- 5). Once a month
- 6). 2-3 times/month
- 7) twice a week
- 8) once a week or less
- 9) Don't know

**Question 9 a:** When is your last time to eat Salmon?

- 0). Never
- 1). 1 year ago or longer
- 2) more than 6 month but less than 1 year ago
- 3). Half year ago
- 4). 5 month ago
- 5). 4 month ago
- 6). 3 month ago
- 7). 2 month ago
- 8). 1 month ago
- 9). 3 weeks ago
- 10). 2 weeks ago
- 11). 1 week ago or less

**Question 9 b:** Where is your last time to eat Salmon?

1. Home
2. Restaurant
3. Other place

**Question 10:** If you eat salmon at home, where do you buy it usually?

1. small and medium supermarket
2. big supermarket
3. Free market or local market

*Marketing Research in Supermarkets in China*

4. Others      5. Never buy Salmon for home consumption      6. No idea

**Question 11:**      On which occasion do you eat Salmon usually? (Multiple options)

1. At home      2. Meeting with friends      3. In Restaurants      4. At work or for business  
5. Festivals      6. Other occasion      7. Don't know

**Question 12 a:**      Your age.....

**Question 12 b:**      Gender    F(0)    M(1)

**Question 13:**      What is your current occupational situation?

1. Full time job      2. Part-time job      3. Housewife      4. Student      5. Retired  
6. Jobless temporary    7 Jobless for long time.      8. Not be able to work      9. Others  
10. No Answer

**Question 14:**    Your income per month (optional)

1. Less than 1000 yuan/month  
2. 1000—2000 yuan/month  
3. 2000—3000 yuan/month  
4. 3000—5000 yuan/month  
5. 5000---7000 yuan/month  
6. over 7000 yuan/month  
7. No Answer

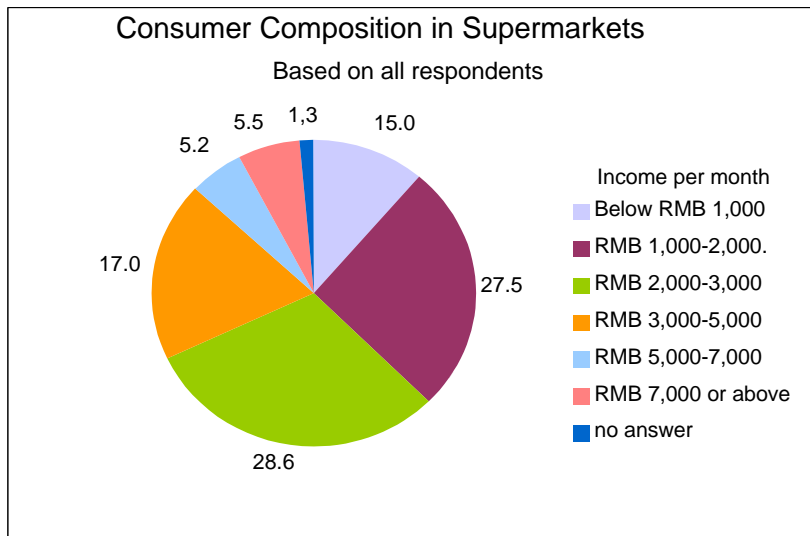
*NB: For housewife, I record the husband's income instead.*

**Question 15:**    Type of occupation:

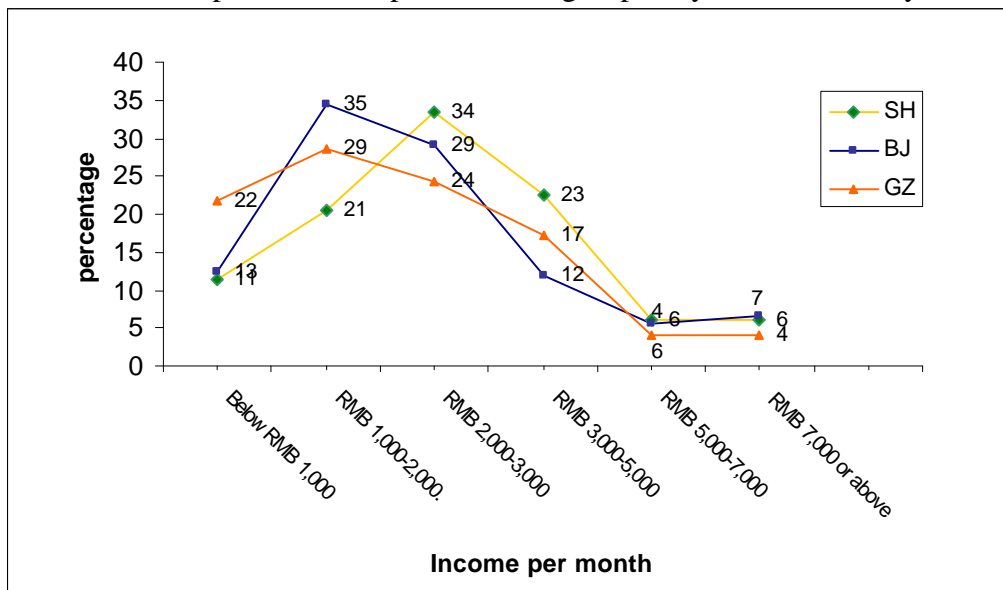
1. Unemployed
2. Student
3. Housewife
4. Retired
5. Part-time job
6. Farmer/ Peasant
7. Blue collar/ artisan
8. Owner of shop
9. Solider
10. Teacher (employed)
11. Civil servant
12. Doctor
13. White collar
14. Middle manager (supervisor, high level technician...)
15. Executive, director, top management (employed)
16. Entrepreneur, professional (self employed)
17. Others
18. No answer/ Not willing to answer

Appendix 2: Description of respondents:

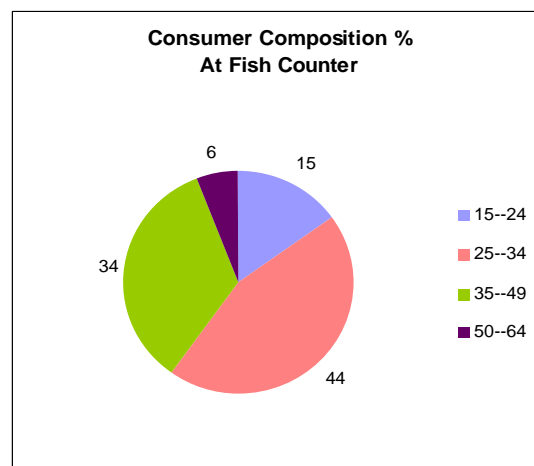
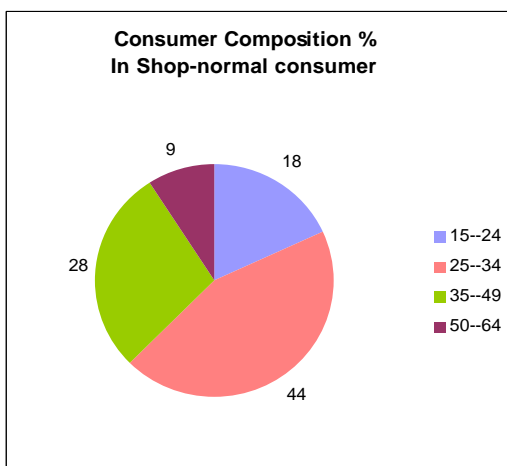
1. Consumer composition in supermarkets (based on all respondents)



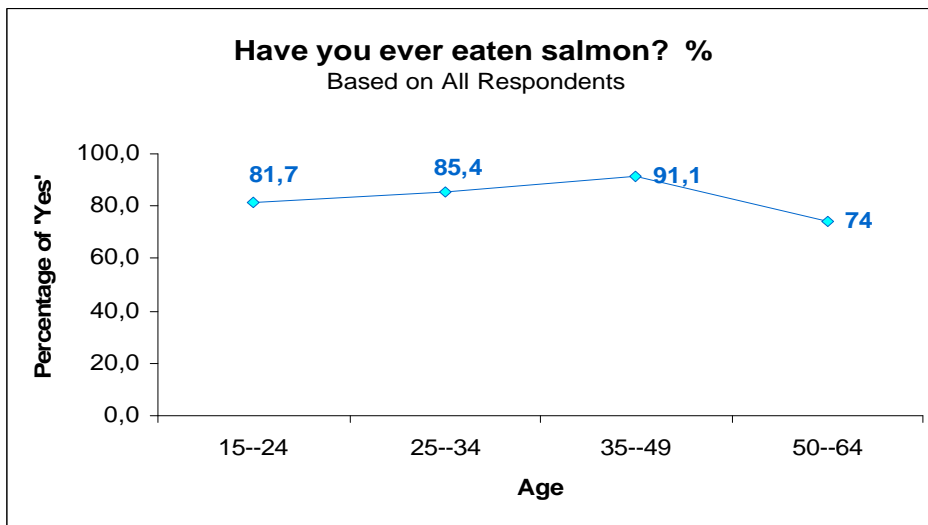
2. Consumer Composition in Supermarkets-- grouped by income and city



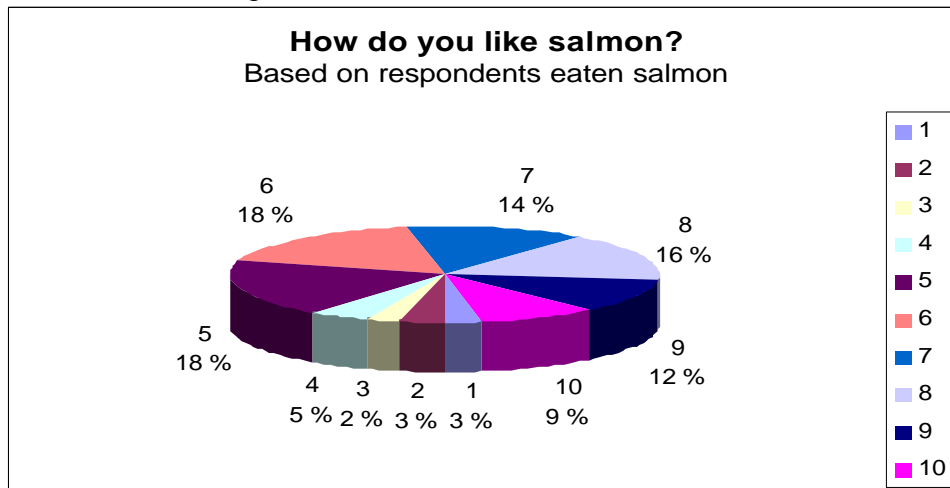
3. Consumer composition percentage grouped by age



4. Incidence of consuming salmon grouped by age.

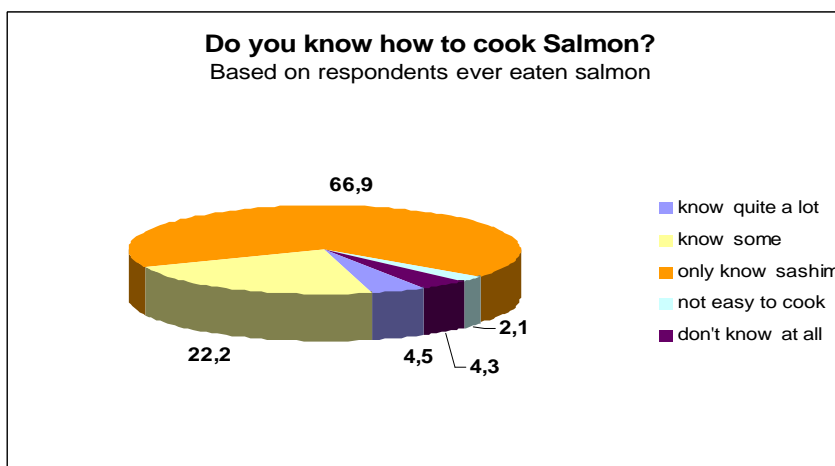


5. Consumers' liking of salmon



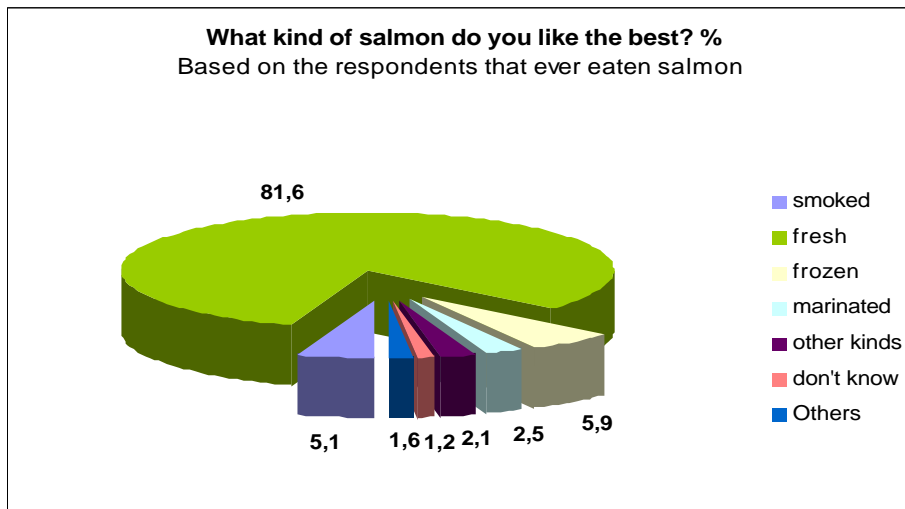
Scale 1, 2, 3.....5,.....10 measure consumer preference of salmon  
Scale: 1-Dislike Salmon at all 10-Like Salmon very much

6. Do you know how to cook salmon?

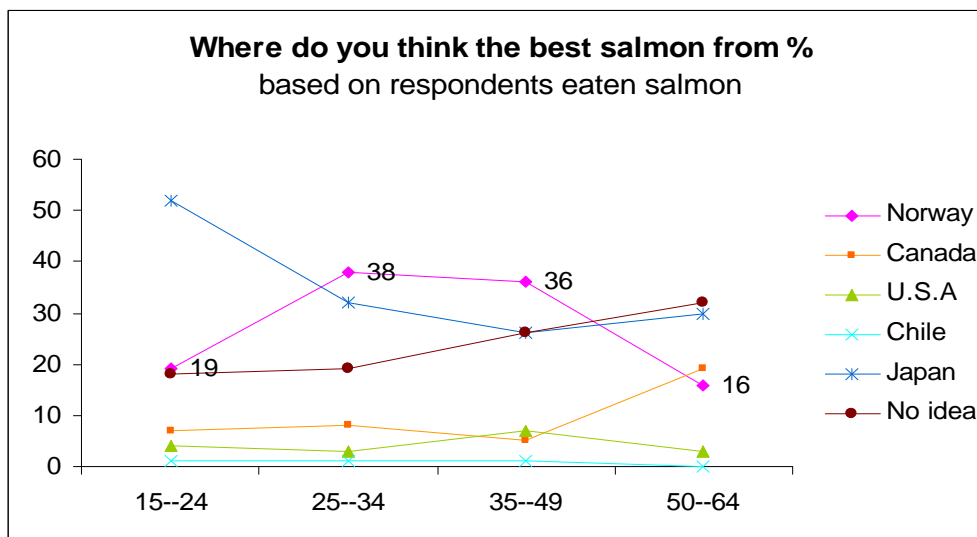


City	Know quite lot	Know some	Only know sashimi	Not easy to cook	Don't know at all
	%	%	%	%	%
SH	2,9	25,9	60,6	4,1	6,5
BJ	5,3	16,4	73,7	1,2	3,5 2
GZ	5,2	24,3	66,5	1,2	2,9

7. What kind of salmon do you like the best?

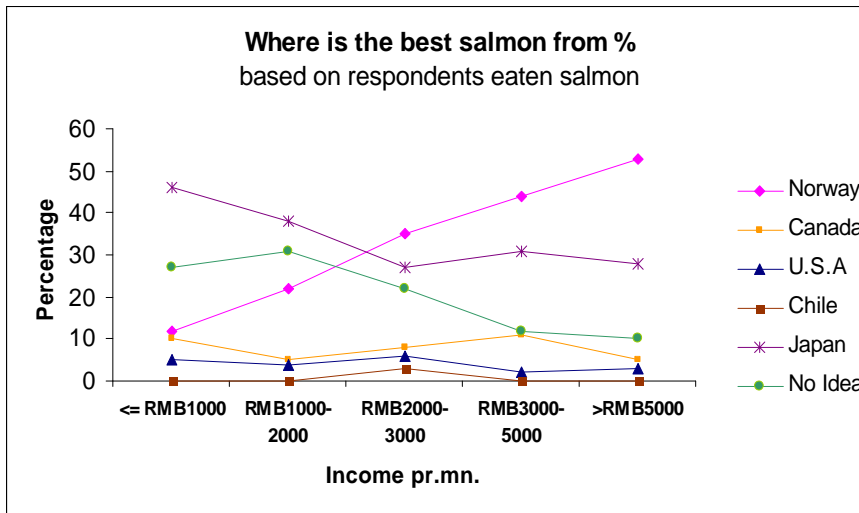


8. Where is the best salmon from? (grouped by age)

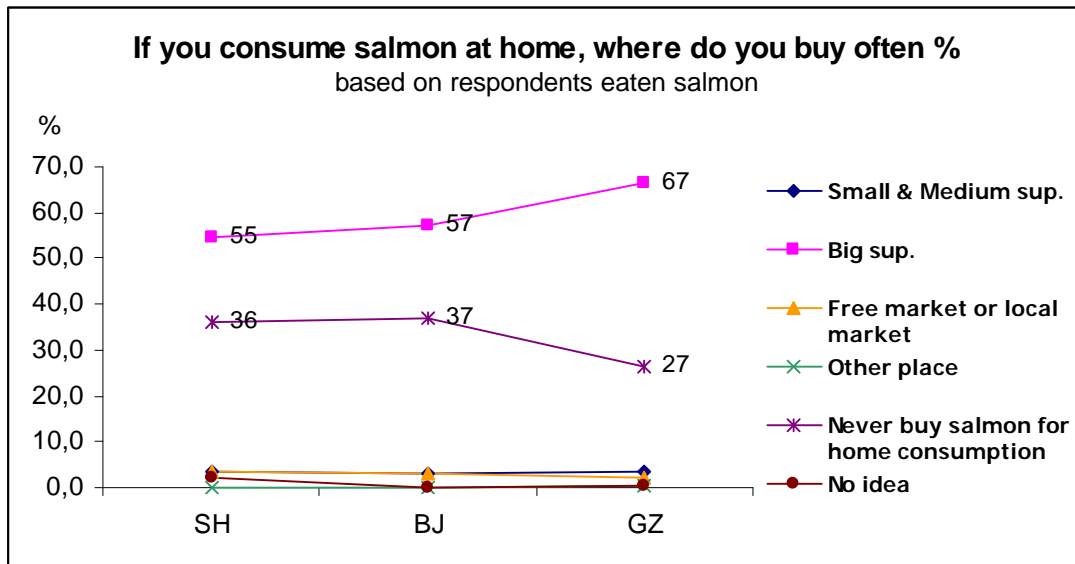


Age	Norway	Canada	America	Chile	Japan	No idea
15--24	%	%	%	%	%	%
15--24	19	7	4	1	52	18
25--34	<b>38</b>	8	3	1	32	19
35--49	<b>36</b>	5	7	1	26	26
50--64	16	19	3	0	30	32

9. Where is the best salmon from? (grouped by income)



10. If you consume salmon at home, where do you buy often?



11. How often do you eat salmon?

