Consumers' Perceptions, Attitudes and Willingness to Pay towards

Food Products with "No Added Msg" Labeling

Alias Radam (Corresponding author)

Faculty of Economics and Management Universiti Putra Malaysia, 43400 UPM Serdang, Malaysia E-mail: alias@econ.upm.edu.my

Mohd. Rusli Yacob

Faculty of Economics and Management Universiti Putra Malaysia, 43400 UPM Serdang, Malaysia E-mail: alias@econ.upm.edu.my

Than Siew Bee

Faculty of Food Science and Technology Universiti Putra Malaysia, 43400 UPM Serdang, Malaysia

Jinap Selamat

Faculty of Food Science and Technology Universiti Putra Malaysia, 43400 UPM Serdang, Malaysia E-mail: jinap@putra.upm.edu.my

Abstract

This research was carried out in order to determine consumers' perceptions, attitudes and willingness-to-pay (WTP) towards food products with "No Added MSG" labeling. A total of 200 respondents within the area of Klang Valley were interviewed using a close-ended questionnaire. The Contingent Valuation Method (CVM) was used to determine the consumers' WTP for the consumption of safer beef. A logit model was used to estimate the premium that consumers are willing to pay for food products with "No Added MSG" labeling. The results pointed out that majority of the consumers know and have read about or heard of Monosodium Glutamate (MSG) and illnesses caused by MSG, but only a small portion of them have experienced these illnesses before. Not all of the consumers have high awareness towards illnesses caused by MSG due to lack of information. However, their perceptions and attitudes towards food products with "No added MSG" labeling were found to be generally positive. Besides, the CV method which was used to determine and estimate consumers' WTP towards the food products mentioned by using logit model showed that the most important and significant actors that influenced a consumers' WTP are gender (female), household size, household income, family member with children below the age of 12, price levels and education level (university). Results also revealed that respondents were willing to pay a premium of about RM 0.43 for food products with "No added MSG" labeling. Based on the study, it was found that the demand and consumption of "No Added MSG" is still high and increasing. This current trend will certainly have effects on the present market. Hence, to ensure a better development of these products, there is a need to formulate proper standards, policies and promotion programmes for these products more efforts in research and development (R&D) are needed to improve the production technologies and food safety systems for these "No Added MSG" food products.

Keywords: Contingent valuation method, Food safety, Willingness to pay, MSG Labeling

1. Introduction

MSG is a flavor enhancer which has been used effectively for nearly a century to bring out the best flavor in food. Its principal component is an amino acid called glutamic acid or glutamate which is found naturally in protein-containing foods such as meat, vegetables, poultry and milk. The human body also produces glutamate naturally in large amounts. Glutamate is found in two forms: "bound" and "free" glutamate. Only free glutamate is effective in enhancing the flavor of food. Foods often used for their flavoring qualities, such as tomatoes and mushrooms, have high levels of naturally occurring free glutamate.

However, the issue of consumer acceptance of MSG has been largely debated since the Adverse Reaction Monitoring System in FDA's Center for Food Safety and Applied Nutrition received 622 reports of complaints about MSG between 1980 and 1994. Due to these complaints, the manufacturers are acutely aware that many consumers would prefer not to have MSG in their food. Some manufacturers have responded by advertising "No MSG," "No MSG Added," or "No Added MSG," on labels.

Food safety related with MSG has become a high profile issue facing, not only consumers, but also marketers, producers, processors, retailers and governments. Increased awareness by consumers towards food safety related with MSG has made them more conscious of their diet and food intake. Since consumers are becoming more health conscious, attributes such as quality, appearance, freshness, convenience and health enhancement are also important. However, consumer awareness and understanding of MSG are still low. Thus, private and public sectors' provision of educational programs and information is a valuable strategy. Some of the consumers typically read the label only for a few selected products. Their interests were concentrated around new products, particularly those with high fat content, high cholesterol, high calories and etc (Wandel and Bugge, 1996).

During the past three decades, there has been substantial controversy regarding the use of MSG in foods, at least in Western countries. The original source of this controversy appears to be a letter to the *New England Journal of Medicine* (Kwok, 1968) in which it was speculated that MSG (as one alternative among several other ingredients) could be the cause of adverse reactions following consumption of Chinese restaurant food. This article and subsequent publicity about MSG seems to have tapped into more general consumer concerns regarding food additives, resulting in an increasingly widespread belief among consumers that MSG is responsible for allergic reactions, variously asthma or "Chinese restaurant syndrome" of numbness, weakness, headaches and palpitations (Prescott and Young, 2002).

Nevertheless, and despite the fact that MSG is often required to be included among the list of food ingredients, many food manufacturers have increasingly adopted a strategy of placing additional prominent messages regarding MSG on food labels. As a result, food labels advertising "No added MSG" have become commonplace. One possible consequence of such labels is that they generate and reinforce beliefs that MSG is harmful and/or an unsafe ingredient. Recent research on the effects of different types of label information suggests the possibility that these messages may also influence the acceptability of products containing added MSG. Prescott and Young (2002) examined the impact of information specifying the addition of MSG to foods or not on ratings of the hedonic and sensory properties of soups. In addition they measured the beliefs and attitudes towards MSG in foods with a view to provide a context within which any effects could be interpreted. The attitudes towards MSG were evaluated and found to be generally negative. To assess the impact of information about MSG content, subjects evaluated saltiness, richness, natural taste of and liking for, vegetable soups with (MSG +) and without (MSG -) added MSG. Subjects tasted both soups under three information conditions, presented as an ingredient list: contains added MSG, or not, or no mention. The expected changes in liking and sensory properties due to MSG were found, but there were no effects of information. This suggests that sensory properties are weighted more than information when products are evaluated during tasting, even when the information is highly relevant (Prescott and Young, 2002).

The objective of this study was to present some insights on Malaysian consumers' awareness, perceptions, attitudes, and to estimate their willingness to pay (WTP) towards food products with "No Added MSG" labeling. It was also to determine the level of awareness and factors that influenced consumers' buying behaviour to formulate alternative policies and strategies in improving the food industry.

2. Literature Review

Uwe et al., (1993) defined perceptions as an event over time rather than as an instantaneous reaction to outside stimulation. They also view perception as an event the roots of which are to be found beyond the restricted confirms of awareness often closely intertwined with the observers' private world of memories and emotional experience.

According to Katona and Strumpel (1978), attitudes and perception are closely related. Both these concept tend to affect one's perceptions and shape one's behavior. They suggested that the growing concern among consumers related to poor quality of products and services may have been affected "... the worsening of workmanship, lesser durability, and similar objective factors, or in consumers' expecting more from the goods and services than before."

The study of willingness to pay has taken on a variety of forms in the applied economics literature. The traditional approach has been the use of contingent valuation, which is a questioning technique that asks

individuals what they would be willing to pay, contingent on market availability of the product or service (Gil et al., 2000; Boccaletti and Nardella, 2000; Cranfield and Magnusson, 2003).

Through the use of discrete choice techniques, stated choice experiments, and experimental auction methods, analysts have also derived estimates of money an individual is willing to pay to obtain a product (Lusk et al., 2000; Loureiro and Umberger 2005; Lusk, 2003; Umberger et al., 2003). Innate in consumer surveys is often a determination of consumers' WTP for features either intrinsic or extrinsic to an item. Price premiums, the excess prices paid over and above the "fair" price that is justified by the "true" value of the product (Rao and Burgen, 1992; Vlosky *et al.*, 1999), may be indicators of consumers' demand for that product (Tse, 2001). Organic food purchases are mainly attributed to consumers' environmental concerns and food quality/safety consciousness. Thus, WTP for organic products can be a good predictor of organic food demand.

In the international literature one can find a large body of research regarding consumers' WTP for environmental friendliness and/or quality/safety in food production (Gil *et al.*, 2000; Corsi and Novelli, 2002; Angulo *et al.*, 2003; Baltzer, 2003; Canavari *et al.*, 2003; Smed and Jensen, 2003), as well as for non-food products (Vlosky *et al.*, 1999; Laroche *et al.*, 2001) or services (Tse, 2001).

Perhaps the most convincing evidence supporting the growth of ecologically favorable consumer behaviour is the increasing number of individuals who are willing to pay more for environmentally-friendly products (Laroche *et al.*, 2001). However, consumers are highly fragmented in terms of their level of environmental awareness and willingness to choose higher-price environmentally oriented products (Irland, 1993). Laroche *et al.* (2001) argue that consumer attitudes towards the environment are very good predictors of their WTP in terms of for more green products. On the other hand, Sriram and Forman (1993) and Teils et al. (1999) maintain that there is limited information as to how much consumers are willing to "sacrifice" for such products. Blend and van Ravenswaay (1999) assert that studies do not take into account economic factors such as prices and available income, which influence the demand for environmentally-friendly products.

Govindasamy and Italia (1997) argue that, among the factors that were found to affect WTP internationally, demographic characteristics such as gender, age, income and education, are among the most important. However, the same authors cite a large number of surveys show conflicting results regarding the exact demographic profile of consumers who are willing to pay. Davis *et al.* (1995) suggest that slight differences between gender groups are observed as regards to their WTP: men would pay more at a percentage of 41 percent compared to 44 percent of women. Laroche *et al.* (2001) claim that most of the relevant studies have identified married females with children as being more willing to pay for environmentally friendly products. Additionally, Henson (1996) maintains that females and younger consumers are the most willing to pay for reductions in the risk of food poisoning, while results for income and education are conflicting.

3. Methodology and Data

A schematic representation based on Yeung and Morris (2001) model is presented in Figure 1 above. The figure explains the relationships that exist between source of food risk, food risk characteristic, risk perception, risk reduction and purchase likelihood of consumers. Basically, the model can be categorized into three parts, namely consumers' awareness, perception and attitude, and WTP.

In the awareness section, which consists of source of food risk and food risk characteristic, consumers may appear to be aware of major sources of food risk and its characteristics but may not entirely understand them. These two components strongly influence risk perception, which was categorized in the perception and attitude section together with risk reduction. Consumers risk perceptions on food safety have a tendency to give greater weight to the perceived potential severity of unhealthy food than the probability of exposure (Yeung and Morris, 2001). At the same time, consumers would try to reduce perceived risk by modifying their purchasing decisions. For this reason, consumers' perceptions and attitudes appear to have a huge influence on the purchase likelihood component in the WTP section.

There is a large body of literature assessing consumer WTP for food safety and environmentally friendly production practices. CVM is generally considered by many researchers as the most appropriate choice for measuring food safety because it is a flexible tool which can be tailored to analyze specific food safety policies (Buzby et al, 1995).

To measure the value of food safety is an individual's WTP for safer food products. WTP can be measured empirically using the CVM. This methodology has also been widely used to assess the values of non-market goods such as environmental amenities (Mitchell and Carson, 1989), mortality risk reduction (Jones-Lee *et al.*, 1985) and morbidity risk reduction (Krupnick and Cropper, 1992).

The goal of CVM is to stimulate the same kind of ordered preferences which economic theory have argued, would be revealed through market behaviour if such market existed (Freeman, 1979). Although, there are several economic tools to value non-market goods, such as hedonic pricing and the travel cost method, the application of CVM has been largely limited to public-good commodities which are not traded in the market.

There are several advantages of using the CVM. Firstly, this method is simple to understand as it does not have to contemplate the exact values for the resource. This method also minimizes the possibility of starting point and strategic point and strategic biases (Bowker and Stoll, 1988; Boyle and Bishop, 1988; and Cameron, 1988). This method only requires respondents to make comparisons between the alternatives rather than try to value them directly. In addition, CVM is relatively information-rich in terms of the characteristics of the data of respondents and does not rely on secondary data, which are frequently collected for different purposes (Cummings et al. 1986).

However, this method has some disadvantages. One of the disadvantages is that it is a sophisticated statistical and estimation method to analyze qualitative responses. Another disadvantage is that only limited information can be obtained from respondents and this method also requires appropriate ranges of value. Consequently, it is essential that contingent valuation surveys incorporate a well-designed and sensitive measurement instrument. Arrow et al. (1993) recommended that respondents are carefully informed about the particular non-market goods being valued and similarly the payment vehicle is fully presented and convincingly described. In particular, care must be taken to avoid influencing responses according to the amount and type of information provided and the manner in which it is presented to respondents (Mitchell and Carson, 1989).

In this study, CVM was used to analyse the data and the WTP was measured empirically by using this method. The basic model of the research is the Van Ravenswaay and Hoehn (1991) approach, an extension of Lancaster's attribute model (Lancaster 1971). The identified specification model for this study is as follows,

$$WTP = f(P, Y) \tag{1}$$

where,

WTP = willingness to pay;

P = price (RM);

Y = income (RM);

Subsequently, the logistic regression technique was used to estimate the WTP (Hanemann 1984). Using this approach, the probability of saying "YES" to bids at different levels of the independent variable are estimated as,

$$P = (1 - e^{-x})^{-1}$$
(2)

where,

x = estimated regression logit regression equation and;

P = probability of accepting the price.

Mean of WTP is estimated as the area under this probability function. This area shows the proportion of the population who would consume the goods at each level, and their associated utility. The area under the curve is estimated by integration techniques and can be expressed as,

$$E(WTP) = \int_{L}^{U} (1 + e^{a + bPRICE})^{-1} dPRICE$$
(3)

where,

 $(1 + e^{a + bPRICE})^{-1}$, are the probability of saying "YES" and;

U and L are the upper and lower limits of integration respectively.

Estimating the mean WTP within this framework relies on making some assumptions about the upper and lower limits of the integral, i.e. knowing the price amounts at which the probability of saying "NO" is zero and the probability of saying "YES" is one. By applying this to the price behaviour, and assuming that individuals will not pay if they receive a disutility from it, negative WTP can then be ruled out and zero can be used as the lower limit. Bishop and Heberlein (1979) and Sellar et al. (1986) used the upper range for the integration of their price amounts as the upper limit for the integration. Hanemann (1984) argued that such an approach makes certain assumptions about the probability distribution for the unknown WTP in the sample. He argued that the upper limit should be infinity and that using the highest offered amount may be a poor approximation of the mean utility estimate when integrating between zero and infinity. In this study, zero was chosen as the lower limit of

the integral and the maximum value as the upper limit. Confidence interval of WTP was also calculated using the variance-covariance matrix and a technique adopted for dichotomous CVM by Park et al. (1991).

In this study the data were gathered through personal interview using structured questionnaires. The primary data for the study are gathered directly from interview respondents in a face-to-face setting. The interview is conducted based on administration of a prepared questionnaire. Respondents are asked to complete a questionnaire regarding their awareness, perceptions and attitudes with respect to food safety and also their profile. The areas of sampling frame are within Klang Valley. Two hundred respondents from diverse demographics and socio-economic backgrounds are chosen. Survey data is obtained using in-person interviews. The survey instrument is pre-tested and question wording is refined based on the results of a pilot test. A simple convenient sampling design is used to obtain the sample. The main principle for the sample survey design is to maximize the amount of information for a given cost and to assure that every individual in the targeted population has an equal chance of being drawn. Respondents were asked to complete a questionnaire regarding their WTP with respect to food safety based on the CVM format and their profiles. The respondents' socio-economic characteristics obtained included place of origin, age, marital status, education, size of family members, occupation, monthly and supplementary gross income. They were asked the following question and were required to respond by answering either "YES" or "NO":

Monosodium glutamate (MSG) is the sodium salt of the non-essential amino acid glutamic acid, one of the most abundant amino acids found in nature. Glutamate is thus found in a wide variety of foods, and in its free form has been shown to have a flavor enhancing effect. Since the late 1960s MSG has been claimed to be the cause of a range of adverse reactions in people who had eaten foods containing the additive. In particular, MSG has been implicated as the causative agent in the symptom complex known as "Chinese Restaurant Syndrome". These symptoms were described as "numbness at the back of the neck, gradually radiating to both arms and the back, general weakness and palpitation. MSG also has been reported as a trigger for bronchoconstriction in some asthmatic individuals. Thus, we have to be more concerned about our health by consuming food products that have been certified as safe even if it means we have to pay more due to the high cost of inspection, implementation and maintenance of food safety systems. If the price of "No Added MSG" food product is RM____X___ higher than food product that contains MSG, are you willing to purchase it?

where x ranged from RM0.10 to RM0.50 and representing a 'reasonable' additional amount of price to buy a food product.

The willingness to pay is represented by the dichotomous variable of WTP, with values of 1 for those willing to pay the additional amount and 0 is otherwise. An OLS regression of the above relationship with WTP as the dummy variable is beseted by several problems namely: (1) non-normality of the error term, (2) heteroscedasticity, and (3) the possibility of the estimated probabilities lying outside the 0-1 boundary (Gujarati 1988). Since the dummy WTP is actually a proxy of the actual propensity or ability of willingness to pay, the logit model guarantee that the estimated probabilities lie in the 0-1 range and that there are nonlinearly related to the explanatory variables.

Although the CVM has been widely used for the past two decades, there is considerable controversy over whether it adequately measures people's willingness to pay for goods and services. People have enough practices in making choices with market goods, so their purchasing decisions in markets are likely to reflect their true willingness to pay. The CVM assumes that people understand the goods in question and will reveal their preferences in the contingent market, just as they would in a real market. However, most people are unfamiliar with placing dollar values on goods and services. Therefore, they may not have an adequate basis for stating their true values. The answers expressed in the willingness to pay question in the contingent valuation format may be biased because the respondent is actually answering a different question than what the interviewer had intended. Rather than expressing value for the goods, the respondent might actually be expressing their feelings about the scenario or the valuation exercise itself. For example, respondents may express a positive willingness to pay because they feel good about the act of giving for a social good, although they believe that the good itself is unimportant. Respondents may state a positive willingness to pay in order to indicate that they place importance on improved goods in general. Alternatively, some respondents may value the goods, but state that they are not willing to pay for it, because they disapprove some aspects of the scenario, such as increased taxes or the means of providing the goods.

4. Results and Discussion

This section presents the results of the study. The descriptive analysis discusses the socio-economic profile of the respondents, their awareness, perceptions and attitudes, that lead to the willingness to pay (WTP) for food products with "No Added MSG" labeling. This is followed by the analysis of CVM to determine the level of WTP towards food products with "No Added MSG" labeling.

4.1 Socio-economic Profile of Respondents

As shown in Table 1, the number of respondents from rural and urban area is 20% and 80% respectively. More than half of the respondents were male, which consisted of 62.5% as compared to female, which was 37.5%. The respondents interviewed were 35% Malay, 49% Chinese and 16% Indian. Majority of the respondents (95.5%) interviewed were below the age of 40. In terms of marital status, 23% of the respondents were single and 77% married. It is important to categorize the respondents' marital status because of its influence on their purchasing attitude with regards to frequency of purchasing. These results were in accordance with Malaysia's environment where the Malaysian age range is mostly between 20 and 40, and married couples are more compared to single Malaysians. The household size of most respondents (62%) have gone through college or university education, 44% worked in the private sector and 78.5% of the respondents' income was below RM3000.

4.2 Awareness Analysis

The frequency analysis results of consumers' awareness towards MSG are presented in Table 2. The results show that 71.5% of the respondents have heard or read about MSG and 60% of them have heard/read about illness caused by MSG and only 24.5% of the respondents have experienced the illness caused by MSG. The type of illness that most respondents have experienced was chest pain (17.5%). Meanwhile, the respondents also revealed that they had gotten the illnesses mostly from food stall (17.5%) and restaurant (10.5%). Results also indicated that less than 50% of the respondents were aware of purchasing food products that contain MSG. This might be due to lower percentage of them experiencing the illnesses caused by MSG. However, 66% of the respondents claimed that they were aware of the existence of "No Added MSG" food products.

Table 2 also shows the best understanding about MSG among all the respondents. When respondents were asked about what is MSG, results revealed that majority of the respondents (56.5%) associated MSG with what is usually termed as Ajinomoto. 26% of them said that MSG is the flavor enhancer which they normally used in their daily meal to bring out the tastiness of food. Only 10.5% of the respondents answered that MSG is the sodium salt of glutamic acid.

Most of the respondents gained the information from newspapers (36%) and friends plus acquaintances (22%). This finding is similar to the study by Buzby et al., (1995) in which results showed that 70.1% of the respondents mentioned newspaper articles as the main source of information on food safety. In general, this indicates that a very high percentage of respondents are aware of food safety related with MSG.

4.3 Perception and Attitude Analysis

Consumers' perceptions and attitudes can influence the decision making process and buying behavior of each individual. Perceptions represent the formation of an individual state of mental awareness that is affected by internal and external environmental stimuli such as economic, social and cultural influences. On the other hand, attitudes are noted as an internal response, which is partially affective in nature and considered to be continuing evaluations of objects, issues or persons.

Table 3 shows the results of consumers' attitudes towards food products with "No Added MSG" labeling. 79% of the respondents would like the "No Added MSG" to be labeled on food products. Results also revealed that as many as 86% of them would purchase the food products with "No Added MSG" labeling. Among all the respondents, 56% of them purchased such food products before. Majority of them (35%) purchased these food products twice a week. Meanwhile, some of them (27.5%) made the purchasing 'once a month', followed by 'once a week' (19%) and 'twice a month' (18.5%). The finding confirms the information obtained through the pilot study of Wandel and Bugge (1996). There were relatively few people (14.5%) who would read the food label 'very often' and 24% who 'often' read the label. 'Sometimes' was the most common answer with the highest percentage (45%).

Table 4 summarizes the consumers' perceptions towards food products with "No Added MSG" labeling. 82.0% of the respondents perceived that food products with "No Added MSG" labeling are healthier and 47.5% of them said that these products are safer to consume. About 43% of the respondents agreed with the statement that these products are affordable. Respondents who thought that food products with "No Added MSG" labeling would

have no harmful effect and thus more nutritious were 28.5% and 27.5% respectively. Only a few of the respondents had negative perception towards these products, which included worse in taste (4.5%), cannot be trusted (5.5%) and a fraud (7.5%).

4.4 Willingness-to-Pay (WTP) for Food Products with "No Added MSG" Labeling

Table 5 shows the summary of respondents' WTP for certified safer beef for each increment price level. Previous studies have identified a variety of demographic characteristics that may affect consumers' WTP for food safety. The initial estimation of the model involves socio-economic characteristics such as residential area, gender, race, age, marital status, household size, children, education level, and occupation as independent variables. The Maximum Likelihood Estimation (MLE) of the specification for logit is calculated using LIMDEP, version 7.0 (Green, 1995). The results of the estimated models for food products with "No Added MSG" labeling are shown in Table 6, and a number of demographic factors are found to have significant influence on WTP for these products.

Firstly, the regression analysis indicates a significant positive relationship between income and WTP. Consumers with higher incomes are obviously more able to pay a higher price for food products with "No Added MSG" labeling, and have a lower marginal utility of money income. This is in accordance with the results from most previous studies (Henson, 1996).

Secondly, the regression analysis also indicates a positive relationship between households with children (family members below age of 12) and WTP. They were less likely to be concerned with price when making decisions. Parents have a responsibility and intrinsic interest in providing safe and wholesome meals for their children. The result is similar to Govindasamy and Italia (1997).

Thirdly, price was found to correlate negatively with WTP. That's mean, the higher the price of the food product, the less likely respondents will pay for it. Besides, the regression analysis indicates a significant negative relationship between household size and WTP. Those with household size of 4 or more members were likely to be highly price sensitive. Significant differences in household size may be attributable to the effect of differences in annual income. Lower levels of per capita discretionary income may cause larger households to be more financially conservative. In support of these results, Ritzmann (1982) detected that large households were unable to spend more per capita on food expenditures.

Finally, female respondents were found to have a positive relationship with WTP. They are generally willing to pay more for food products with "No Added MSG" labeling. This is because females are more health-conscious compared to male nowadays. This result is supported by Henson's study (1996) which maintained that females consumers are the most willing to pay for reductions in the risk of food poisoning. The regression analysis in the study also indicated a positive relationship between education till university level and WTP. Respondents with university level tended to pay more for these risk reduction products.

The MLE of the specification for logit model is shown in Table 6. The factor in this model had expected signs and is significant at 1% level. The value of adjusted McFadden's pseudo R², which estimates the performance of the overall model, is 0.2013. The percentage of right prediction is 77.0.

Next, the means of WTP were calculated using METEMATICA, version 2.2 (Sherlock, 1993). Based on the estimation results, equivalent WTP measures were performed through logit model using gender and education level (Table 7). Based on the gender and education level, female respondents are generally willing to pay more for food products with "No Added MSG" labeling as compared to male, and both sexes with university level also have a higher WTP than those who are non-university. The average mean premium WTP is about RM0.43, which indicated that respondents are willing to pay a premium of about RM 0.43 for food products with "No added MSG" labeling.

5. Summary and Conclusion

The objective of this study was to present some insights on Malaysian consumers' perceptions, attitudes, and to estimate their willingness-to-pay (WTP) towards food products with "No Added MSG" labeling. It is also to determine the level of awareness and factors that influence consumers' buying behavior to formulate alternative policies in improving industries with such products.

This study used CV technique to estimate consumers' decision on paying a premium and the extent to which they would go to pay for such food products with "No Added MSG" labeling based on data collected from areas within Klang Valley. The results show that price, household size, household income, family members below the age of 12, female and university level are the most vital and significant factors that influence and determine the total premium that an individual was willing to pay for these products. The result, thus, should be able to assist

the governments, policymakers, producers and marketers in taking into consideration the products market potential in near future.

Results of the study indicate that the majority of the respondents appeared to be aware of MSG, yet they appeared to have little understanding of the terms involved. The relevant parties should introduce basic MSG safety principles and policies to the society by using education system as a medium. They should be encouraged to carry out education campaigns on the importance of safety related with MSG. It is hoped that individuals from all walks of life will be well educated on the significance of safety values and policies related with MSG, as to promote more positive perceptions and attitudes towards food products with "No Added MSG" labeling.

The government should strengthen its effort in informing the public about safety issues and polices related with MSG by exploiting the services of mass media. In addition, relevant government authorities could launch promotions on MSG safety through the existing mass media to heighten consumers' awareness and develop more positive perceptions and attitudes towards food products with "No Added MSG" labeling.

Presently, the Food Regulations does not require mandatory nutrition labeling and HACCP certification for food products (except for special purpose foods such as infant formula, cereal-based food and enriched or fortified food). Based on these current circumstances, a certification system should be created whereby marketers would be granted certificate only if their products are guaranteed to have met the safety requirements for consumption. The local policymakers should also consider making nutrition labeling and HACCP certification a mandatory requirement throughout the food industry.

References

Angulo, A.M., J.M. Gil and L. Tamburo, L. (2003). Food Safety and Consumers' Willingness to Pay for Labelled Beef in Spain", paper presented at the 83rd EAAE Seminar, Chania, 4-6 September, [Online] Available: www.maich/eaae.gr, .

Arrow, K., R. Sollow, E. Leamer, P. Potney, R. Rander and H. Schuman. (1993). Report on the NOAA Panel on Contingent Valuation. *Federal Register*, 58:4601-4604.

Baltzer, K. (2003). Estimating Willingness to Pay for Food Quality and Safety from Actual Consumer Behaviour, paper presented at the 83rd EAAE Seminar, Chania, 4-6 September, [Online] Available: www.maich/eaae.gr, .

Bishop, R.C., and T.A. Heberlein. (1979). Measuring values of extra market goods: Are indirect measure biased? *American Journal of Agricultural Economics*, 61: 926-930.

Blend, J.R., and E.O. van Ravenswaay. (1999). Measuring Consumer Demand for Ecolabeled Apples. *American Journal of Agricultural Economics*, 81(5):1072-7.

Boccaletti S., and Nardella. (2000). Consumer Willingness to Pay for Pesticide-free Fresh Fruit and Vegetables in Italy *The International Food and Agribusiness Management Review*, 3(3):297-310.

Bowker, J.M. and J.R. Stoll. (1988). Use of Dichotomous Choice Nonmarket Methods to Value of Whooping Crane Resource. *American Journal of Agricultural Economics*, 70: 372-381.

Boyle, K.J., and R.C. Bishop. (1988). Welfare Measurement using Contingent Valuation: A Comparison of Technique. *American Journal of Agricultural Economics*, 70:202-208.

Buzby, J.C., J.R. Skees, and C.R. Richard. (1995). Using Contingent Valuation to Value Food Safety: A case of Grapefruit and Pesticides Residues. In *Valuing Food Safety and Nutrition*, ed. Julie A. Caswell, pp 219-256. Colorado: Westview Press.

Cameron, T.A. (1988). A New Paradigm for Valuing Non-Market Goods using Referendum Data: Maximim Likelihood Estimation by Cencerod Logistic Regression. *Journal of Environmental Economics and Management*, 15:355-379.

Canavari, M., G. Nocella., and R. Scarpa, (2003). Stated Willingness to Pay for Environment-friendly Production of Apples and Peaches: Web-based versus In-person Surveys, paper presented at the 83rd EAAE Seminar, Chania, 4-6 September, [Online] Available: www.maich/eaae.gr, .

Corsi, A., and S. Novelli. (2002). *Consumers' Willingness to Pay a Price for Organic Beef Meat*, paper presented at the 10th EAAE Congress, Zaragoza, 28-31 August,

Cranfield, J.A.L., and E. Magnusson. (2003). Canadian Consumer's Willingness-To-Pay For Pesticide Free Food Products: An Ordered Probit Analysis. *International Food and Agribusiness Management Review*, 6(4), 13-30.

Cummings, R.D., D.S. Brookshire and W.D. Schulz, eds. (1986). *Valuing Environmental Goods: An Assessment of the Contingent Valuation Method.* Savage, MD: Rowman & Littlefield.

Davis, A., A.J. Titterington and C. Cochrane. (1995). Who Buys Organic Food? A Profile of the Purchasers of Organic Food in N. Ireland. *British Food Journal*, 97(10):17-23.

Freeman, A.M. (1979). The Benefits of Environmental Improvement. Baltimore, MD: Johns Hopkins Press.

Gil, J.M., A. Gracia., and M. Sanchez. (2000). Market Segmentation and Willingness to Pay for Organic Products in Spain. *International Food and Agribusiness Management Review*, 3:207-26.

Govindasamy, R., and J. Italia. (1997). Predicting the Influence of Demographic Characteristics on the Willingness to Pay for Fresh Vegetables: A Logistic Approach. *Journal of Food Products Marketing*, 4 (4): 25-38.

Green, W. (1995). LINDEP. Version 7. User's Manual Reference Guide. Bellport, NY: Ecobnometric Software Inc.

Gujarati, D.N. (1998). Basic Econometrics. New York: McGraw Hill

Hanemann, M. (1984). Welfare Evaluation in Contingent Valuation Experiment with Discrete Responses. *American Journal of Agricultural Economics*, 66:332-341

Henson, S. (1996). Consumer Willingness to Pay for Reductions in the Risk of Food Poisoning in the UK, *Journal of Agricultural Economics*, 47(3): 403-420.

Irland, L.C (1993). Wood Producers Face Green Marketing Era: Environmentally Sound Products. *Wood Technology*, 120:.34.

Jones-Lee, M.W., M. Hammerton and R.R. Philips. (1985). The Value of Safety: Results from a National Survey. *Economic Journal*, 95:49-72

Katona, G., and B. Strumpel. (1978). A New Economic Era. New York: Elsevier.

Krupnik, A.J., and M.L. Cropper. (1992). The Effect of Information on Health Risk Valuations. *Journal of Risk and Uncertainty*, 5: 29-48

Kwok, R.H.M. (1968). Chinese Restaurant Syndrome. New. England Journal of Medcine, 278:796.

Lancaster, K. (1966). A New Approach to Consumer Theory. Journal of Political Economy, 74:132-157.

Laroche, M., J. Bergeron and G. Barbaro-Forleo. (2001). Targeting Consumers who are Willing to Pay More for Environmentally Friendly Products. *Journal of Consumer Marketing*, 18(6):503-20.

Loureiro, M.L., and W.J. Umberger. (2005). Assessing Preferences for Country-of-Origin Labeled Products. *Journal of Agricultural and Applied Economics*, 37(1):49-63.

Lusk, J. L. (2002). A Comparison of Conjoint Analysis Response Formats: Comment. American Journal of Agricultural Economics, 84(4):1165-71.

Lusk, J., M. Daniel, D. Mark and C. Lusk. (2000). Alternative Calibration and Auction Institutions for Predicting Consumer Willingness-to-pay for Non-genetically Modified corn Chips. *Mimeo*, Mississippi State University.

Mitchell, R.C., and R.T. Carson. (1989). Using Surveys to Value Public Goods: The Contingent Valuation Method, *Resources for the Future*, Washington.

Park, T., J. Loomis and M. Creel. (1991). Confidence Intervals for Evaluating Benefit Estimates from Dichotomous Choice Contingent Valuation Studies. *Land Economics*, 67:64-73

Prescott, A., and A. Young. (2000). Does Information About MSG (Monosodium Glutamate) Content Influence Consumer Ratings of Soups with and without Added MSG? *Appetite*, 39:25–33.

Rao, A.R., and M.E. Bergen. (1992). Price Premium Variations as a Consequence of Buyers' lack of Information'. *Journal of Consumer Research*, 19:412-23.

Ritzmann, L. (1982). *Household Size and Prices Paid for Food*. U.S. Department of Agriculture-Agricultural Research, Service.

Sellar, C., J. P. Chavas and J. R. Stoll. (1986). Specification of the Logit Model: The Case of Valuation of Non-market Goods. *Journal of Environental Econonomics and Management*, 13:382-90

Sherlock, T.W. (1993). Mathematica, Enhanced Version 2.2, Wolfarm Research Inc.

Smed, S., and J.D. Jensen. (2003). Demand for Low-Fat Dairy Products – Demand for Healthiness or Taste?, paper presented at the *83rd EAAE Seminar*, Chania, 4-6 September, [Online] Available: www.maich/eaae.gr, .

Sriram, V., and A.M. Forman. (1993). The Relative Importance of Products' Environmental Attributes: A Cross-cultural Comparison. International Marketing Review, 10(3):51-70.

Teils, M.F., B. Roe and A.S. Levy. (1999). Ecocertification: Why it May Not be a 'Field of Dreams'. American Journal of Agricultural Economics, 81(5):1066-71.

Tse, A.C.B. (2001). How Much More are Consumers Willing to Pay for a Higher Level of Service? A Preliminary Survey. Journal of Services Marketing, 15(1):11-17.

Umberger, W.J., D.M. Feuz, C.R. Calkins and B.M. Sitz. (2003). Country-of-Origin Labeling of Beef Products: U.S. Consumers Perceptions. Journal of Food Distribution Research, 34(3):103-116.

Uwe H., J.S. Gudmund and J.G. Draguns. (1983). Defense Mechanisms: Theoretical, Research and Clinical Perspectives. Elsevier,

Van Ravenswaay, E., and J. Hoehn. (1991). Contingent Valuation and Food Safety: The case of Pesticide Residues in Food. Department of Agricultural Economic Staff Paper No. 91-13. Urbana: Michigan State University

Vlosky, R.P., L.K. Ozanna and R.J. Fontenot. (1999). A Conceptual Model of US Consumer Willingness-to-Pay for Environmentally Certified Wood Products. Journal of Consumer Marketing, 16(2):122-36.

Wandel, M., and A. Bugge. (1997). Environmental Concern in Consumer Evaluation of Food Quality. Food Quality and Preference, 8(1):19-26.

Yeung, Ruth M.W., and Morris, J. (2001). Food Safety Risk: Consumer perception and purchase behavior. British Food Journals, 103 (3): 170-187.

Characteristics	Number	Percentage (%)	Characteristics	Number	Percentage (%)
Residential area			Family members above age 12		
Rural	40	20.0	0-2	12	6.0
Urban	160	80.0	3 - 5	139	69.5
Gender			6 - 8	48	24.0
Male	125	62.5	Above 8	1	0.5
Female	75	37.5			
Race			Education level		
Malay	70	35.0	Never been to school	4	2.0
Chinese	98	49.0	Primary school	10	5.0
Indian	32	16.0	Secondary school	62	31.0
			College/University	124	62.0
Age			Occupation		
Below 30	164	82.0	Public sector	31	15.5
31-40	27	13.5	Private sector	88	44.0
41-50	4	2.0	Self-employed	12	6.0
Above 50	5	2.5	Housewife	19	9.5
Marital status			Others	50	25.0
Single	46	23.0	Monthly household income		
Married	154	77.0	Below RM1000	21	10.5
Household size			RM1001-RM2000	78	39.0
0-2	8	4.0	RM2001-RM3000	58	29.0
3 - 5	119	59.5	RM3001-RM4000	19	9.5
6 - 8	64	32.0	RM4001-RM5000	20	10.0
Above 8	9	4.5	Above RM5000	4	2.0

. . .

Table 2. Consumers'	Awareness	towards M	SG
---------------------	-----------	-----------	----

Statements	Number	Percentage (%)
Heard/read about MSG?		
Yes	143	71.5
No	57	28.5
Heard/read about illness caused by MSG?		
Yes	120	60.0
No	80	40.0
Experience illness caused by MSG?		
Yes	49	24.5
No	151	75.5
Type of illness experienced?		
Burning sensations in back of neck, forearms, chest	8	4.0
Chest pain	35	17.5
Drowsiness	6	3.0
Weakness	8	4.0
Get illness from?		
Home-cooked	4	2.0
Restaurant	21	10.5
Food stall	35	17.5
Fast food	8	4.0
Aware of purchasing MSG food products?		
Yes	95	47.5
No	105	52.5
Aware of existence of "No Added MSG" food products?		
Yes	134	67.0
No	66	33.0
Best understanding about MSG among respondents		
Ajinomota	113	56.5
Flower Enhancer	52	26.0
Sodium salt of glutamic acid	21	10.5
Other	14	7.0
Source of Information about MSG		
News papers	72	36.0
Magazines	28	14.0
Radio	8	4.0
Television	4	2.0
Friends	44	22.0
Doctor	12	6.0
Someone in household	32	16.0
Internet	20	10.0

Statements	Number	Percentage (%)
Would like "No Added MSG" to be labeled?		
Yes	158	79.0
No	42	21.0
Would purchase food products with "No Added MSG"		
labeling?		
Yes	172	86.0
No	28	14.0
Purchased it before?		
Yes	112	56.0
No	88	44.0
How often of purchasing?		
Once a week	38	19.0
Twice a week	70	35.0
Once a month	55	27.5
Twice a month	37	18.5
How often do you read the labels on the foods when		
purchasing?"		
Very often	29	14.5
Often	48	24.0
Sometimes	90	45.0
Rarely	31	15.5
Never	2	1.0
Consumers' Perceptions towards Food Products with "No		
Added MSG" Labeling		
More nutritious	55	27.5
More delicious	16	8.0
Healthier	164	82.0
Safer	95	47.5
No harmful effect	57	28.5
Superior quality	43	21.5
Affordable	86	43.0
Worth purchasing	29	14.5
More expensive	44	22.0
A fraud	15	7.5
Worse tasting	9	4.5
Cannot be trusted	11	5.5

Table 3. Consumers' Attitudes towards Food Products with "No Added MSG" Labeling

Table 4. Important Factors in Consumers' Perceptions towards Food Products with "No Added MSG" Labeling (percent)

Factor	1	2	3	4	5	Mean	Rank
Healthiness	45.0	24.0	17.0	8.0	6.0	2.06	1
Nutrient Contents	26.0	35.5	25.0	6.0	8.0	2.35	2
Freshness	26.0	27.0	31.0	10.0	6.0	2.43	3
Taste	20.0	31.0	14.0	14.0	4.0	2.51	4
Availability	10.0	25.5	14.0	14.0	2.0	2.73	5
Price	14.0	24.0	13.5	13.5	8.0	2.78	6
Source (local/import)	8.0	25.5	42.5	16.0	8.0	2.91	7

	No		Yes		Total	
Price (RM)	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
0.10	1	2.04	38	23.90	39	19.50
0.20	1	2.04	39	24.53	40	20.00
0.30	18	36.73	22	13.84	40	20.00
0.40	7	14.29	33	20.75	40	20.00
0.50	14	28.57	27	16.98	41	20.50
	41	83.67	159	100.00	200	100.00

Table 5. Summary of Consumers Willingness to Pay (WTP) for Food Products with "No Added MSG" Labeling

Table 6. Coefficient Estimate using Logit Model

Name	Coefficient	t-ratio	
Price	-6.8444	-4.0945*	
Household Size	-0.66347	-2.9756*	
No. of children below age of 12	0.43658	1.7325***	
Income	0.00052007	2.2294**	
University Level	1.0573	2.2076**	
Female	1.1921	2.5792*	
Constant	2.9128	2.8448*	
McFadden R ²	0.20132		
Percentage of Right Prediction	0.77000		

Note:

* Significant at 1% level

** Significant at 5% level

*** Significant at 10% level

Table 7. Mean Premium WTP using Logit Model (RM)

Gender	Education Level	WTP
Mala	University	0.431
Male	Non-university	0.356
Esmals	University	0.475
remale	Non-university	0.438



Figure 3.1. A Schematic Model of Consumer Behavior Relating to Food Safety