

Consumer Choice for Quality and Sustainability in Seafood Products: Empirical Findings from United Kingdom

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Abstract. There has been a growing interest in recent years in the potential use of product differentiation (through eco-type labelling) as a means of promoting and rewarding the sustainable management and exploitation of fish stocks. This interest is marked by the growing literature on the topic, exploring both the concept and the key issues associated with it. It reflects a frustration among certain groups with the supply-side measures currently employed in fisheries management, which on their own have proven insufficient to counter the negative incentive structures characterising open-access fisheries. The potential encapsulated by product differentiation has, however, yet to be tested in the market place. One of the debates that continues to accompany the concept is the nature and extent of the response of consumers to the introduction of labelled seafood products. Though differentiated seafood products are starting to come onto the market, we are still essentially dealing with a hypothetical market situation in terms of analysing consumer behaviour. Moving the debate from theoretical extrapolation to one of empirical evidence, this paper presents the preliminary empirical results of a study undertaken in the UK. The study aimed, amongst other things, to evaluate whether UK consumers are prepared to pay a premium for seafood products that are differentiated on the grounds that the fish is either of (a) high quality or (b) comes from a sustainably managed fishery. It also aimed to establish whether the quantity of fish products purchased would change. The results are presented in this paper.

Keywords: Consumer demand, seafood, fisheries management, certification, sustainability, quality, stated choice methods.

1. INTRODUCTION

Traditionally, the focus of fisheries management has lain with supply-side measures and attempts to use these measures to promote responsible and sustainable fisheries management. Over the last few years, however, there has been a growing recognition that traditional techniques aimed at controlling either inputs or catches are insufficient on their own to adequately address many of the management challenges facing fisheries management, particularly over-exploitation (Hanna 1992, Homans and Wilen 1992, Wessels and Anderson 1992, Johnston 1995). This recognition has spurred interest in the potential of product labelling, as a means of generating market-driven incentives in support of fisheries management objectives. Traditionally there has been little differentiation in seafood products, such that consumers have been largely unable to exercise choice as to the location and state of the fishery their seafood came from and how it was caught. By introducing 'eco'-type labelling the intention is to facilitate this consumer choice and by employing an environmental vector in the consumers' demand function provide an incentive and reward structure for fisheries adopting 'sustainable', 'responsible' or 'ecologically' sound management practices

The concept builds on a growing understanding of the workings of the market place and the inter-relationships between the market and fisheries management. Over the last 10 to 15 years there have been a number of studies exploring the characteristics of the market for seafood products. These studies have addressed, among other aspects, price integration (Squires et al 1989), price transmission within the industry (Nyankori 1991), how the market reacts to uncertainty (Lent 1984), product substitution and patterns of demand, demographic aspects of demand (Cheng and Capps 1988), the effect of advertising on retail demand (Brooks and Anderson 1991, Capps and Lambregts 1991, Kinnucan and Venkateswaran 1990) and price flexibility in response to changes in supply (Cooper and Whitmarsh 1994, Jaffry et al 1997). Of particular relevance is the work by such as Wang and Kellogg (1988) and Botsford et al (1986), which have assessed the relationship between product attributes and price (in these instances, size) and studies which have used variations of self-explicated utility approaches (notably conjoint analysis) to characterise seafood markets, for salmon in the USA (Anderson and Brooks 1986, Anderson 1988) and Japan (Anderson and Kusakabe 1989) and

striped bass (Wirth et al 1991). In the last five years, this body of literature and research has enveloped the particular issue of the eco-labelling of fish products (Asche, pers. comm. 1999, Wessels et al 1999). Amongst other things, this research has addressed the consumers' willingness-to-pay for seafood safety assurances, establishing that consumers are able to demonstrate clear preferences and values for alternative assurances of safety (Wessels and Anderson, 1995); which obviously has potential knock-on implications for quality. It has also encompassed the potential effectiveness of eco-type labelling of seafood products in altering consumer demand for seafood in the USA and Norway (Wessels 1998).

The concept has also received practical manifestation in a number of schemes initiated around the world, one of the most prominent being that initiated by the Marine Stewardship Council. Other schemes include the Swan-label for labelling ecological food products in Sweden and the "blue" label for fish and fish products in Denmark, aimed at supporting "ecologically" sound fisheries (Legal Act of Parliament nr. 233 16 April 1997). The first fish products covered by these schemes are now starting to enter the market place, as with the Thames herring and the Western Australia rock lobster fishery certified by the Marine Stewardship Council. However, it is still early days and their presence is limited, as is consumer awareness. As a consequence, the potential of the concept to generate an appropriate incentive structure to complement supply-side management measures has yet to be clearly determined.

This paper presents the preliminary findings of a survey in the United Kingdom, which attempts to elicit the influence of sustainability certification and labelling on consumer choice for seafood products: the first stage in determining the potential of the concept to generate an appropriate incentive structure. 'Seafood' in this context is defined as including finfish, shellfish and crustaceans in fresh, frozen and processed product forms. The survey and analysis explored in the paper employs expressed preference techniques, notably choice experiments, with the aim of identifying any price increment that consumers' may be willing to pay for and the quantity they would be willing to purchase of certified products. It should be noted that for comparison a second form of product differentiation is explored along side sustainability certification: that of 'quality' differentiation. The findings have interesting connotations for the management of seafood quality throughout the production chain.

2. CHOICE EXPERIMENTS

Choice experiments are the product of two, somewhat inter-related, heritages: one associated with the conjoint analysis paradigm and one with Lancasterian consumer theory and the random utility theory.

The conjoint analysis paradigm has its basis in marketing research and the elicitation of the relative importance of different attributes (characteristics or features) of a good or a service. It assumes that any good or service can be defined as a combination of levels of a given set of attributes. The total satisfaction or utility that an individual derives from that good or service is determined by the utility to the individual of each of the attributes. The aim of the technique is to estimate (a) the relative importance of the individual attributes; (b) the trade-offs or marginal rates of substitution that individuals are willing to make between these attributes; and (c) the total satisfaction or utility scores for different combination of attributes (Ryan, 1996).

It is a paradigm that has received wide acceptability within the field of market research for the analysis of marketed private goods, which makes it particularly relevant to the subject matter of this paper. However, it is viewed by many economists as lacking a behavioural theoretical foundation consistent with economics (Adamowicz et al 1998, Carson 1999, pers comm.). This criticism derives from the traditional elicitation methods employed within the paradigm, notably ranking and rating, and the underlying assumptions necessary for the inference of consumer preferences from them. With the ranking format, respondents are asked to rank a group of commodities, each with different attributes and levels, from "most-preferred" to "least-preferred". In the rating format respondents are asked to indicate their preferences for several commodities based on a pseudo-cardinal preference scale, which could result in two or more commodities receiving the same score.

In both of these formats, the drawing of inferences as to consumer preferences requires a number of assumptions to be made that are potentially logically inconsistent and a number of mathematical axioms to be met. The analysis of ranking data, for example, requires a number of ordinal conditions to be met and assumes, *inter alia*, an additive utility specification, perfect information and that individuals are perfectly transitive and consistent and do not exhibit indifference or ambivalence (Mackenzie 1992, 1993). In terms of rating, while the method of elicitation potentially provides more information about preferences for attributes than ordinal rankings (Mackenzie 1992), to forecast choices from conjoint ratings data one must assume that either (a) the highest predicted rating equals first choice, or (b) the predicted ratings values satisfy Multinomial Logit (MNL) or other choice model scale

properties. These assumptions do not necessarily hold. A further limitation involves the comparability of ratings across respondents, particularly where no particular rating level is specified to represent respondent indifference or ambivalence. The cardinal significance of any ratings is also not readily clear (Mandasky 1980, Morey 1984).

Over the last few years, this criticism has led to developments in the range of elicitation methods available, including the development and adoption of choice experiments. Choice experiments draw notably on Lancasterian consumer theory and the random utility theory, although psychological theories on information processing in judgement and decision-making have also played a fundamental role. Lancasterian consumer theory proposes that utilities for goods can be decomposed into separate utilities for their component characteristics or attributes (Lancaster 1966). Random utility theory explicitly models the choice among substitute alternatives on a given occasion, given constraints (e.g. income, time) with the choice being modelled as a function of the characteristics of the substitute alternatives. The random component reflects, *inter alia*, that the analyst may omit variables or commit measurement errors or that the consumer may be inattentive during the choice process (Adamowicz et al 1998). This economic foundation has made the elicitation method popular among economists. However, it should be noted, that due to this foundation, the choice experiment method is regarded among certain sectors of the economic and marketing community as being distinct from conjoint analysis, rather than being a development within the paradigm (e.g. Adamowicz et al 1998, Carson 1999, pers. comm). It is an issue that comes down to the definition of and the drawing of boundaries around “conjoint analysis”.

The rationale behind the use of choice experiments to elicit the influence of sustainability certification and labelling on consumer choice for seafood products outlined below partly explains this popularity among economists. Being based on random utility theory, from an economics point of view, choice experiments have distinct advantages over the alternatives (Carson 1999, pers. comm.). Further:

- The method does not require any assumptions to be made about order or cardinality of measurement (Louviere and Woodworth 1983)
- Choice models can be estimated directly from choice data, thus avoiding potentially unrealistic ad hoc assumptions about choice behaviour that would be implied under the alternative formats.
- The method can also avoid problems like the untestable statistical properties of estimated parameters in ranking data and cardinal measurement assumptions in the rating method.
- In particular, it permits the design of choice or

allocation experiments, which mimic real choice environments closely.

There are, however, challenges associated with the format, notably the construction of both the choice alternatives (products) and the choice sets. Choice experiments are challenging in their design because they require two separate designs to be combined: one to create the choice alternatives (conjoint treatment and /or existing alternatives) and a second to place choice alternatives (treatments plus possibly other non-designed choice alternatives) into choice sets. Both designs must satisfy certain statistical properties to enable one to estimate parameters and conduct statistical tests efficiently (see Louviere & Woodworth 1983). However, it is not an insurmountable challenge, and one assisted by a variety of factorial and fractional factorial designs (for detail, see Louviere 1988b; Louviere and Woodworth 1983; Adamowicz, et al. 1994

Within the choice experiment format, the respondent makes a discrete choice from a set of presented alternatives or choices, combined within choice sets. Each alternative is represented with a utility function that contains a deterministic component (V_i) and a stochastic component (ϵ_i). The overall utility of alternative I is represented as:

$$U_i = V_i + \epsilon_i$$

An individual will choose alternative I if $U_i > U_j$ for all $j \neq i$. However, since the utilities include a stochastic component, one can only describe the probability of choosing alternative i as:

$$prob\{i \text{ chosen}\} = prob\{V_i + \epsilon_i > V_j + \epsilon_j; \forall j \in C\}$$

Where C is the set of all possible alternatives. The V_i contains attributes of the products and there are four alternatives (A, B, C and D). Assuming a type I extreme value distribution for the error terms (we could also experiment with the mixed lognormal, gamma, and Weibull distributions of preferences) and independence between choice scenarios and individuals, the probability of choosing alternative i becomes

$$prob\{i\} = \frac{e^{sV_i}}{\sum_{j \in C} e^{sV_j}}$$

where s is the scale parameter.

In any single sample the scale parameter cannot be identified and thus is assumed to be 1.

By selecting an appropriate functional form for the

cumulative distribution, the systematic portion of the expected utility function can be estimated as specified.

There are several probability models, which can be used to analyse choice experiments. These consist of multinomial logit, conditional logit model and nested logit models. The choice of model mainly depends upon the type, characteristic and assumptive distribution of data and theory. Multinomial logit models are particularly appropriate in this context in that they serve as an error mechanism to diagnose or test various specifications for the utility function if the choice experiment is designed in such a way as to accommodate the required tests. Models that satisfy IIA can be fully specified by estimating the marginal choice probabilities for each alternative. The general form of the model is:

$$V_i = \alpha_i + \beta(Z_i) + \gamma(Y_i)$$

Where α_i is an alternative specific constant, Z_i is a vector representing all attributes, Y_i is vector of demographic variables and β and γ are parameters.

3. PRACTICAL APPLICATION

The rest of this paper looks to the practical application of choice experiments to the context in question.

Louviere (1988a) describes several steps and considerations to be applied to its practical application:

- Understanding the decision problem and environment: one must develop a perceived model of how respondents make decisions in a particular situation through various methods such as exploratory research and pre-test;
- Identify determinant attributes: once a list of attributes is determined, two other considerations arise - whether the decision attributes are actionable, and the language and terms or the way in which an attribute's variation is to be communicated to respondents;
- Developing product positioning measures like ranges of levels that satisfy research objectives and are meaningful to subjects;
- The experiment must be designed to elicit how the target individuals integrate the decision attribute. That is, how they evaluate multi-attribute alternatives or brand;
- Measurable and actionable market segments must be identified;
- A choice simulation system must be created to forecast how the target individuals are likely to choose among different brands or multi-attribute alternatives offered in the marketplace.

These tasks are undertaken in parallel with consideration for the practicalities of design, implementation and analysis:

- The administration of the survey tasks;
- Developing practical approaches to approximating the overall utility function;
- Simplifying models by assuming responses to be approximately linear;
- Incorporating non-linearity and non-additives in the design;
- Developing approximations to non-linear and non-additive models;
- Combining individual-level and aggregate response information.

Choice experiments also offer excellent informational efficiency via a question format that respondents find plausible and easy to understand. Compared with open-ended contingent valuation methods, choice experiments minimise protest responses and increase familiarity with the elicitation method by subsuming price within vignettes (Mackenzie 1990). In the context of food and fish product purchasing in northern Europe, consumers are rarely price setters, with prices pre-determined for them. In treating price as simply another attribute, the analysis minimises many of the biases that can arise in open-ended contingent valuation studies when respondents are presented with the unfamiliar, and often unrealistic, task of being price setters. It is also a powerful extension of the closed-ended contingent valuation methods, over which a greater insight to consumer behaviour can be obtained (Mackenzie 1992). Strategic bias, ordering, embedding and scope effects may also be somewhat less of a problem with choice experiments than contingent valuation, while scenario mis-specification bias and implied value cues may be encountered in both of them.

4. SURVEY DESIGN

Because of the substantial amount of among-person variation in consumer preferences, the analysis is usually carried out at the individual level. The form of the preference model is generally assumed to be the same for all individuals, but the parameters of the model are permitted to vary across the sample of individuals from the relevant target population. Likewise, after selecting the preference model there are several considerations for survey design such as sampling plan, data collection method, stimulus set construction, and stimulus presentation.

Sampling theory provides a framework within which one can make a decision on sample size and distribution. The considerations involve an assessment of the desired limits of error and the intended purpose of the analysis, matched

against the resources available.

On the basis of this theory and the practical considerations of the budget, 600 in-home interviews were carried out in each of the two case study countries (United Kingdom and Denmark), aimed at returning a margin of error of less than 5% for each country. The target population was the number of households in the United Kingdom and Denmark, 24.08 million and 2.37 million, respectively (1996 figures). The sample represents 0.002% and 0.02% of each population, respectively. Both fish and non-fish consumers were included to elicit any switching behaviour into fish products in response to the introduction of labelling. The sample was then stratified in accordance with the regional distribution of households within the country, and then by age of respondent, existence or otherwise of dependent children, and social class within each region. The number of stratification criteria was guided by resource constraints.

In the design of the stated choice questionnaire, the principal consideration, apart from that of satisfying the requirements of the methodology, was comparability. The survey instrument needed to be comparable between countries and also with the contingent valuation survey being done in parallel. There are five sections to each of the questionnaires. Four of these were identical to ensure comparability between the different methodologies being adopted, each of which began with a transition statement explaining why the subsequent questions were being asked. Each section was designed to be easily understood and filled out without external consultation. Many parts were self-explanatory but, where it was necessary, clear explanations were provided. Attempts were made to limit opportunity cost and embarrassment by keeping the questionnaire as brief as possible and present questions, instructions and information in a clear and easy to understand manner.

Section one of the questionnaire addressed the respondent's general food purchases and the major factors that affect their existing choice of food products. Section two moves on to questions concerning the respondent's fish and fish product purchases. It elicits the major factors that affect the respondent's choice of fish and fish products, where they usually buy their fish and fish products and which, if any, of the fish products targeted by the survey they currently purchase (frequency, quantity and total expenditure). Section four concerns general purchase choices. One question attempts to elicit the attitudes of the respondent to certain categories of product attributes (as a validation exercise) - respondents were asked how often the statements given were true for themselves in the context of their general purchases. The

final section pertains to respondents' socio-economic and demographic variables. Note, that in certain aspects, the Danish and English versions of the questionnaire varied reflecting cultural differences and differences in consumer behaviour.

Section 3 was specific to each survey methodology. In the choice experiment survey instrument, after a trade-off question to elicit attitudes to the various objectives of fisheries management, this section set up the hypothetical market, including definitions of quality certification and the certification of fish products on the basis that they come from a sustainably managed fishery. In formulating these definitions attention was given to the meaning of schemes in existence and the need to reduce the multitude of criteria within these schemes into a few simple statements readily understood by the consumer, yet a true reflection of what is being offered to the consumer. It was felt inappropriate to use the approach adopted by some surveys of focusing on one aspect of sustainability (e.g. avoidance of over-fishing), as the interpretation of the survey results would be restricted (relative to the aims of the project and in terms of validity). The definitions used, therefore, were:

'Certified as of high quality: This label means that the quality of the fish has been assessed and the safety, freshness, taste and appearance of the fish has been shown to be of a high standard'.

'Certified as coming from a sustainably managed fishery: This label means that the fish comes from a source that has been assessed and shown to be "sustainably managed", such that-

- fish supplies are maintained
- high fish populations are guaranteed
- long term environmental damage is avoided'.

For the choice experiment method, it was essential to avoid bias by emphasising unduly those product attributes the survey was particularly interested in (Carson 1999, pers. comm.). At the same time to obtain as realistic results as possible it was essential to mimic the purchasing environment closely (including the amount of information that would be available to the consumer and in what form). Hence, corresponding with the attributes incorporated within the product design, definitions were also provided to the respondent for some of the other attributes assigned to the products (i.e. farmed fish) with which the consumer may not have been familiar.

With the definitions of labelling given on a cue card, five cards were presented to the consumer, the first an unrecorded trial card. Each card contained four products and a "None" option. Various combinations of attributes describe the products. The attributes used in the product

descriptions were identified and selected on the basis of existing knowledge, a review of consumers attitudes towards food and fish products (including focus group sessions), existing product differentiation and the attributes identified as useful in masking those the survey was particularly interested in. The product descriptions used in the cards for the United Kingdom were identified using variants of the following attributes (Table 1):

Table 1: Factors of orthogonal design

Attributes	Levels
Product form:	Fresh and chilled cod fillets Fresh and chilled salmon steaks Tinned tuna Frozen fish fingers Smoked haddock fillets Frozen prawns
Certification:	Certified for sustainability Certified for quality Uncertified
Certifier:	Non-governmental Governmental
Origin:	UK Foreign Un-stated
Production method:	Wild Farmed
Price:	Low Medium High Very high
Brand:	Shop's brand Manufacturer's brand

The product forms were chosen due to their high market penetration within the United Kingdom and Denmark, their suitability for use by a revealed preference study also being undertaken and to avoid zero answers due to product form rather than labelling.

Four choices (products) were included on the cards to simulate one potential choice set the consumer could have in front of them when they go shopping in the future (as meal alternatives). Each respondent was asked, for each card in turn, to choose which, if any, of the products they would actually buy.

The attribute combinations that make up the products on each card were constructed using orthogonal main-effects design. This design resulted in thirty-two choices. This was considered to be too large a choice task for each respondent. Therefore, the design was blocked providing eight cards of four choices. The number of alternatives or choices presented to each respondent theoretically depends on the number of the coefficients to be estimated.

However, there is evidence that certain numbers of choices can make respondents confused and distract their interests. According to Malhotra (1982), the use of 15 to 20 (or to 25) alternatives does not significantly affect the standard error of the parameters, however, other authors cite the optimal number to be presented at one time to be much lower (Carson 1999, pers. comm.). The block design was, therefore, adopted to minimise this effect as well as to minimise the 'none' responses (zeros), while providing, in combination with a random number chart, for each choice to be presented an equal number of times throughout the survey and the respondent to be presented with a choice set that mimics the purchase environment.

The format for the presentation of the questionnaire and stimuli was a combination of verbal description with cue cards, paragraph descriptions, and pictorial representation. The verbal description method offers simplicity and efficiency. The written description method provides the advantage of a more complete description of the stimuli, reinforcing the message through the use of multiple senses. Written information is then combined with pictorial representation facilitating as far as possible the reduction of information overload; homogeneity of perceptions across respondents; and the retainment of the respondent's interest.

5. CURRENT STATUS OF THE STUDY

The questionnaires were pre-tested using focus groups and trial interviews with a cross-section of respondents and subsequently modified to accommodate language and cultural differences between the United Kingdom and Denmark. A full pilot was undertaken during December 1999 and January 2000, with the questionnaire format subsequently refined to incorporate the findings. The full survey was undertaken during May and June 2000 by market research companies in both the United Kingdom and Denmark and the analysis is now underway, albeit at an early stage.

Table 2 below demonstrates some of the preliminary findings from the survey analysis, giving a foretaste of what is likely to be revealed by the full analysis over the coming months. It can be seen from table 2 that a number of variables appear significant in terms of influencing the choice of the six fish and fish products targeted by the survey, most notably income, qualifications, specie-product form combinations, price and certification on the grounds of either sustainability or quality.

Table 2: Preliminary survey results

Variable	Coefficient	Standard Error	Wald Chi-Square	Pr>Chi-Square
Fresh or chilled cod fillets	0.001124	0.00051	4.934	0.0263**
Smoked haddock fillets	0.021362	0.00283	57.041	0.0001***
Fresh or chilled salmon steaks	0.251034	0.08513	8.697	0.0032***
Frozen fish fingers	-0.091710	0.16028	0.327	0.5672
Tinned tuna	-0.118544	0.10253	1.337	0.2476
Certified (quality)	0.598863	0.12127	24.386	0.0001***
Certified (sustainability)	0.581444	0.11735	24.550	0.0001***
Certifier (governmental)	-0.168955	0.11713	2.081	0.1492
Produced in the United Kingdom	-0.125979	0.07071	3.174	0.0748*
Produced abroad	-0.006429	0.09602	0.004	0.9466
Wild caught	0.139051	0.07249	3.679	0.0551*
Shop brand	0.295234	0.08148	13.129	0.0003***
Medium price (current average price)	-0.343238	0.13551	6.416	0.0113**
High price (+20%)	-0.318894	0.12476	6.534	0.0106**
Very high price (+40%)	-0.314343	0.10625	8.752	0.0031***
Income - £10,000 to £14,999	-0.190543	0.13159	2.097	0.1476
Income - £15,000 to £19,999	-0.359611	0.12870	7.808	0.0052***
Income - £20,000 to £24,999	0.251457	0.12028	4.371	0.0366**
Income - £25,000 to £29,999	0.719445	0.11864	36.776	0.0001***
Income - £30,000 to £34,999	0.632551	0.12978	23.758	0.0001***
Income - £35,000 to £39,999	0.684271	0.15493	19.507	0.0001***
Income - £40,000 +	0.250667	0.15011	2.789	0.0949*
Year of birth	-0.089210	0.02477	12.967	0.0003***
CSE	0.448073	0.10994	16.610	0.0001***
GCSE/"O" level	1.208094	0.10525	131.751	0.0001***
Advanced level	0.700939	0.11421	37.664	0.0001***
Diploma, vocational or technical training	0.458659	0.09919	21.381	0.0001***
Undergraduate degree	0.466730	0.13711	11.588	0.0007***
Post graduate degree	0.813759	0.12662	41.306	0.0001***
Professional qualification	0.882997	0.14429	37.450	0.0001***

The significance of the specie-product form combinations as a choice factor is demonstrated by the example in table 2, comparing fresh and chilled cod fillets, fresh and chilled salmon steaks, tinned tuna, frozen fish fingers and smoked haddock fillets against frozen prawns. In this example, it would appear that smoked haddock fillets, fresh salmon steaks and fresh cod fillets are preferred over frozen prawns, when a choice between them is available, with fresh and chilled salmon having the greatest positive influence on choice. In contrast, consumers would appear to be less convinced in their preferences between frozen prawns and tinned tuna or fish fingers. This confirms that consumers exhibit preferences for some species and product forms over others, although in this comparison the effects on choice are not as great as that of some of the other product attributes included in the survey.

Another anticipated, significant factor in product choice is price, demonstrating a negative correlation as expected.

Relative to a price set at 20% lower than the current average price for each product form (without certification and determined through national retail statistics), the current average price and increments of 20% and 40% over this price have a negative impact on the probability of a product being chosen, at the 95-99% level of significance.

The statement of origin also appears to have some effect on choice. The labelling of a fish or fish product as coming from the United Kingdom as distinct from an unstated source would appear to reduce the probability of a product being chosen, at the 90% level of significance. Origin, in terms of method of production, seems to have a similar scale of effect. Consumers appear to prefer wild caught fish over farmed fish, although the scale of effect is less than that for price and the other attributes assigned to the products in the survey.

Differing somewhat from expectations, the survey results indicate that a shop brand is likely to be chosen in preference to a manufacturer's brand product. This result should be interpreted carefully, given that fresh and chilled fish is rarely sold with brand labelling. The full effect of branding will only be revealed by analysis at the individual product form level. If the sign of the coefficient holds under more in-depth analysis, this could reflect a change in the perception of shop brands, away from the budget product image of the 1970s-1980s. The introduction of premium store brands during the 1990s designed to compete with the higher priced, 'higher quality' manufacturer's brands, led by Marks and Spencer and Sainsbury, is giving rise to a shift in public perceptions (Samways 1995). It could also reflect the perception that store brands have a price edge on the manufacturer's brands, and that the consumers are in effect inferring a financial saving in choosing the shop. More detailed analysis will need to explore such questions.

One of the biggest effects on the probability of the targeted fish and fish products having been chosen during the survey appears to be product certification, despite the masking of the focus of the survey in the design of the product descriptions. Both sustainability and quality labelling would appear to be significant in terms of influencing product choice, at the 99% level of significance, and of greater influence than the specie-product form combinations and price. In contrast, the identity of the certifier is not significant, no preference being demonstrated for either a governmental or private certification body. In respect of the former variables, these preliminary findings reflect the findings of other studies on eco-labelling and provide positive signals for moves towards the eco-labelling of fish products. It would also appear from these preliminary results that neither sustainability nor quality has a greater effect than the other on product choice, although further analysis will reveal whether this holds true for each of the 6 product forms and each social grouping. It is interesting to note, albeit not reflected in the table nor in the conjoint results due to formulation of the choices, that in the pilot of the contingent valuation survey, where respondents had to choose between a product certified on the basis of sustainability and one certified in terms of quality, that an explicit preference was made by many respondents for products certified on the basis of both sustainability and quality. Unfortunately, given the project brief this is an option that cannot be fully explored in the major survey, as providing that option would undermine the ability to compare the responses to the two different forms of certification.

Turning now to attributes of the respondent rather than the product, it would appear that socio-economic factors have

the greatest influence on product choice. Household incomes of £15,000 or more significantly increase the probability of the targeted fish and fish products being bought, relative to household incomes of less than this. Similarly, the possession of qualifications by members of the household increases significantly the probability of choice. Both observations are significant at the 99% level of significance. Age likewise is a positive influence, significant at the 99%, with the probability of choice increasing the older the respondent. In contrast to the other two social factors, however, the age effect is relatively small. Incomes of £25,000 to £39,999 and the possession of CSE, 'O' level, 'A' level, postgraduate and professional qualifications in a household being the most dominant of all factors on the choice of the products targeted by the survey. Further analysis will reveal whether this pattern holds for the more detailed relationships between these socio-economic factors and the different product forms and product attributes.

6. DISCUSSION

From these findings, it would appear that there may be potential encapsulated within the development of quality and sustainability labels for fish products, albeit as previously noted these findings may well be overturned by fuller analysis over the next few months. The premium that consumers are prepared to pay and any increment on the volume purchased will also be extrapolated during this analysis.

These early findings already reveal some of the benefits of utilising choice experiments for the analysis of consumer choice: notably the ability to disaggregate the effect on choice of the component attributes of a product and their various levels. By including the targeted attributes within an overall product description, the consumers also face a more realistic purchase scenario and with price being an attribute rather than a measure of preference (as in most forms of contingent valuation), they are more familiar with the preference elicitation format. This advantage is compounded by the use of a choice-based elicitation method, which further mimics the purchase scenario.

The choice experiment used has a number of distinct advantages over the other 'conjoint' elicitation methods (e.g. ranking and rating), not least in being based on the random utility model, which gives it a strong economic and theoretical basis. The avoidance of order or cardinality of measurement issues and the avoidance of potentially unrealistic assumptions about choice behaviour, being estimated directly from choice data, are further fundamental advantages. The practical application of the method does, however, throw up some challenges, notably:

in the identification of the key product attributes that satisfy the research objectives, facilitate across country comparisons and are meaningful to the survey respondents; the construction of the choices and choice sets in accordance with rigours of the analysis, while minimising nonsense combinations; and the design of stimuli presentation to avoid information overload, to ensure comprehension and valid responses.

These challenges have now been addressed, the survey undertaken and data analysis is underway. Once the analysis of the survey data is complete, the effect on consumer choice of the labelling schemes of interest should have been ascertained, both in terms of premium and volume consumed. In conjunction with the parallel Danish survey, the contingent valuation study in both countries and the revealed preference component of the project, the potential for long-term market-based changes in consumer seafood choice can then be extrapolated. It will also be possible to draw conclusions as to the potential of certification labelling to create market-driven incentive structures in support of the sustainable or responsible management of fisheries: the overall aim of the study of which the survey covered in this paper is a part.

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