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Consumer panel surveys: Methodological aspects and main results

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SUMMARY – One main purpose of this presentation is to assess the contribution of consumer panel surveys to the economics of markets and consumption of aquaculture products. The first part tackles the methodological aspects of this kind of survey, which aims at measuring the main trends of home consumption based on the monitoring of household purchases, and to analyse the different factors that may impact on the structure and changes of food habits (distribution outlets, purchasing variables, regional and socio-demographic criteria). In the second part, the main results provided by the British, French, Italian and Spanish consumer panel surveys are reported and analysed. This exercise highlights the harmonisation issues raised by a European comparative study, which are both related to the processing and presentation style of the raw data, and to the segmentation approach and level of detail of the product itemisation in each survey.

Key words: Consumer panel surveys, home consumption, aquatic food, aquaculture.

RESUME – *"Enquêtes de panel consommateurs : Aspects méthodologiques et principaux résultats". Un des objectifs de cette présentation est d'évaluer l'apport des enquêtes de panel consommateur dans l'étude économique des marchés et de la consommation des produits issus de l'aquaculture. La première partie aborde les aspects méthodologiques de ce type d'enquête, qui vise à mesurer l'évolution de la consommation à domicile à partir du suivi des achats des ménages, et à en expliquer les principales tendances sur la base de différents facteurs (circuits de distribution, variables d'achat, critères régionaux et socio-démographiques). Dans la deuxième partie sont analysés les principaux résultats fournis par les enquêtes consommateur pour la Grande-Bretagne, la France, l'Italie et l'Espagne. Cet exercice permet de souligner les problèmes d'harmonisation auxquels doit faire face une étude comparative à l'échelle européenne, liés au mode de traitement et à la forme de restitution des données de base, ainsi qu'à la logique de segmentation du marché et du niveau de détail des nomenclatures produits.*

Mots-clés : *Enquêtes de panel consommateurs, consommation à domicile, produits aquatiques, aquaculture.*

Methodological issues pertaining to consumer panel survey (CPS) – Focus on TNS and SECODIP data

The Taylor Nelson Sofres (TNS) Family Food Panel in the UK (which constitutes the UK component of the Europanel project) was established in 1974 in the UK (and in 1978 in France) and was the first continuous panel designed to supply information on both the usage as well as the purchase of different foods. The data cover all food consumed in the home in addition to take-out meals consumed in the home and home-made or home-grown food. Another survey monitors what is eaten out of the home. Data are recorded by means of a diary in order to capture the finest level of detail pertaining to purchase and food utilisation. Alternative retrospective options are known to accumulate error through data points simply being forgotten and not recorded.

At the diary level data are organised by meal occasion and informants are required to detail how foods are used and prepared (albeit briefly). A "housewife" is nominated as the diarist, whose role is to complete the diary, and despite the connotations of the term may (knowingly) be male. Diarists are selected by means of a random sample and this selection procedure means that single person and single parent households are likely be represented in the sample in the same proportion as the population as a whole. The UK panel has grown steadily since its inception, for example it was 2100 strong in 1989 and is currently comprised of some 15,000 households, the panel is smaller in France with some 8000 households (only 5000 are monitored for fresh meat and aquatic food however). However, the data discussed in this paper relates to 1999 when the panel was somewhat smaller with

10,000 household respondents. It should be noted that these figures are well in excess of those that are commonly regarded as a sufficient sample size for a representative randomly selected sample in market research (Kent, 1993). For example political opinion polls or omnibus surveys of the whole population of either the UK or France are commonly conducted using samples of 1000 to 2000 selected individuals.

The numbers in the UK CPS allow meaningful static statistical analysis (non-time series) for specific geographic, demographic segments, or segments formed from other informant identifier variables. The identifier variables used are consistent with the industry standards for representative sample design and include the household composition, demographic data, socio-economic indicators and geographical variables. The panel can therefore be segmented according to one or more of these attributes areas and the relationship between them and the purchase outcomes can be investigated. Such analyses are commonly utilised within marketing management decision-making and their availability thus adds to the perceived value of the data set. It has to be said that this is perhaps easier at present for the TNS panel in the UK than the SECODIP panel in France, which does not currently have as many identifier-informant variables as the TNS data. However it is the intention of the EUROPANEL group to be able to interrogate all EEA member panels in a similar manner in the near future through standardisation of the variables involved.

All the evidence suggests that the representativeness of the TNS sample is high and accurately reflects the diversity of household types found in contemporary UK and French society. Indeed the increase in the size of the panel can only increase its claims to be an accurate reflection of the UK population as a whole and should be regarded as a significant achievement given the multi-cultural, plural society that constitutes modern Great Britain. Notwithstanding its strengths there is scope for some debate over the concentration on the household as opposed to the individual; individual consumption information could be collected rather than recording data at the household level. Neither individual nor household based data represent an optimum, both categories give insights into each other without being synonymous. Nonetheless it should be understood that extrapolations about individual consumption from Europanel are just exactly that. The purchase decision processes within the household are often complex as Kirchler (1999), among others, has demonstrated. The primary shopper and the dynamics of product choice will vary from one household to another, and over time; however the panel is based on actual purchases which are consumed by individuals at a specified time period and as such represents a valuable resource.

The principal objective of any continuous data collection exercise whether for academic or commercial purposes has to be reliability, length of series and breadth of coverage. In simple terms the level of detail pertaining to both the products and the people is critically important. The TNS panel is reliable, has been running for a comparatively long period of time and provides disaggregation to weekly data points whilst providing a high degree of detail in terms of sample and product characteristics. There is no evidence to suggest that the reliability of the data recorded by the panel presents grounds for scepticism. TNS appear to make strenuous efforts to ensure that recording is reliable, incentivated through payment and closely monitored (Kent, 1995). Clearly there is still scope for "pick-up" errors although the pervasive use of barcode/scanner technology now means that even this danger is diminished. In France however a considerable amount of fresh aquatic food is sold without any bar-coding and this limits the efficiency of the scanner technology as a data collection tool for the SECODIP panel in that market at present.

The scanner-based data capture methods are now firmly entrenched, being over a decade old, so there has been plenty of scope to iron out problems and perfect the methods employed. The other possible factor that might be perceived to undermine the representativeness of the panel is the inevitability of constant socio-economic change. These dynamics however should be regarded as an integral part of contemporary society, and their inclusion arguably only adds to the realism of the observations made. As a further check, the panel composition is both randomly selected by geographical location and compared to census data in order to ensure it remains representative and to minimise the possibility of representative drift.

The categorisation of seafood adopted by the panel is primarily consumer-defined in so much that it is not principally based on other arguably idiosyncratic industry-orientated taxonomies. For example no distinction is currently made for product that is farmed unless this is indicated on the barcode (although this particular example will change with new legislation from 2002). Commonly other data

sources can be used to inform the analysis of the panel in order to address questions of the production regime or origin of the product. The panel is better placed to address other questions relating to product form, household preferences, the influence of various identifier variables, etc. The key strength is that it is consumer based and allows the investigation of temporal evolution of trends and well as snap-shot aggregate or static analysis. Importantly it also allows the correlation of a number of household related variables to product related variables.

Apart from *ad hoc* surveys and the UK government Family Food Survey (which is not as detailed) the TNS CPS is the only source of such data that addresses the interface between the consumer and the product. In France the National Family Food Survey which was carried out by the INSEE before 1992 from a 10,000 household sample, had provided data series in volume and value for many years. However it has been interrupted and changed from its former version since then and restricted to the publication of budget indicators for selected items. Although this national food survey only distinguishes two aggregated items for seafood (fish, preserved fish), the resulting estimation of the global final consumption (at home and out of home) made up the unique reference evaluation in volume and value to be confronted with SECODIP extrapolated home consumption data.

Hitherto the evidence suggests that on the whole the aquaculture industry relies more on product based data and has relatively little access (or seeks little access) to continuous data or consumer oriented data. This pattern of data consumption probably reflects the relative recency of the aquaculture sector and its residual production orientation. Nonetheless as the industrial structure of aquaculture, notably within the salmon sector, continues towards greater concentration of ownership by transnational organisations, such CPS data may be perceived increasingly important and integral to the aquaculture decision-making process.

The EUROPANEL panel data can de delivered to clients in a variety of formats, e.g. reports, spreadsheets or in other electronic formats often with the associated software. Clearly the vast number of data points opens up the possibility of data-mining, neural networks, genetic algorithms and many state of the art non-linear data interrogation and reduction techniques. The potential of the panels in this respect has been under-estimated and under-utilised possibly because the analysis of the data is cost driven and such techniques are often perceived as "speculative". Nonetheless the potential is vast (Smith, 2000), and has the intriguing strategic option of real access to national individual raw data instead of national processed and aggregated data, harmonised as at present.

The other commonly-perceived barriers to such developments are the time constraints associated with commercial analysis of purchase data and the availability of commensurate expertise. (Although arguably a more proactive interpretation might regard this as time well-invested.) Previous academic endeavour using panel data has demonstrated that valuable insights into factors such as brand and product loyalty can be achieved when commercial expedience is not a priority. Ehrenberg's seminal work (1972, revised in 1988) on repeat buying using the Negative Binomial Distribution (NBD) and the Dirichlet model has inspired much similar research (Frisbie, 1980; Goodhardt *et al.*, 1984; Chintangunta, 1992; Fader and Schmittlein, 1993; Uncles and Hammond, 1995; Uncles *et al.,* 1995; Bhattacharya, 1997 to name but some of the others).

The availability and accessibility of the data is a more problematic issue. It is not free, obviously, it is generated by a private institution and is therefore a commodity. "Free access" would have to be paid for by someone. Clearly individual aquaculture producers would either balk at the costs, and perhaps for reasons of unfamiliarity and frugality, or fail to see the value in the data. The data are undoubtedly of value to them although this has to be *demonstrated,* most effectively by generating additional net profit. The project associated with this paper is arguably one way of demonstrating the value to the industry. However other mechanisms might also need to be devised, afresh or as some variant on existing themes. These might include the purchase of data by consortia or by marketing authorities, e.g. the Norwegian Seafood Export Council, or more proactive forms of dissemination where data provision becomes a more integral part of stakeholder interests.

Contribution of CPD to the analysis of aquatic food consumption

The main purpose of the following analysis is to review and assess the different types of results provided by the CPS, and from the given examples, to highlight the contribution and the limits of such

surveys within the frame of the comparison of consumer buying behaviours at the European level. By focusing our attention on just one year of CPS results (1999, except for Spain), we have to constantly bear in mind the economic factors that can impact the present situation in seafood markets, and which will prevent us from drawing final conclusions from discrete one-off data. In addition, we have to recall that above all, CPD aims at keeping track of the main changes in seafood home consumption, rather than providing absolute measurements of the size of aquatic food markets, and also aims at highlighting the regional or socio-demographic factors that may impact the demand variables.

Characterisation of seafood household purchases in Great Britain, France, Italy and Spain

Unlike the first part dealing with methodological issues which focused on French and British CPS, the review and assessment of the quantitative information provided by consumer panel survey have been extended to Italian and Spanish available CPD. Therefore, before comparing the specificities of household consumption in Britain, Spain, France and Italy, we must recall the main attributes of each consumer panel survey that have to be taken into consideration in the interpretation of the results, for a given country, and in the context of a global analysis at the European level.

The respective scope of the CPS analysed through MASMANAP

The contribution of the CPS to the analysis of aquatic food consumption depends upon a certain number of specifications, among which the size and characteristics of the household panel, the extent of the field of the survey and the level of detail of the product itemisation are reported to be determining (Table 1). The delivery of "special" variables (penetration ratio, average purchase in quantity and value, purchase frequency, volume and spent per occasion), in addition to the basic ones (volume, expenditure and average price) also makes the difference between a statistical tool and a "marketing- and consumer"-oriented on-going survey.

The global data concerning home consumption are obtained by extrapolating the registered purchases of the household panel to the population taken as a whole. As a result, they correspond to a statistical assessment, the representativeness of which remains quite uneasy to appraise. Independently to the sampling rate of the whole household population, which represents one statistical representativeness indicator, different factors interfere to make the coverage rate of the extrapolated panel data far from reaching 100% of the real home consumption. These factors are related: (i) upstream, to the field of investigation of the CPS itself, which restricts the extent of home consumption survey in terms of surveyed consumer units, market segments, recordable household purchases (dedicated to home consumption only); and (ii) downstream, to the possible omissions and errors of declaration from the diarist.

Moreover, the statistical shortcomings on which depend these data might be more or less significant depending on the products surveyed and the distribution networks that are followed. Generally speaking, we consider that purchases in "multiples" are better covered that those made in traditional retail networks, just because the first are better informed, and less exposed to possible omissions from the diarist than single purchases made in specialised stores (fishmonger’s shop, direct sales, etc.). For the same reasons, to which adds the impact of the purchase recording mode by diarists depending on the nature of the products, the coverage rate of the fresh, non-elaborated products, is below that of the products that result from the processing industry, which are all bar-coded and mainly distributed by the hypermarket networks. Within the same panel, there may be differentials of coverage rates depending on the markets, or the markets segments analysed (in France, the coverage rate of industrial products is estimated to be better than that of fresh non-elaborated products). *A fortiori*, the comparison of the CPD between different countries must be relativized so as to take into account the striking features of consumption, and notably the breakdown into fresh seafood and processed seafood, and the respective market shares of the various distribution networks.

On the other hand, the scope of the panel’s outcomes obviously depends on the field of investigation retained. In order to carry out a comparative analysis of CPD, it is essential to specify all the markets surveyed in the framework of each national survey, and to delimit their outlines. The markets of aquatic products covered by the 4 CPS countries are listed in Table 1.

Table 1. Some specifications of the British, French, Italian and Spanish CPS

	Great Britain	France	Italy	Spain
Source: Panel institute and/or panel subscriber	TNS	SECODIP	NIELSEN	MAPA (CPS subscriber)
Sample size	10,000 households	5000 households	6000 households	2700 households
Criteria of composition of the sample	Region of residence, household size, with/without children, age of the purchaser, social class	Region of residence, household size, with/without children, age of the purchaser, socio-economic class, type of habitat	Region of residence, household size, age of the purchaser, with/without children, socio-economic class	Region of residence, household size, household age, with/without children, socio-economic class, type of habitat
The field of the survey about aquatic food and the general structure of the itemisation	Total wet smoked fish and shellfish Natural fish Coated fish Shellfish Smoked fish Frozen fish Defined chilled fish	Total fresh fish and shellfish Natural fish Molluscs Crustaceans Salted, dried, smoked fish Frozen fish Chilled deli seafood Canned fish	Total fresh and defrozen fish and shellfish Marine fish Freshwater fish Molluscs Crustaceans Salted, dried, smoked fish Frozen (2 sub-segments) Canned seafood	Total fresh and frozen fish Fresh fish Frozen fish Shellfish Fresh Cooked Frozen fish Tinned fish and shellfish
Sub-segmentation of fresh fish market	Natural/coated fresh fish • Per species • Per packaging (loose, pre-packed, including MAP) • Per presentation (whole, cuts)	Natural fresh fish • Per species • Per packaging (loose, pre-packed) • Per presentation (whole, cuts)	Natural fresh fish • Per species • Per presentation (whole, fillets), only for seabass, seabream, salmon and all kinds of trout Processed fish	Natural fresh fish • Per species or group of species
Number of species/products identified within the fresh fish itemisation	20 fish species + "other fish" item, including 3 farmed species (salmon, trout, seabass), declined per presentation and per packaging	25 fish species + "other fish" item, including 4 farmed species (salmon, trout, seabass, turbot), declined per presentation and per packaging	22 fish species (+ 2 "other fish" items) including 5 farmed species (seabream, seabass, salmon, trout, salmoned trout)	7 fish items + "other fish" item, including two farmed species (trout, salmon)
Purchasing data variables	Basic measures + special measures	Basic measures + special measures	Basic measures + special measures (only for aggregate items)	Only basic measures available

The main shortcomings that have been noticed in the monitoring of aquatic products thus concern the absence of available information on the market of canned seafood in Great Britain, and on the market of cured fish in Spain. Besides, the identification of a "new" segment of "chilled value-added products" is only effective in France and Great Britain, where these markets are the most developed. Yet, the terminology "defined chilled fish" adopted by the TNS refers to a more open range of products than that of the "deli seafood" segment in the SECODIP panel, which specialises in recipes the main ingredient of which is fish, and which does not take into account the derived products. In the Nielsen panel, some "defined chilled seafood" items are identified, but does not yet constitute a special category in the product itemisation at present.

Thus, before presenting the results aggregated by country, the differences in the delimitation of the study field and in the mode of categorisation of aquatic products must be underlined. Furthermore, it is apparent that the level of detail of the product itemisations is a key factor of the ability of CPS in keeping track of the market trends of aquatic food, notably while focusing on the products issued from aquaculture.

Global indicators of the home consumption of aquatic food

Another factor that should be taken into account to restore the CPS results in the framework of the different domestic seafood markets is the respective weight of home consumption and out-of-home consumption in each country. In the UK, the share of the catering sector is almost as significant as

that of the household purchases made for home consumption (48% vs. 52%), a first factor that explains the relative weakness of the indicator in volume of the retail seafood market, compared to other countries (Table 2). Indeed, in France and in Spain, the greatest part of seafood consumption is made at home, and the outlets offered by commercial or institutional catering are estimated to be respectively 27% and 26%.

Table 2. Overview of aquatic food consumption at home, in GB, France, Spain, and Italy

Total Great Britain (1999)†	Household purchases			Market share (%)	
	Volume (t)	Value (million €)	Retail price (€/kg)	Volume	Value
Fresh fish	69,741	639	9.17	28	30
Fresh shellfish	9,066	104	11.42	4	5
Smoked fish	15,783	164	10.40	6	8
Frozen fish	138,836	1,031	7.43	55	49
Defined chilled fish	17,967	180	10.00	7	8
TOTAL1	*251,393*	*2,118*	*8.42*	*100*	*100*

Total France (1999)††	Household purchases			Market share/Total 1 (%)		Market share/Total 2 (%)	
	Volume (t)	Value (million €)	Retail price (€/kg)	Volume	Value	Volume	Value
Fresh fish	136,690	1205	8.81	30	34	25	29
Fresh shellfish	130,847	731	5.58	29	21	24	17
Cured fish	25,980	399	15.34	6	11	5	9
Deli seafood products	35,256	316	8.97	8	9	6	8
Frozen seafood	119,951	871	7.26	27	25	22	21
TOTAL1	*448,724*	*3521*	*7.85*	*100*	*100*	81	84
Canned seafood	*103,704*	*680*	6.55			19	16
TOTAL2	*552,428*	*4201*	*7.60*			*100*	*100*

Total Spain (1998)†††	Household purchases			Market share/Total 1 (%)		Market share/Total 2 (%)	
	Volume (t)	Value (million €)	Retail price (€/kg)	Volume	Value	Volume	Value
Fresh fish	446,700	2140	4.79	58	55	50	46
Frozen fish	106,500	470	4.41	14	12	12	10
Shellfish (fresh & frozen)	219,600	1301	5.92	28	33	25	28
TOTAL1	*772,800*	*3911*	*5.06*	*100*	*100*	86	84
Tinned fish	122,500	746	6.09			14	16
TOTAL2	*895,300*	*4657*	*5.20*			*100*	*100*

Total Italy (1999)††††	Household purchases			Market share/Total 1 (%)		Market share/Total 2 (%)	
	Volume (t)	Value (million €)	Retail price (€/kg)	Volume	Value	Volume	Value
Fresh fish	172,056	1372	7.97	47	49	38	40
Fresh shellfish	75,362	435	5.77	21	16	17	13
Cured fish	17,893	200	11.18	5	7	4	6
Frozen seafood	101,089	786	7.78	28	28	23	23
TOTAL1	*366,400*	*2793*	*7.62*	*100*	*100*	82	81
Canned seafood	82,009	672	8.19			18	19
TOTAL2	*448,409*	*3465*	*7.73*			*100*	*100*

†From TNS data.
††From SECODIP data.
†††From MAPA data.
††††From Nielsen data.

With respect to the various sources of disparity that can impact the interpretation of the CPD, we will just highlight the most significant facts when we compare the global results of home consumption:

(i) The position of the national markets, in volume and value, which emerges from the comparison of CPD by country, is validated by the indicators of global apparent consumption calculated for the countries concerned. Spain constitutes from far the leading market for aquatic food, with a total supply estimated to 1.7 to 2 million tonnes in net weight, followed by France, Italy (1.2 to 1.3 million tonnes)

and then Great Britain (700,000 to 950,000 tonnes in the UK). The gap in home consumption observed between France and Italy is more difficult to interpret. In the absence of assessment concerning the proportion of out-of-home consumption in Italy, it results difficult to conclude whether the Italian CPD offer a different coverage rate than the French CPD, or if the weight of consumption in catering is higher in Italy.

(ii) In terms of purchasing structure, the share of fresh products consumption is lower in Great Britain, and conversely, the frozen aquatic products are over-represented in household purchases, a feature that distinguishes quite clearly the Anglo Saxon consumption pattern from the practices usually observed in Latin countries (France, Spain, Italy). For basically similar categories (total seafood, except canned products, and except cured fish in the case of Spain), the value share of frozen aquatic products rose to nearly 50% in Great Britain in 1999, whereas it was lying between 25% and 30% in the three other countries[1].

(iii) The share of cured fish (smoked, salted, dried) in relation to the subtotal of seafood products – except canned food – is the highest in the consumption of the French households (11% in value, vs. 8% in Britain and 7% in Italy). Concerning the new segment of chilled added value products, the comparison of the panel's results is possible in the cases of Britain and France, on the condition that the differences of content covered by the market segments retained by TNS and SECODIP are taken into account. In value, the market share of "defined chilled seafood" accounts for about 8% of the British households' seafood purchases, whereas the segment of "deli seafood" is estimated to account for 9% of the total seafood (except canned products) bought by the French households.

For the countries having information about the canned food market, this mode of processing of seafood products accounts for a market share below 20%. In absolute value, the leading retail market of canned seafood is in Spain. Now, in terms of consumption structure, the Italian households dedicate a greater share of their seafood budget to buy canned seafood (19% of the seafood products expenses, vs. 16% for the French and Spanish households).

The breakdown of seafood purchases according to the distribution network

The analysis of retail sales networks allows us to distinguish two consumption patterns among the various countries studied. These are determined by the evolution of the whole food distribution sector which has been observed since the late eighties. The weight of large retailers has become a leading factor in Great Britain and France, whereas in Spain and in Italy, the "traditional" circuits (fishmongers, markets, direct sales, etc.) are still playing a major role in the final distribution process of fish and shellfish (Table 3).

Table 3. Market share of the main distribution circuits on the fresh fish retail market† (comparison 1987/1999) (source: TNS, SECODIP, Nielsen)

	Ratio large retailers 1987		Ratio large retailers 1999		Ratio fishmongers + markets 1987		Ratio fishmongers + markets 1999	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Great Britain		14%		66%		72%		26%
France	36%	34%	68%	64%	57%	60%	28%	32%
Italy††			37%	37%			60%	60%

†"Markets" include mobile (open air) and fixed stalls.
††No available CPD for 1987.

More particularly, regarding the fresh fish market, we observe opposite purchasing behaviours between GB and France on the one hand and Italy on the other hand. In the first group of countries

[1]In Spain, the estimation of the frozen seafood share is more hypothetical, due to the lack of information about the split into fresh and frozen within the "shellfish" aggregate item. Notwithstanding the segmentation shortcoming of the shellfish market, the share of frozen seafood very likely not exceeds 25%.

the large retailers concentrated at least 65% of the household purchases in 1999, versus 35% in Italy. If we add to the results obtained by supermarkets the purchases of fresh fish made at department stores, the share of multiples reached 70% in GB (in value).

Among the specialised retailers, the situation of fishmongers and traditional markets (covered or open-air markets) deserves particular attention. Being the main specialised points of sale, their evolution is inversely correlated to the development of hypermarkets. These traditional outlets have declined quite rapidly in France and GB during the past decade, accounting for only 25 to 30% of the marketed volumes in 1999, whereas in Italy they still covered about 60% of retail transactions. Yet, the last trends observed on the Italian market allow us to anticipate a significant development of modern retailers in the distribution of fresh aquatic products within the next years (an additional 8.5 points of market shares between 1998 and 2000).

In Spain, the data available concerning the distribution of the points of sales are too aggregated to allow for direct comparison with the previous information. Indeed, the indicators obtained for retail trade concern all aquatic products (fresh, frozen and tinned markets), to which correspond large retailers ratios higher than those obtained on the sole fresh market. The evolution of the large retailers market share for the total of aquatic products in Spain has shown a clear progression, getting from 15.5% in 1987 to 44% in volume in 1998 (versus 47% in Italy and 75% in France in 1998). These elements of comparison confirm the opposition of the distribution models between Northern and Southern Europe. Yet, in order to be able to measure the impact on the purchasing behaviours, we must have indicators about the structure of household purchases per distribution networks for the various markets (fresh, processed seafood) and for the main wild and farmed fish species.

The monitoring of aquaculture products home consumption

The contribution of CPS in the monitoring of aquaculture species depends upon the level of detail of itemisations on the consumption markets concerned, i.e. mainly the fresh aquatic products retail market, and the smoked, dried, and salted fish retail market. The level of detail required concerns the species identification, its type of presentation (whole, fillets) and its mode of production.

If we focus on the home consumption of fresh fish, we can notice, at diverse degrees, the inadequacy of the itemisation to measure and analyse with accuracy the market of aquaculture fish.

Concerning the *species identification*, the information level proposed by the TNS, Secodip and Nielsen consumer panels, is higher than that offered in the Spanish consumption survey. Indeed, by targeting a limited number of species or species categories, the Spanish survey does not allow for the monitoring of the more specialised markets represented by new aquacultures species (but salmon): seabream, turbot, seabass, etc.

Regarding the *mode of presentation*, this information is available in the TNS and Secodip surveys for all the fish listed, whereas in the Nielsen survey it is only available for the species which can be farmed. It allows for the monitoring of the market's evolution and consumers' expectations towards aquaculture fish, referring to either "regular consumption" species such as salmonids, or species with more limited outlets such as seabream, turbot, seabass, etc.

Conversely, the absence of distinction in the MAPA data between whole fish and cut fish, does not allow for the analysis of the evolution of the consumption of salmonids, all the more since the results in value are non-existent as well.

The issue of the *mode of production* then appears globally for all the CPS, which could not distinguish aquaculture fish from "wild" fish within their itemisations in 1999. Now, though the absence of identification for the production regime does not impact the analysis of the consumption of salmonids (salmon, trout) which basically come from aquaculture, it becomes a real obstacle for the monitoring of sea-bass and sea-bream purchases, which come from both fishing and aquaculture. As for the turbot, which still represents a niche market in spite of the increasing supply resulting from farming, its analysis is limited by the thresholds of statistical representativeness of the CPD.

Due to the current limits of the itemisation, we will mainly compare the CPD related to the consumption of salmonids. France is the largest retail market for salmon, followed by GB, and Italy

(Table 4), whereas the Italian and Spanish markets are the leading places for the consumption of trout. The analysis of the consumption of Mediterranean species will be studied as well, but only through the Italian example.

Table 4. The share of farmed salmonids and of seabass/seabream in the fresh fish retail markets of France, Great Britain, Italy and Spain (source: SECODIP, TNS, Nielsen and MAPA data)

	Household purchases			Market share (%)		Ranking	
Total fresh fish retail market	Tonnes	Million €	Retail price (€/kg)	Volume	Value	Volume	Value
Total France 1999	136,690	1,205	8.8	100	100		
Salmon	22,623	196	8.7	17	16	1	1
Trout	10,704	70	6.5	8	6	4	6
Seabass†	1,695	20	11.9	1	2	19	17
Top 3 species	*47,298*	*408*	*8.6*	*35*	*34*	–	–
Total Great Britain 1999	*69,741*	*639*	9.2	100	100		
Salmon	15,610	157	10.1	22	25	1	1
Trout	5,296	38	7.2	8	6	4	5
Top 3 species	*46,241*	*447*	*9.7*	*66*	*70*	–	–
Total Italy 1999	166,618	1,286	7.7	100	100		
Seabream†	18,830	159	8.4	11	12	1	1
Seabass†	9,843	95	9.7	6	7	5	4
Salmoned trout	15,014	89	5.9	9	7	2	6
Salmon	7,387	61	8.2	4	5	7	8
Trout	5,654	25	4.4	3	2	10	11
Top 3 species	*48,713*	*355*	*7.3*	*29*	*28*	–	–
Total Spain 1998††	446,700	2,140	4.8	100	100		
Salmon	22,970			5		–	–
Trout	18,570			4		–	–
Total salmonids France	33,327	266	8.0	24	22		
Total salmonids GB	20,906	195	9.3	30	31		
Total salmonids Italy	28,055	174	6.2	17	14		
Total salmonids Spain††	41,540			9			

†From both aquaculture and fisheries.
††Non available value data per species.

In France, the increasing salmon consumption occurred in parallel with the development of large retailers, and the shortage of "white" fish, underlining the role played by hypermarket networks in the marketing of aquaculture products[2]. In 1999, hyper and supermarkets were responsible for 82% of the salmon retail market value (versus 64% for the total fresh fish). In parallel, salmon accounted for 21% of the purchases of fresh fish in modern retailers, versus only 8.3% in "traditional" retailers. The dependence towards multiples is also observed for trout, another salmonid issued from the inland farming industry, which ranked fourth in volume and sixth in value (with a 76% of purchases made in multiples). For comparison, cod that was the first species consumed by French households up to 1994, had a "large retailer" ratio hardly different from the total of fresh fish.

In Great Britain, salmon also became a leading product on the fresh fish market, though in 1999, it had only a short lead compared to haddock and cod. These three species accounted for 70% of household purchases, revealing the degree of specialisation of the British market compared to the French or Italian markets (Table 4). Besides, trout accounted for 6% of fresh fish expenses and ranked fifth in terms of home-consumed fish.

In Spain, in 1998, the total purchases of salmonids represented a quite significant market in

[2]From 1987 to 1999, the salmon market share in value in the total of fresh fish purchases increased from 4% to 16%. In the meantime, the weight of GMS in the distribution of fresh fish rose from 34% to 64%.

volume, though in terms of market share they accounted for a lower percentage of fresh fish consumption (9%). Being among the leading fish consumers in Europe, the eating habits of the Spanish are clearly oriented towards fish from the wild, with a clear preference for hake (22% of the household purchases in volume in 1998), and the small pelagic species, sardines and anchovy (23%).

In Italy where demand for aquaculture fish has been traditionally met by the domestic trout farming industry (leadership in Europe just before France), the development of salmon purchases has remained more limited. In 1999, 74% of the salmonid purchases concerned fresh water species such as "white trout" and "salmoned trout" (versus 32% in France). The price differential between salmon and trout, as well as the relative weakness of supermarket networks in Italy in the fresh fish trade, are factors that can partly explain the differences observed in purchasing habits between Italian and French consumers. In addition, as far as "sea fish" are concerned, the introduction of "new" aquaculture species has been essentially based upon Mediterranean species, such as seabass and seabream, which are now among the leading species on the Italian market. Taking into account the level of domestic production, and the net importations of farmed seabass and seabream, we can consider that despite the absence of precise figures, the share of aquaculture products in the consumption of these species is the most significant. As a result, the Italian retail market is also and maybe more, open to aquaculture products than the French and British markets, but presents clear preferences in terms of species, and favours "Mediterranean" fish such as sea-bream and sea-bass, and trout for freshwater species.

Furthermore, the smoked fish market proposes a more or less significant outlet for salmonids, and notably salmon. In 1999, this species accounted for respectively 51%, 13%, and 8% of the quantities of cured fish bought by the French, British, and Italian households, whereas the share of smoked trout was 4% (in progression) for France and 1% for Great Britain.

Initially, the leadership of France in the field of smoked salmon first resulted from consumption traditions based on the "festive" nature of this product. The purchases of smoked salmon then developed throughout the whole year, becoming regular as the European salmon farming industry developed along with considerably reduced prices of the raw material supplying the national processing industry. According to the SECODIP data, the home consumption of smoked salmon increased by 260% between 1989 and 1999, while the expenses made for this product tripled. In 1999, the extrapolated expenses of the French households reached 267 million € for smoked salmon, i.e. expenses higher than those affected to the purchasing of fresh salmon.

Conversely, in Great Britain, where the quantities of smoked fish bought by households were just 25% lower than in France, the share of salmon was more reduced. Concerning smoked salmon, the extrapolated value of household purchases rose to 53 million €, i.e. approximately 20% of the purchases made by the French households. Even if we take into account that the outlets offered by the food service/catering sector are higher in Great Britain, the analysis shows that in the structure of smoked fish retail market in 1999, smoked salmon ranked only fourth in terms of consumption volume, even if it was the leading product in terms of value. The preferences of the British households moved towards traditional, cheaper products such as haddock, herring and smoked mackerel.

Further analysis of the determining factors of home consumption – Positioning of aquaculture products towards the whole fish reference market

In addition to the global indicators of consumption, the CPS aim at explaining demand for aquatic products by dividing it into two purchasing variables: the % of purchaser households, called "penetration ratio", and the average level of consumption per purchaser household. These variables are essential to allow for the monitoring of the evolution of the consumption of aquaculture species, and to determine which strategy must be chosen to increase demand: development of customers and/or development of purchasing level through the multiplication of consumption opportunities (promotion, special offers, product diversification, etc.). Besides, these different strategies must be based upon a precise study of the market segmentation (volume, price), and of the positioning of aquaculture species in relation to species from the wild.

Analysis of purchasing variables

The comparison of the variables "clientele size" and "average level of consumption per purchaser

households" at the European level is only based upon the French, the British, and partly the Italian CPD which provide information about these variables at the aggregate item level only. Here, the problem of harmonisation of the aggregate items appears clearly all the more since the demand variables analysed cannot be cumulated. Table 5 shows the difficulties raised by the comparative analysis of the purchasing variables due to the product categorisation differences observed between the three home consumption surveys.

Table 5. Comparison of the purchasing variables for the main aggregate items in Great Britain, France and Italy (source: from TNS, Secodip and Nielsen data)

1999 data	Great Britain			France			Italy		
	% of purchaser household	Average consumption (kg)	Average expenses (€)	% of purchaser household	Average consumption (kg)	Average expense (€)	% of purchaser household	Average consumption (kg)	Average expense (€)
Total fresh aquatic food				83	13.5	97.4	79	15.2	111.0
Fresh fish	61	4.8	44.1	74	7.7	67.6			
Fresh shellfish	29	1.3	14.7	68	8.1	44.7			
Fresh crustaceans				54	2.4	26.7			
Fresh bivalves				50	8.0	29.5			
Total frozen seafood	89	6.6	48.7	87	5.8	42.0			
Freeze/frozen without packaging							43	2.1	12.4
Frozen in packaging							73	2.8	25.7
Total smoked, salted and dried seafood†	43	1.5	16.0	76	1.4	21.9	43	0.9	9.7
Total canned seafood††				97	4.5	29.3	94	4.0	32.6

†Indicators based on smoked fish only in Great Britain.
††No available CPD for canned seafood in Great Britain.

Concerning the market of fresh aquatic products, the Italian CPD do not provide purchasing variables that refer to large species families, but refer to the modes of preparation, distinguishing the "natural" products and the "processed" products. This segmentation provides few additional data since the fresh aquatic products constitute the most significant form of the purchases made by Italian households (95% in value). As a result, we will just observe that in Italy, the "penetration ratio" of the total fresh aquatic products is slightly lower than in France (80% vs. 83%), whereas the mean expenses made by the purchaser households are conversely a bit higher.

Besides, in the case of frozen aquatic products, the subdivision of the Italian market in two segments does not allow us to obtain the data required for a comparison at the European level. The French and British CPD show that the variable "percentage of purchaser households" is nearly equivalent in the two countries (+2 points in GB), whereas the consumption differential of frozen seafood between the two countries can mainly be explained by the variable "consumption level per purchaser household" (6.6 kg in GB vs. 5.8 kg in France in 1999).

Finally, the sole purchasing variables that can be compared in the three countries refer to the home consumption of "smoked, dried and salted fish". The confrontation of the CPD reveals the very differentiated behaviour of the French households towards the consumption of cured fish, the penetration rate of which is comparable to that of fresh fish (approx. 75% of purchaser households). Comparatively, the "cured fish" clientele concerned only 43% of the Italian and British households in 1999. In terms of average consumption level, the gap is less marked between France and GB, but increases with Italy.

Now, if we take a look at the fresh fish market using the detail of the various data provided by the TNS and SECODIP panels, in terms of species and presentation, we can highlight certain elements regarding the purchasing behaviours in France and in Great Britain (Table 6).

Table 6. Comparison of the purchasing variables for the main presentation of fresh fish in Great Britain and in France (source: from TNS and SECODIP data)

1999 data	Great Britain			France		
	% of purchaser household	Average consumption (kg)	Average expenses (€)	% of purchaser household	Average consumption (kg)	Average expenses (€)
Total fresh fish	61	4.8	44.1	74	7.7	67.6
Prepacked	*50*	*2.5*	*24.4*	*29*	*1.8*	*17.4*
Whole	20	2.9	18.7	49	5.0	36.8
Cuts, fillets	58	4.0	39.5	69	4.7	46.5

The French clientele is comprised of people who buy "whole fish" (49% of the households), and more and more of people who buy "fish cuts" (fillets and other pieces), gathering 69% of the total households. Comparatively, the demand of the British households for fresh fish is more dependent upon the consumption of cut fish (58% of purchaser households, vs. only 20% for fresh whole fish). Besides, the British consumers of fish cuts and the packaged fish clientele seem globally the same (50% of purchaser households) which is not the case in France where the penetration ratio for pre-packaged fresh fish (29%) is far behind, compared to the penetration ratio of cut fish and even whole fish.

In terms of species, the leading product on the French market, from the point of view of the % of purchaser households, is farmed salmon (41%), followed by cod (34%), hake and farmed trout (30%). For comparison, the penetration ratio of the species most consumed in GB is about 30% (32% for cod, 28% for salmon and haddock).

The segmentation of the fresh fish market

Bearing in mind the state of the current CPS itemisations, the analysis of the segmentation of the fresh fish retail market is based on the most reliable characteristics of the purchases, e.g. species identifier and presentation (whole, cuts). In Italy, where the distinct monitoring of "whole" fish/"cuts" only concerns the farmable fish (salmon, trout, sea-bass, sea-bream), the predominance of "whole" fish is likely overstated. Despite this statistical bias, we will consider that the Italian household demand is mainly "whole fish"-oriented and we will therefore focus on it. Conversely, the price analysis of the British fresh retail market will rely mainly on the "fish cuts" segment, as the "whole fish" purchases are not developed enough.

The demand of fresh fish is characterised by a high diversity of species in France and Italy, where the concentration ratio of purchases is by far lower than in Great Britain. As previously reported in Table 4, the 3 top species in GB amounted to a 65% volume share of the total fresh fish purchases in 1999, while 10 species in France and 11 species in Italy were required to reach the same market share. As a result, the amount of non specified purchases related to the Italian and French CPS is shown to be quite significant (21% and 14% in volume), which limits the exhaustivity of the consumption insight for these countries. Notwithstanding, Fig. 1 provides some volume and price indicators to compare the different countries home consumption of either fresh "whole fish" and of "fish cuts".

As far as the "*whole fish" retail market* is concerned, the extent of the price range is likely to target a wide category of customers, from the economic point of view.

However, this first conclusion should be relativized, in so far as the cheapest fish segment represented a significant demand mainly in Italy (37,000 tonnes in 1999, versus 10,000 tonnes in

France and less than 3000 tonnes in Great Britain). In Italy, the lower price species range targeted not only small pelagic fish (as in France and Great Britain), but also freshwater salmonids, the price positioning of which was cheaper than in Great Britain and France.

	Italy	France	Great-Britain
Retail market size indicator			
extrapolated purchases	150,000 tonnes (whole fish*) 16,500 tonnes (fish cuts**)	62,000 tonnes (whole fish) 74,700 tonnes (fish cuts)	14,200 tonnes (whole fish) 55,500 tonnes (fish cuts)
Retail price indicators			
average prices	7.3 €/kg (whole fish) 11.1 €/kg (fish cuts)	7.6 €/kg (whole fish) 9.7 €/kg (fish cuts)	6.4 €/kg (whole fish) 9.9 €/kg (fish cuts)
Mini-Maxi	3-12 €/kg (whole fish) (90% below 10 €/kg) 8-15 €/kg (fish cuts)	3-15 €/kg (whole fish) (83% below 10 €/kg) 7-15 €/kg (fish cuts) (97% below 12 €/kg)	4-14 €/kg (whole fish) (96% below 10 €/kg) 5-16 €/kg (fish cuts) (97% below 12 €/kg)
Non specified item			
% of the total purchase	22%	14%	5%
Average price	7.3 €/kg (whole fish†)	6.6 €/kg (whole fish) 11.2 €/kg (fish cuts)	6.7 €/kg (whole fish) 9.7 €/kg (fish cuts)
Segmentation 1	**Whole fish†**	**Whole fish**	**Whole fish**
lower price range	3-5 €/kg (29% market share) *sardine, mullets, trout,salmoned trout, mackerel, anchovy*	3-4 €/kg (16% market share) *sardine, mackerel*	4-5 €/kg (18% market share) *mackerel, herring*
middle price range	6-9 €/kg (27% market share) *8-9 € (seabream & hake; 22%)*	5-9 €/kg (31% market share) *5-6 €/kg (trout & salmon; 24%)* *6-9 €/kg (white fish)*	6-7 €/kg (56% market share) *salmon, trout*
upper price range	9-12 €/kg (19% market share) *seabass (6%), sole (5%)*	9-15 €/kg (27% market share) *hake(5%), seabream, seabass, sole (8%), monkfish(4%), turbot*	8-14 €/kg (16% market share) *flat fish : skate, plaice,sole-lemon sole*
Segmentation 2	**Fish cuts††**	**Fish cuts (fillets, pieces...)**	**Fish cuts (fillets, pieces...)**
lower price range		7-9 €/kg (26% market share) *saithe, trout, ling*	5-9 €/kg (15% market share) *saithe, trout*
middle price range	around 9 €/kg (60% volume) *salmoned trout, salmon*	10-12 €/kg (54% market share) *tuna, cod, whiting, salmon (19%), grenadier*	9-12 €/kg (82% market share) *9-10 €/kg (cod & haddock; 52%)*
upper price range	15 €/kg (35% volume; swordfish)		*11-12 €/kg (salmon (21%), plaice)*

†Total wild fish (swordfish excepted) + farmable "whole" fish.
††Total fillets of seabass, seabream, trouts, salmon plus swordfish.

Fig. 1. Segmentation of fresh fish retail markets in Italy, France and Great Britain in 1999 (source: from Nielsen, Secodip and TNS data).

As regards "middle price" fish, it is worth comparing the structure of the French and Italian purchases. In France, where this market segment made up 31% of the whole fish consumption, salmonids were dominant and clearly less expensive than wild fish (5-6 €/kg versus 6-9 €/kg). In Italy, the share of the "whole salmon" was very weak (3%) and its price ranking was inferior (6-7 €) whereas the bulk of the demand targeted 8-9 €/kg fish, such as seabream and hake.

Then, the market potential for top price species reached respectively 21% and 27% in Italy and France in 1999 (about 34,000 and 17,000 tonnes). As a result of the high increase of farmed seabass in the Italian market, this species has reached the leading market share on the "upper price" segment and offers a more affordable price than in France (less than 10 € versus 12 €), where it still held a niche market in 1999 (2%). In the latter, the most valuable species comprised mainly sole and monkfish in 1999, providing a good insight into the most appreciated fish by the French consumer.

In other respects, *the market for fresh fish cuts* (loose or pre-packed), which meets the demand for more convenient products, covers a smaller range of species, the retail price of which only varies by twice as much.

In Great Britain, the purchases of fish cuts, which represented the core of the fresh fish market in 1999, comprised both natural and coated fish, with a large share of pre-packed products; two features that distinguish the British and the French consumer habits. Moreover, in terms of price and volume

market share, the British home consumption is reported to be more standardised with: (i) a little segment dedicated to the lower price species; and (ii) a large majority of the demand relying on the middle price range (9-12 €/kg). The latter could be subdivided into two segments, the first targeting the most popular fish in Great Britain, i.e. haddock and cod (52% market share; 9-10 €/kg price scale), the second dominated by salmon and positioned at the upper level of the "middle price range" fish.

In France, the diversity of the household purchases, from the species point of view, is quite higher, though the price range of most "fish cuts" is very narrow. At the lower limits of the price scale, the cheapest fish comprise saithe, trout and ling (26% market share in 1999). Then the bulk of the retail market concerns middle range species, the price of which slightly fluctuated around 10-11 €/kg in 1999. The prices of white fish fillets (whiting, cod, etc.) and salmon cuts are shown to be highly competitive, but unlike the fresh "whole fish" market, salmon is the most expensive product. Independently to supply factors which influence the commodity price trends, and hence the relative prices of "white fish" and "salmon", all the evidence suggests that the valorisation of salmon is higher on the "fish cuts" market, where in addition the price hierarchy with trout is reversed, compared to the "whole fish" market. On the other hand, the potential of product diversification through filleting for top price farmed species, such as seabass and gilted seabream has not yet been considered. Even the Italian retail market, which offers significant outlets and lower prices regarding these species, was only slightly involved in the Mediterranean farmed fish processing in 1999.

From these preliminary elements of market segmentation, we could observe some difference in the price positioning of the farmed fish, with respect to the country or to the market segment (whole/cuts of fish). This emphasizes the need for further characterisation of the products purchased, in terms of quality labelling, geographical origin, distribution channels, etc.

Conclusion and prospects

To be complete, the present expertise and presentation of the main results provided by CPS would have to deal with the analysis of the impact of regional and demographic criteria on aquatic food consumption. Yet, the observed differences in the definition of household categories and in the processing method of CPD, with respect to regional and socio-demographic attributes, do not make the intra-European comparison easier. It also may be argued that qualitative information about national food preferences and general consumption patterns is necessary to give a more meaningful interpretation of the consumer profiles observed in the four countries studied and to permit a more detailed analysis of the demand for aquaculture products.

Nonetheless, the preliminary findings developed in the paper as a whole have already stressed the abundance and richness of data provided by consumer panel data, which in return requires time investment and appropriate expertise to be fully exploited. Concurrently, we could measure the complexity of CPD, in their elaboration and meaning. Several methodological issues have been raised, covering the setting up and running of a continuous panel, the registration techniques of the household purchases and the scope of the survey, with respect to both markets and consumer units investigated. In any cross-country analysis the differences in CPS specifications currently lead to evident harmonisation problems. Besides, the emphasis is put on the rationale and level of detail of the seafood categorization, which is a key factor of the ability of CPS to keep track of the market trends of aquaculture products. Even bearing in mind that the structure of the existing typologies reflects national and cultural concerns about aquatic foods, the setting up of a Europanel requires, at least agreement on the definition of common aggregate items. This essential condition to conduct European marketing initiatives in the field of aquaculture should be accompanied in a number of countries with an increase in the detail and a regular updating of the products itemised.

In conclusion, the problems of access to CPD and data utilization by some prospective user groups warrant discussion. Consumer panel data remain perceived as a prohibitively expensive cost, despite their potential benefits to the aquaculture decision-making process. It may be speculated that the perception of a prohibitively high cost of CPS is connected, to a certain extent, to the failure to appreciate and under-utilisation of their results. This highlights the need to advance thinking about the CPD analysis, and to make it more proactive. Indeed, some consumer panel institutes have developed "ad-hoc" outcomes for their customers, to scrutinize household purchasing behaviour and

to address new sets of questions, notably concerning product loyalty, repeat buying and related phenomena. Nevertheless, all evidence suggests that the ambit to look into the complex dynamics of product choice will rely in the future on more sophisticated and costly computerized techniques, and given the speculative nature of such enterprises, support from regular subscribers, public or private representatives organisations may be slow in forthcoming. Thus, it would seem desirable to consider the scope for collaboration between panel institutes, academic research groups and others covering various disciplines, from marketing and other social sciences.

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