Field: Agribusiness

New trends in agro-food market

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Boosting Adult System Education In Agriculture - AGRI BASE

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1. Introduction

A wide variety of individuals, groups, and organizations make choices regarding scarce resources; the most common economic agents are households, firms, and governments. Because we have unlimited wants but resources are limited, we face interesting choices about how to allocate these scarce resources.

Economics is the study of how agents choose to allocate scarce resources and how those choices affect society. Agents may not be aware of all of the ways their choices affect other agents.

Economists describe the choices agents actually make (positive economics) and prescribe or recommend the choices that agents should make (normative economics).

Microeconomists study small pieces of the economy, such as the output, pricing, and hiring decisions of a single firm, or of several firms in a particular market, whereas macroeconomists study the economy as a whole, which consists of many firms in many markets.

Economics is a social science, but economists look at the world differently than do anthropologists, historians, political scientists, psychologists, and sociologists. In particular,

economists highlight three key concepts: optimization, equilibrium, and empiricism. In order to get one thing, we must give up something else; we illustrate this simple trade-off concept with a budget line, which shows all of the combinations of goods that are affordable with one's current income.

For every option chosen, there is at least one option not chosen, and we refer to the best of these forgone options as the opportunity cost. It is often useful to use the value of the best alternative forgone, and if we conservatively value a set of hours spent on one activity, we can imagine those hours spent on a part-time job earning the going wage.

To compare two or more alternatives we identify all of the relevant costs and benefits, compute net benefit (equal to that alternative's total benefit—total cost) for each option, and then identify the alternative(s) with the highest net benefit. Maximizing net benefit is equivalent to optimizing.

Given human nature, it would not be a surprise to find situations in which one can enjoy benefits without bearing one's share of the cost. The authors use lazy roommates (nobody wants to clean up) and turnstile jumpers (who enjoy using the subway without paying) as examples of free riders.

1. Section 1

Demand, Supply and Equilibrium

A perfectly competitive market is characterized by (i) many insignificant individual buyers and sellers, and (ii) homogeneous products, we expect price taking behavior and transactions to occur in a "take it or leave it" style at the single market price.

Demand Curves—Typical demand curves are downward sloping, which means that as the price rises (falls), the quantity demanded falls (rises). This negative relationship between price and quantity demanded is so common that we refer to it as the Law of Demand. The height of a demand curve reflects willingness to pay.

A total demand curve is found by horizontally adding individual demand curves. Intuitively, the total quantity demanded in the market at a specific is equal to the quantity demanded at that price plus the quantity demanded at same price by another person, and so on.

The market demand curve is found by horizontally summing the individual demand curves for all of the potential buyers. A change in the price of a good causes movement along the demand curve, whereas a change in one of five major demand determinants causes the entire demand curve to shift.

The other half of the supply and demand diagram is the supply curve, which is based on profit-maximizing decisions by potential suppliers, who determine how many units to supply at any given price.

An individual producer's supply curve shows the quantity supplied at different prices. In the vast majority of cases, the supply curve slopes upward, reflecting the positive relationship between the two variables known as the Law of Supply: at higher prices, more projects become profitable, and the firm supplies a higher quantity. Equivalent to marginal cost, willingness to accept (WTA) is the lowest price at which a seller will produce and sell an additional unit.

The market supply curve is found by horizontally summing all of the individual supply curves. When the price changes, we move along the market supply curve; in contrast, the entire supply curve shifts when there is a change in one of these four variables:

1. prices of inputs used to produce the good

2. technology used to produce the good
3. number and scale of sellers
4. sellers' beliefs about the future

Putting together the two curves gives us the familiar S&D diagram, which features a competitive equilibrium characterized by a competitive equilibrium price (CEP) and a competitive equilibrium quantity (CEQ). At prices above the CEP, we expect an excess supply and market forces acting to reduce the price. At prices below the CEP, we expect an excess demand and market forces acting to increase the price.

Economists use the S&D diagram to analyze events that shock either supply or demand. Once we know how to analyze one shock, we can analyze a pair of shocks by analyzing one and then the other.

Elasticities

Elasticity measures the sensitivity or responsiveness of one economic variable to a change in another.

The price elasticity of demand measures the percentage change in quantity demanded of a good due to a percentage change in its own price. The magnitude of Price Elasticity of Demand (PED) allows us to categorize it as perfectly elastic, elastic, unit elastic, inelastic, or perfectly inelastic. It is useful to know that PED varies along a downward-sloping, linear demand curve, and at that demand curve's midpoint, there is unit elasticity. PED differs across goods based on the closeness of substitutes, the budget share spent on the good, and the available time to adjust.

The Cross PED (CPED) measures the percentage change in the quantity demanded of a good due to a percentage change in the price of another good. The Income Elasticity of Demand IED measures the percentage change in the quantity demanded of a good due to a percentage change in income.

2. Section 2

Food consumption in the European countries can be summed up in four major points: (1) the proportion of expenditure allocated to food is decreasing and has reached very low levels; (2) the achievement of a certain calorie threshold, beyond which people do not increase their food consumption; (3) a shift in food consumption structure; (4) changes in consumption patterns, which correspond to an increase in the relative quantity of food consumed away from home. The first point is not surprising, since it is a generalized phenomenon of the macroeconomic growth in Europe. The second point it is the result of what happens in the richest countries, where quality is preferred to quantity, since people want to eat better as their food expenditure diminishes. The third point is generally characterized by the so-called nutrition transition and although there are several differences among countries which are influenced by distinctive aspects and also by their cultural and historical evolution. Similarly, the last point is also common to all countries, even though its intensity presents variations among countries and labor circumstances (Gracia & Albisu, 2001).

3. Changes in Food Consumption Models

According to Malassis the evolution of food consumption passes through the following three models: a traditional model, an agro-industrial model and, finally, a 'satiety' model. In the traditional model, the importance of food consumption acquires a remarkable level in households expenditures and it is still characterized by high levels of personal consumption which are typical of rural households. The development of the industrial transformation and the internationalization of markets brings to high consumption levels in caloric terms and mass consumption of standard products increases along with their included services. The traditional meal structure changes and people also start to consume meals away from home, instead of just eating at home. The internationalizing processes of economies are starting to produce their effects in terms of an increasing availability of food goods, moreover, these are less affected by the seasonality. The 'satiety' consumption model, defined by Malassis, corresponds to an extreme version of the agro-industrial model. It is characterised by the saturation of caloric consumptions and the growing importance given to health and hedonistic properties of food.

This is connected to a tendency of differentiation in consumptions, whereas the household expenditure for food is decreasing in relative terms. The saturation process, that happened in all developed countries, has brought to a loss in terms of importance of the income as explicative variable of food consumption. Moreover, it has brought to substitution effects and higher competitiveness among food goods. Recent nutritional trends modify the 'satiety model' due to several overlapping factors which bring to a more fragmented and differentiated food-market. Food-quality and food-safety have become the main elements in the evolution of consumptions. Specifically, the research of quality has developed among the consumers an interest in typical goods, that has created many market niches. The demand of quality products recalls to the concept of food safety, which is a fundamental requirement especially after the food diseases occurred in the 1980s and 1990s. In the last years, an increasing attention has been paid to nutrition and health and this explains why the nutritional and healthy features have been used to sell products. The influence of international processes has contributed to the deseasonalization of food consumptions, but, on the other hand, has brought to a major awareness and attention at the sustainability of production among consumers (Fanfani, 2009).

4. Food consumption determinants

The food chain is divided in three levels: consumers, food manufactures and retailers. At each step there can be plenty of food determinants, and their importance varies significantly over time and space. The situation of the agri-food industry and the distribution channels in each country affect consumption trends and patterns in Europe. Consumers are the most important agents in determining food consumptions, therefore their characteristics, attitudes and behaviour influence the food consumption determinants.

Consumers

Consumers cannot and are not willing to eat more, but their food demand is shifting among different products. Nowadays food consumption is a matter of choice, and great efforts must be carried out to attract consumer food choice' (Gracia & Albisu, 2001).

Socio Demographic Characteristics

Socio demographic characteristics are important to explain consumers' behaviours and preferences. In fact, in the last year, per capita food consumption, in quantity terms, has changed only slightly in Europe, especially referring to the EU-15. European consumers prefer to buy more added values products. In the last years European population growth is stable, therefore there are just few potential consumers and more elders. It was estimated that, in the last decade, most significant changes occurred in the 20-29 age group, facing a large decline in population, and the 65 and over age group, facing a large increase (Gracia & Albisu, 2001). Older consumers tend to reduce their energetic intake and usually, they prefer eating more traditional foods. Moreover, they rarely try new food products or take-away meals, preferring the food products they used to eat in the past. Generally, elders are more concerned about their health and for this reason they allocate a greater share of their income to buy fruits and vegetables, consuming less fats (Gracia & Albisu, 2001). Another change in demographics has been caused by the recent immigration flows that affected especially EU-15 countries. Generally, Northern African and Middle Eastern people have arrived in the old continent, carrying different cultures and traditions. The majority of these immigrants believes in the Islamic religion which requires some restrictions in food consumption, such as alcohol and pig-meat. Moreover, it is required to slaughter the meat through the traditional Islamic procedure.

The average household size in EU is diminishing whereas the total amount of household is increasing, that means single-person household are increasing. In general, those households are composed by two different categories: elders who live alone or young people. Usually, the latters are more willing to take ready-to eat meals. In the last decades, thanks to wider education opportunities and anti-gender discriminations laws, women moved into paid work . However, women are still largely in charge for family nutrition and main family meal planners. This brought to two majors evidences, the increased real household incomes – at least at the beginning – and a lesser amount of time for cooking. The consequences are a higher demand in convenience food and ready-to-eat meals, and the increasing number of meals consumed away from home. After these considerations in changes of the consumer characteristics (growing income,

ageing population, smaller households, increasing number of working women, etc.) it is evident that European consumers at have shifted their preferences to added-value food products.

Demand for Quality

The market requires quality: all the agents in the agri-food chain claim that market demands quality products. However, quality is a complex word that involves many different aspects. There are also many definitions, the most significant of which is the one provided by the International Standard Organisation, since they have developed several Quality Standards. The mentioned definition is: "The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs." According to this definition, many features of food products are able to satisfy such requirements. Besides these characteristics, also other aspects closely linked to the product, such as the places where it is sold or the services provided, may satisfy their implied needs. Eventually, such perception of quality is related to the final price, which the consumer is willing to pay. In fact, the consumer decides to buy a food product depending on its food attributes, such as smell, taste, appearances, convenience, nutritive and healthy aspects, packaging, etc. From now are briefly presented the attributes related to **product development, convenience, sustainable issues, health and safety concerns** since they influence consumers' quality perception. New products are launched to the market constantly in order to improve costumers' satisfaction. An interesting European tendency is the introduction food products from other cultures, thanks to many cross-cultural expositions. In particular, **new** four **food types** are interesting in the latest years: functional foods, which possess a hypothetical metabolic and regulatory (physiological) role, which is major than the one contained in common foods. The consumption of such foods brings to a final result which is controllable and positive for man's health; special dietetic foods, which are formulated to satisfy determined dietetic needs due to specific physical conditions, pathologies and disorders; enriched or fortified goods, which present the addition of nutrients in order to prevent or adjust proven lacks of nutrients in a specific group of people; dietary supplement, which are formulated in order to complement the diet in case it presents a lack of nutrients or when these increase their requirement.

An attribute that is increasing in consumers' preferences is a better **convenience** and functionality. For instance packaging is becoming an important component of the product appreciation. In fact, a smaller or bigger packaging, for a single use or an environmentally friendly envelope could improve their perceived quality. Convenience is especially related to time saving, the changing in the society brought to an increase in the demand of ready-to-eat, highly prepared foods, such as bakery and frozen food. It is worth noting that in 2001 the expenditure on processed food represented 43.7% of total food expenditure in the EU, and it was expected to rise in later years (Gracia & Albisu, 2001).

In recent years ethical standards of food products are becoming important choice criteria for many consumers. In this regard, there is ample evidence suggesting that not only do consumers care about the physical properties of the food they eat but also about other social and ethical issues such as how the food is produced, who benefits from their purchase and where it comes from. Such interest is apparent in the increasing demand for organic and local products, which are mostly characterized by ethical attributes. Local and organic products may be categorized as '**sustainable produced food'** since they reflect two different components of sustainability: a social component related to the integration of the support of the agro-food sector with the priorities and needs of citizens and an environmental component relating to sustainable use and management of the natural resources.

Consumers are increasingly interested in **healthier food products**, such as natural, low fat, functional, fortified and home-produced products. Costumers who buy these type of foodstuffs recognise an higher quality in such products. The **food safety** attribute is usually taken for granted by European consumers, but recently the confidence on food safety have been damaged by several scares, such as the BSE epidemic, salmonella, swine fever and bird flu. These worries brought to a stricter regulation, for instance, after the BSE epidemic, an improved and stricter labelling policy was introduced in Europe, which allows tracing all the passages occurred in the supply-chain. In general EU commission have played an active role in promulgating regulations in order to give consumers more tools and information. The increased health concern of consumers prompts to select food

based on its nutritional properties. A significant relationship between diet and chronic diseases has been pointed out in recent studies.

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5. Section 3

Unsustainability of the Current Food System

Given escalating rates of obesity and diet-related diseases, excessive food miles, food scares and food insecurity, the spread of fast food culture, and in-creasing food waste—all of which have consequences for global climate change—the western food system is clearly unsustainable . To achieve sustainable food consumption, the problems of both over- and under-consumption must be con-fronted, together with food-safety issues in affluent societies and food-security issues in poorer regions. This section therefore briefly reviews the environmental, aspects of food consumption and the key challenges that constitute contemporary public debate.

Environmental Aspects

Food consumption is one of the private consumption areas that has the largest impact on the environment; among the EU-25 countries approximately one-third of households' total environmental impact—including energy use, land use, water and soil pollution, and GHG emissions—is related to food and drink consumption . The overall impact and private household space for manoeuvring, however, also depend on the decisions of other actors in the production chain, whose roles and responsibilities are highlighted below.

2.1Agriculture

The main environmental effects from food arise in the primary production stage. Agriculture is a major source of such impacts through land usage and soil degradation, water consumption, eutrophication and water pollution, monocultures that cause biodiversity loss, and introduction of hazardous chemicals through synthetic pesticides and mineral fertilizers. In terms of energy use, agricultural production is responsible for about 30% of the food sector's total energy demands , 40% of which result from the production of chemical fertilizers and synthetic pesticides . Another more indirect cause is the production of cattle fodder , which in terms of primary production accounts for nearly half of the GHG emissions from food consumption. Simultaneously, climate change is dramatically affecting agriculture and will do so increasingly. Yet research on the environmental impacts of organic production shows that, depending on the products involved, organic farms use 50 to 70% less energy (direct and indirect) per unit of production than conventional farms, mainly as a result of different fertilizer use. Organic

production also has clear benefits for biodiversity on agricultural land, although lower yields may mean that a larger land area is required than under conventional production methods. In milk production, however, the advantages are less clear, primarily because of the higher output of conventional dairy farming and the higher GHG emissions from grass-fed cattle. Nevertheless, animal treatment is typically better on organic farms, and cows are less likely to be lame or stressed or to carry disease .

2.2 Industry

Because the food industry encompasses all stages of the value chain beyond the farm gate and before food purchase and consumption, it includes manufacturers, wholesalers, retailers, and food-service providers. The activities of this industry can degrade the environment in numerous ways, including through the generation of air emissions from grinding grain, bulk-product transfers, and silo vents; the contamination of land from accidental oil spills and past site use; the creation of noise pollution from food-manufacturing equipment, grinding machinery, and packaging lines; the (over)use of resources such as water, energy, and food-packaging materials; the disposal of out-of-date products, peelings, animal by products, food packaging, food-manufacturing equipment, and effluent-plant sludge; and the discharge of water from effluent plants, accidental spills, and cooling towers. Within the UK, for instance, the food industry accounts for 14% of the energy consumption by all businesses, seven million tons of carbon emissions per year, about 10% of all industrial use of the public water supply, approximately 10% of the industrial and commercial waste stream, and 25% of all heavy goods vehicle kilometres .

Consumers

The environmental impacts of food consumption in households, restaurants, schools, and other institutionalized settings result mostly from the handling and preparation of food, that is, storage (primarily freezing), cooking, and dishwashing. The choice of diet and food types, however, is also relevant in that, for example, (red) meat and dairy products cause by far the highest GHG emissions. In fact, within the EU-25, meat and meat products contribute to be-tween 9 and 14% of total releases, with the second most relevant food products being milk, cheese, and all types of dairy products . Cereals, fruits, and vegetables, in contrast,

contribute comparatively low levels of GHG emissions. In terms of storage, cooking, and dishwashing, the environmental impacts depend in particular on the energy efficiency of the relevant household appliances. Another factor that effects the environment, one too easily neglected by consumers, is the means chosen for the "last mile of transport" . That is, the tendency to travel by car to out-of-town supermarkets for food purchases counteracts consumers' own interest in environmentally sound grocery shopping, a typical "tragedy of the commons" situation where individual and social interests stand in contradiction. Finally, at the very end of the food chain, the main issue, as previously discussed, is waste and discarding of food.

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Section 4

Over the last years, consumer purchasing behaviour towards fish and seafood products has been capturing the interest of researchers internationally for political and economic reasons related to aspects of nutrition and diet, food safety, sustainability and business of the fish industry. Fish and seafood are widely accepted to be an essential component of a balanced and healthy diet because they have a low fat content and provide high quality proteins as well as many micronutrients such as vitamins and minerals. In particular, fish and seafood are the primary dietary source of long chain polyunsaturated fatty acids (LCPUFAs or Omega-3), including eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), which provide various health benefits such as decrease in the risk of getting cardiovascular diseases (FAO/WHO, 2011). According to the International Society for the Study of Fatty Acids and Lipids, an intake of about 500 mg of EPA + DHA per day would be expected to reduce the risk for death from coronary heart diseases in healthy adults significantly. This intake can be achieved by consuming at least two servings of fish (particularly fatty fish) per week. However, despite the strong growth in world fish consumption recorded in the last decades, the recommended fish intake is not widely achieved. The same is also true of industrialized countries where the highest world per capita fish consumption (27.4 kg/year, live weight equivalent) is observed. This happens because of countries' and regions' differences in terms of quantity and frequency of fish consumed, which reflect different levels of availability of fish and other foods as well as heterogeneity of consumers' preferences. Therefore, since public health authorities are interested in promoting fish and seafood consumption in order to improve public health, it is important to learn which are the main factors influencing consumers' behaviour towards these food products. The reasons discussed so far highlight that in a market driven by the demand a better understanding of consumer purchasing behaviour towards fish products is paramount to developing more effective marketing and policy strategies. This study synthetizes and organizes the main findings of recent research on consumer purchasing behaviour towards fish and seafood products.

6. Drivers and barriers of fish consumption

Studies focused on drivers and barriers of fish consumption often introduce this topic highlighting three questions: i) eating fish provides very important health and nutritional benefits; ii) the recommended fish intake is not widely achieved; iii) interventions aimed to increase fish consumption are needed in order to improve public health. The main drivers identified are the sensory liking of fish, perceived health benefits and fish eating habits, while the most important barriers are the sensory disliking of fish, health risk concerns, high price perception, lack of convenience, lack of availability of the preferred fish products, and lack of knowledge in selecting and preparing fish. Because these factors can actually be drivers and barriers of fish consumption at the same time, their positive and negative aspects will be discussed in the same subsection.

2.1 Sensory perception

Sensory characteristics of fish such as taste, smell and texture are expected to be key determinants of fish consumption and they are also extremely important to especially evaluate the freshness of this product. However, since sensory characteristics are product specific, it is very difficult to find studies that investigate these aspects for a heterogeneous food category including all fish and seafood products. For this reason, the "attitude towards eating fish" has been used as a proxy of sensory perception in several studies. This is because an attitude is a psychological tendency to evaluate objects with some degree of favour–disfavour, satisfaction– dissatisfaction and, thus, it can be positive (liking) or negative (disliking). Obviously, it is expected that the more positive the consumer's attitude to eating fish, the more likely it is that a consumer eats fish. Several studies found that attitude towards eating fish is strongly and positively correlated with fish consumption frequency, and in some of these studies attitude towards eating fish emerged as the most important predictor of fish consumption variations. Clear evidence is also provided that the majority of consumers show a positive attitude towards eating fish and thus consider fish consumption as a pleasant experience, even though with different levels of intensity. In particular, the attitude towards eating fish seems to be more positive in older people, in consumers with higher health involvement and in consumers who are more knowledgeable about fish. For the minority of consumers who dislike the taste of fish and show a negative attitude towards eating fish, the aspects of fish which drive dislike are mainly

related to the unpleasant taste and smell (including smell while cooking) as well as the presence of bones. Several studies revealed that consumers who do not like eating fish, as well as consuming less fish themselves, may affect negatively on the level of fish consumption of their family, considering that who is responsible in the household is not willing to prepare fish meals and then receive negative feedback. Empirical evidence that seafood consumption of households is negatively affected by pressure from some members (especially children aged under the age of 10 and adolescents) who do not like eating fish has been provided by several studies.

2.2 Health beliefs

Although regular fish consumption is linked to several health and nutritional benefits, a number of contaminants may be also associated with fish including chemicals, metals and other substances as well as potentially harmful microbes. Therefore, consumers may at the same time perceive both health benefits and health risks of eating fish with expected antagonistic effects on their behaviour. Concerning health benefits, several studies demonstrate that fish and seafood are widely perceived by consumers as healthy foods with a number of specific health and nutritional benefits mainly associated with the high content in proteins and Omega-3 fatty acids together with a low fat content. These findings probably reflect both consumers' beliefs about these products and the action of information measures (e.g. information campaigns, labels, advertising, etc.) promoted by governments, consumer organizations, health professionals (e.g. dieticians), retailers and private seafood companies in many countries all over the world. Currently, the positive consumers' perception of fish in terms of healthiness and nutritional value seem to be so strong that it could not be further increased by exposing consumers to messages stressing health benefits of fish consumption. However, while many consumers believe that fish is healthy, knowledge about specific health and nutritional benefits of fish consumption does not appear to be very strong. Only a low percentage of consumers (mainly older and well educated) really know about the specificity of nutrients contained in fish (particularly, Omega-3 fatty acids), positive health effects (e.g. heart disease protection) and species of fish containing higher or lower amounts of different nutrients delivering health benefits such as Omega-3 fatty acids, iodine,

phosphorus, etc. Furthermore, some studies show that these factors are not able to significantly explain much variation in fish consumption because most people have the same positive opinion about fish. Conversely, overall motivational aspects of consumers such as "general health involvement", "interest in healthy eating", "healthy eating habits" or the belief that "diet is important for health" seem to be more effective factors in explaining fish consumption variations. A significant and positive relationship between "health involvement" of consumers and their seafood consumption was observed in some studies, while in others fish consumptionwas found to be positively affected by consumers' interest in healthy eating. In addition, the moral obligation for family's good health on behalf of consumers in charge of shopping was found to be positively correlated with fish consumption because these people could encourage household members, especially children and teenagers, to eat more fish. These motivational factors appear to be stronger in older and well educated consumers. In addition, it was observed that people who perceive their own health as being relatively low or are concerned about their health having specific requirements about what to eat and how to stay healthy also show high interest in healthy eating. Many consumers are also concerned about health risks related to the presence of chemical contaminants and microbes in fish products.

2.3 Convenience perception

Similarly to other food products, fish consumption is expected to be influenced by consumers' needs for convenience, i.e. the desire to save time and effort in food preparation. With respect to this factor, consumer behaviour should change in relation to the consumption of fresh and processed fish products. The former is expected to be perceived as difficult to prepare, while the latter could be perceived as a quick and easy meal option. As regards fresh fish, focus group discussions conducted in Italy, Denmark, Norway, Iceland, Belgium and Spain revealed that although participants wanted to consume fish more frequently most of them were concerned with the time and effort required in fish preparation. These results are corroborated by a study conducted in Australia where 17% of respondents who considered fish difficult to prepare also stated low fish consumption. Furthermore, several studies agreed that the perceived inconvenience of fish is higher in younger rather than in older people. Other studies

focused on the comparison between convenience of fresh and processed fish products confirmed the lack of convenience for the former and convenience for the latter. For example, in Australia, frozen and canned fish products as well as ready-to-eat fresh fish filletswere viewed as highly convenient products (ideal for "emergency meals"), while whole finfish and crustaceanswere seen as requiring a large amount of time and greater effort to prepare. Thus it is likely that difficulty of preparation coupled with a busy lifestyle might be particularly detrimental for unprocessed fish consumption because of time constraint even when cooking is appreciated.

2.5 Self-efficacy in the fish preparation process

The preparation of fish, particularly fresh fish, often requires a high degree of "self-efficacy" which refers to how competent a person feels in doing what is necessary to manage a specific situation, and thus reduce uncertainty. In the case of fish preparation, self -efficacy depends on the levels of knowledge, experience, expertise and self-confidence, firstly, in evaluating the quality of products at the place of purchase and, successively, in cooking them at home. It is expected that low levels of self-efficacy in managing the entire fish preparation process may affect fish consumption negatively. Qualitative research conducted in Italy, Denmark, Norway, Iceland and Australia indicates that low self-efficacy is a relevant barrier to fish consumption. An Australian study found that 41% of respondents did not know how to recognize the freshness of fish, 29% did not know how to select fish and 25% stated they were not familiar with preparing fish at home. Another Australian survey revealed that 42% of respondents considered freshness and quality of fish more difficult to assess than meat products, 34% would buy more fish if they were more confident in evaluating its quality and 25% stated they were not confident to prepare fish at home. There is a direct relationship between age and self-efficacy in the fish preparation process. It is likely that knowledge, skills and self-confidence for managing fish consumption process are progressively acquired in the course of life by accumulating experiences with the same behaviour.

2.6 Price perception

Fish and seafood include a variety of products sold at very different market prices where the difference between cheap bluefish (anchovies, sardines and mackerel) and expensive lobsters or oysters can be very wide. Despite the large range of prices available to consumers, fish products seem to be widely perceived as more expensive than other sources of proteins and considered less "filling" than meat. Belgian and Spanish consumers perceive that there are no cheap species/forms of fish compared to meat, whereas sausages or minced meat are seen as cheaper alternatives to roasts. In Denmark, Iceland, Norway and Australia, many participants of focus groups stated that they perceived fish as being too expensive and thus making price as one of the most relevant fish consumption barriers. However, in these studies, it is not clear whether the perception of high price actually affects fish consumption negatively.

2.7 Fish availability

Fish consumption may be also strongly affected by the availability of fish assortment. This happens because when preferred fish products are not available, the available alternative fish products may appear to be weak substitutes and thus consumers may decide not to buy any fish products. Two studies, carried out respectively in Denmark and Norway, investigated this issue in depth and demonstrated that the size of "consideration set" had a significant and positive effect on fish consumption frequency. The consideration set was defined by the number of fish product alternatives in terms of different species, conservation forms (fresh, frozen, salted, dried, canned, etc.) and ways of preparing (cooked, fried, grilled, etc.) taken in consideration by consumers before purchasing fish. In other words, the more fish product alternatives are available to consumers, the more likely are close substitutes chosen. Therefore, a limited availability of fish product alternatives reduces the potential size of the consideration set and consequently fish consumption frequency. Furthermore, as expected, the size of consideration set was found to be affected positively by knowledge and attitude towards eating fish, and negatively by convenience orientation and perceived inconvenience of fish. The negative impact of the limited availability of fresh fish products on fish consumption is also confirmed in other studies.

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7. Section 5

A **functional food** is a food in which was demonstrated the ability to interact positively with one or more target function in the organism in order to obtain a significant improvement in the state of health and well-being and / or a decrease of risk effect of chronic diseases.
The term was first used in Japan in the 1980s where there is a government approval process for functional foods called Foods for Specified Health Use (FOSHU).
The first Project of the European Commission in 1996 was Functional Food Science in Europe (FU.FO.S.E), in order to establish and develop a scientific approach based on the evidence in support of the development of food products that can be defined Food Functional. In 2005 European Union promoted the PASSCLAIM Project with the aim of identifying the criteria for the scientific validation of health claims. Recently the European Union introduced Regulation (EC) No. 1924/2006.
EU Regulation (EC) No. 1924/2006 employs as working definition of functional product that proposed by Diplock et al. (1999), which defines functional food as any modified foods or food ingredients which may provide a health benefit beyond nutrients they contain'.
The "EU Regulation 1924/2006 on nutrition and health claims made on foods" entered into force on 19th January 2007 gives a clear distinction between *nutritional claims* (article 8) and *health claims* (articles 13 and 14). Nutritional claims under article 8 state or suggest that a food has beneficial nutritional properties (i.e. "high in Calcium", "low fat", "sugar free") and shall only be permitted if they are listed in the Annex I of the EU Regulation 1924/2006 and are in conformity with the conditions set in this Regulation.
Health claims are defined as "any claim that states, suggests or implies that a relationship exists between a food category, a food or one of its constituents and health", for instance a food that "contributes to the maintenance of normal bones" or "can help to reinforce the immune system".
Health claims under article 13.1 are referred to as "general function" health claims and are concerned to the role of a nutrient or substance in growth, development and body functions or psychological and behavioural functions or slimming and weight control, satiety or reduction of available energy from the diet. To be included in the Community list of permitted health claims, the claims shall be based on generally accepted scientific evidence and well understood by the average consumer
Between July 2008 and March 2010 the European Commission, after examining over 44.000 claims supplied by the Member States, submitted a list of 4.637 "general function" health claims to European Food Safety Authority (EFSA) for scientific evaluation. At the end of June 2011 EFSA finalised the evaluation of the "general function" health claims and

published 341 opinions providing scientific advice on 2.758 "general function" health claims. Some claims, 74 for micro-organism considered to be not sufficiently characterised and 17 for insufficient evidence to establish a cause and effect relationship between the consumption of the food and the claimed effect, were submitted to EFSA for further assessment, the consolidated list of Article 13.1 health claims was published on June 2012.

"New Function" health claims under article 13.5 are based on newly developed scientific evidence and/or for which protection of proprietary data is requested. For these health claims the Member States require authorisation on a case-by-case basis submitting a scientific dossier to EFSA for assessment.

Claims under Article 14 are claims relating to the reduction of disease risk or to children's development or health and, as Article 13.5, require an individual application for authorisation.

For a number of general function health claims (art. 13.1) the Authority concluded that, on the basis of the data submitted, a cause and effect relationship has been established between a food category, a food or one of its constituents and the claimed effect. Health claims corresponding to those conclusions are included in a list of permitted health claims and enclosed in the EU Regulation n.432 of 16 May 2012 that represent the most recent issue about the clarification on the right use of health claims (Regulation (EC) No 432/2012).

This Regulation was applied by the European Commission from 14 December 2012; from that date it was bonding and directly applied in all Member States. It includes the wording of the claims and specific conditions or restrictions of their use.

It is very important to underline that this new Regulation brings out the first list of 222 health claims under Article 13.1 approved by European Commission on the basis of EFSA opinions. So by very few mouths food companies in each Member State are obliged to conform claims labelled of their products to the new indications. The process of validation of these claims was longer and harder than the expectation and after ten years by the Reg. 1924/2006 coming into force only 222 on 2.758 pre-selected claims was authorised, so about 90% of request received a negative opinion.

On the contrary health claims under Article 13.5 and Article 14 require individual submission of applications to support the claims and undergo individuals evaluation by EFSA. The Panel received to date 48 applications for the Article 13.5 (13 have been withdrawn, 8 have been rejected and 27 scientific opinions have been adopted) and 268 applications for the Article 14 (103 have been withdrawn, 90 have been rejected and 75 scientific opinions have been adopted). In total 102 health claims on 316 submissions have been adopted, so about 70 % of received request.

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EU Regulation 1924/2006

EC Regulation No 432/2012