

# Comparison of Seafood and Agricultural Ecological Premiums<sup>1</sup>

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## Summary

The report compares ecolabelled seafood premiums observed in the market with consumers' stated willingness to pay premiums. Also ecolabelled premiums in the agricultural sector were examined. The next issue addressed was the sensitivity of changes in the price and premiums of ecolabelled seafood. Empirical findings showed that all things being equal, consumers stated willingness to pay reflects in their actual market behavior though they may pay less than stated. Premiums observed in the aquaculture (24-38%) appear to be generally higher than the fisheries (10-13%). Stated premiums for environmentally sound seafood production however ranged from 15-50%. In the agricultural sector, revealed premiums mostly seem to lie in range of 10-50% with few extremes and stated premiums in the range of 4-300%. Fresh and perishable organic food products tend to attract higher premiums. Stated premiums were conditioned on a number of factors but most evident was consumer's level of knowledge about ecolabel programs and the aesthetic quality comparable to conventional products. Though premiums varied by consumer segments, reduction in premiums were associated with increase in the number of consumers eager to switch to organic products. Also ecolabelled agricultural products generally appear to be more elastic than conventional products, an indication that reduction in prices would increase the market demand.

## 1. Introduction

Ecolabelling is a voluntary market based incentive created to reward producers who practice environmental or ecological sound principles. Consumers have generally shown positive attitudes towards the patronage and valuing of eco-food products. However, skepticism remains whether consumers have translated their willingness into real purchasing behavior. In this paper, evidence on consumers' willingness to pay premiums and the real premium paid on ecolabelled seafood products are gathered and compared along with other ecolabelled agriculture premiums. Furthermore, empirical evidence regarding the sensitivity of consumers to price premiums and the price elasticity of demand or price flexibilities for ecolabelled products are considered. This is important because information on price differentials between ecolabelled and conventional products are useful but not sufficient for policy purposes, needed in addition is the price sensitivity of demand. It gives information on whether the barrier of high ecolabel prices can be reduced to increase demand. The price elasticity is theoretically assumed to be equal to the reciprocal of the direct price flexibility estimated from inverse demand systems. However, in practice the reciprocal of the price flexibility is absolutely less than the true elasticity for reasons not discussed here (Nielsen, 1999 and Houck, 1965). Also of interest is the

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deduction from literature if the degree of premium paid varies with the degree of attributes associated with the ecolabel. For instance, are consumers' valuations of ecolabels with few attributes such as the MSC the same as Organic labels which have more strict requirements and principles? Sustainable or ecolabelled food products considered in this study are defined as products that have been produced under a set of standards that address environmental issues, animal welfare and/or social justice concerns, making it fit for a seal or logo.

The aquatic environment has not been immune to the movement of sustainability from various factions consistently raising concerns about the overexploitation of resources and its effect on the environment. The demand for seafood<sup>2</sup> is on the increase as the per capita global fish consumption changed from 10kg to 19kg from 1960 to 2012 (FAO, 2014). However, fish stocks in the oceans are depleting. This is driven by the fact that traditional command and control techniques are insufficient on their own to effectively address the challenges facing the fisheries industry, especially overexploitation (Roth et al., 2001). In attempt to meet the global demand for fish food, aquaculture has also evolved and production growth has been quite tremendous. It is anticipated that within the next few years fish demand from aquaculture would bypass the capture sector (ibid). The practice of fish farming has also come with various negative externalities that have been documented in literature (rf. Xie *et al.*, 2013; Biao and Kaijin, 2007).

In order to maintain ecological balance, ecolabelling that rely on independent third-party verification that products meet certain environmental standards (Wessels, 2001) has been the tool used to create market based incentives for better management of the environment (Roheim *et al.*, 2011). Ecolabels can be classified under one of the purposes of food labelling identified by Albert (2014); protect and promote health, protect the environment and promote sustainable production, promote social well-being and protect culture and in relation to new technologies. Ecolabels can also be classified by the degree or intensity of requirements needed to be observed. Within the seafood industry, Thrane *et al.* (2009) distinguish between single attribute and multi-attribute ecolabels. An example of the single attribute is Dolphin Safe Tuna which minimizes/avoids by-catch in fisheries. The multi-attribute was also disaggregated into those focusing on the environmental impact at the fishing stage (e.g. MSC) and those focusing on the entire life-cycle of the product chain (e.g. KRAV in Sweden). An organic label in the seafood industry is only possible in aquaculture and also focuses on the entire product chain. In most countries, aquaculture and agriculture fall under the same labelling system possibly due to high level of consumers' confidence in known labels (e.g. the red-Ø in Denmark, KRAV in Sweden, Naturland in Germany). The KRAV and Naturland which are organic in origin have also designed standards for fisheries. A question left for future inquiry is that given these different standards under the same label/logo, would consumers value organic aquaculture the same as fisheries ecolabels or as organic agriculture?

Other known labels are the Soil Association (UK), Label Rouge (France), Marine Ecolabel Japan and the now up and coming Aquaculture Stewardship Council founded in 2010. The most celebrated and studied seafood ecolabel is the MSC founded in 1997 with the coalition of World Wildlife Fund and Unilever. In 2014 for instance, the number of fisheries engaged in the MSC program was over 300 collectively accounting for 10 percent of global annual harvest of wild capture fisheries. The retail market value grew to \$4.8billion in over 100 countries (MSC, 2014). MSC is attributed a success in the creation of sustainable fish market rather than sustainable fisheries (Ponte, 2012), due to its inability to prove that its certification system has had positive environmental impacts and the marginalizing of fisheries in low income countries (ibid; Ponte, 2008).

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<sup>2</sup> Seafood - although has the word sea, which denotes marine origin – typically refers to all fish products such as shellfish and row, irrespective of the source ; aquaculture or wild caught, marine or freshwater (Cooke et al., 2011)

Complying with the standards set for ecolabels comes with tradeoffs for producers that could result in reduced output, increased input costs and hence lost profits. Besides, the certification process also comes with associated costs. The implication is that consumers who opt for the environmentally friendly products need to compensate producers for the extra costs internalized to ensure continual protection of the ecological base. Hence, the necessary condition for price premiums is consumer's ability to differentiate products at the retail level (Blomquist et al., 2014) which is achieved with ecolabels. However, one should note that observing a premium at the downstream does not necessarily imply transmittal to the upstream level (Roheim *et al.*, 2011 and Sogn-Grunvåg *et al.*, 2013), neither does it provide any information about the supply chain cost structures (Sogn-Grunvåg *et al.*, 2013). The existence of premium on ecolabels is an indication that consumers obtain higher utility when they consume ecological food products. Likewise firms make higher profits and though sustainable production may not be achieved as pointed by Ponte (2012), it seems rational to keep providing food products with ecolabels to the market. The concerns raised at the beginning of the paper are addressed and where possible, intuitions and motivations for the observed premiums given. In the next section, a brief description is given about the structure or methods under which the study is organized, followed by the empirical evidence review and finally the conclusion of the paper.

## **2. Methods**

This review was purely based on desktop literature search of peer reviewed journals and on few cases working papers or grey literature were included if found relevant. Much concentration was given on the European countries and where lacking other geographic areas added. The premiums reviewed were grouped under revealed and stated premiums for seafood and nonseafood (agriculture) products. Revealed premium shows those estimated from actual market purchases while the stated are estimated from consumers' willingness behaviors without actually purchasing the product. Data for the revealed approach were generally obtained from firms, retail scanner data and in-store personal observation while the stated ones were from consumer surveys and choice experiments done in person, mail, telephone or online. Consumer responses to price premiums were reviewed from stated preference studies while price elasticity/flexibility of demand was estimated from total market demand methods. Studies for ecolabelled agricultural products dominate the literature while the seafood is limited. No study was identified in relation to price elasticity of ecolabelled seafood possibly due to the fact that the ecolabelled seafood market is still young limiting data availability.

## **3. Empirical Evidences of Ecological Price Premiums**

In this section, evidence on ecological premiums and price sensitivity are presented by grouping them under revealed and stated valuation findings as well as under seafood and non-seafood products. The order begins with revealed-seafood, revealed-agriculture, stated seafood and stated-agriculture.

### **3.1 Revealed Seafood Premiums along the Value Chain**

This subsection puts together empirical evidence from the seafood market on observed premiums along the value chain. Aarset *et al.* (2000) appears to be the first seafood gray literature to estimate price premiums for organic salmon. The analysis was first based on the application of the LOP in a product space such that price differences between conventional and organic salmon result in non-integrated market if the two products are different (not considered substitutes). Aggregation for data characterized by irregular spacing of observations in time presented statistical problem. However, comparing actual price averages from 1996-1997 of the Norwegian producer Giga reveals that fresh organic salmon commanded a premium of 24% while smoked organic salmon attracted a premium of 38% compared to their conventional alternatives. Regression of the price differences on the destination countries

(Germany, Japan, Belgium and Switzerland), distribution channels (retailer and restaurants) and product categories reveals less clear cut results on the respective premiums. But the authors observed that Germany and Switzerland were high premium buyers, signaling the value of ecolabels attached to salmon products in the countries compared. Norwegian restaurants and retailers were also attractive than importers, wholesalers and exporters. Nonetheless, a value added product (smoked salmon) attracted higher premium than fresh product which could be explained by the relative easiness in their preparations for consumption.

The succeeding analysis of ecolabelled seafood products using actual data have concentrated on the hedonic theory of explaining price formation based on the Lancastrian economics (Lancaster, 1966). The model assumes that the consumer has a demand function for each attribute inherent in a product and maximizes the utility linked to each attribute subject to a given budget constraint. Based on Rosen (1974), the product price is specified as a function of product attributes. Though such models have been used in disentangling product attributes, its application in the seafood sector using actual data started<sup>3</sup> with Roheim *et al.* (2011). Alternative ways identified in estimating the marginal willingness to pay premiums using observed market data is by inferring from inverse demand systems (Baltzer, 2004 and Smed, 2005).

Roheim *et al.* (2011) made use of IRI<sup>4</sup> Infoscan data in the London metropolitan market area. This analysis was a retail level data measuring product flow through supermarkets. The authors assessed how much premium is being paid by consumers of the MSC-certified seafood ecolabel specifically for frozen processed Alaska pollock products. The revealed premium was pegged at 13.3% after controlling for product attributes like brand, product form, package sizes and process form. As opposed to our intuition from the results of Aarset *et al.* (2000) on value addition, the high value added products “breaded and battering” attracted low premium compared to “smoked”. This is explained by the fact that value addition could be perceived as masking less quality products generated along the supply chain Roheim *et al.* (2011). They raised the fact that, observing premiums at the retail level does not indicate the prevalence of premiums at the producer level nor its transmittal. This could be explained by the existence of oligopsony market power in the ecolabelling supply chain exercised by supermarket retail chains. Thus the retail chains claim certification if they should purchase. This restricts producers who want to sell to certify their products even without premiums.

Blomquist *et al.* (2014) addressed this concern on premium transmission in the Swedish market for MSC-certified Baltic cod. Knowing the necessary condition for price premiums at the producer level is product differentiation at the retail level, the authors used personal observed in-store data to estimate a joint premium for ecolabels<sup>5</sup> of seafood at 10%. At the upstream, *no* significant premium (-0.3%) was observed for MSC certified landings for fishermen in the cod fishery after conducting robust analysis on data from log books and landing tickets obtained from SwAM<sup>6</sup>. No general conclusion can be made on the flow of price premiums along the chain but at least for the Swedish cod fishery, this is the mystery revealed. One should treat this evidence with caution since the retail data was based on a simple difference test while the landings data was based on a more robust hedonic analysis. However, if this is indeed the case then one become curious whether the premium paid by consumers are retained by the retail chains who likely have market power or somewhere else along the supply chain.

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<sup>3</sup> We are unaware of any gray literature that existed on hedonics of ecolabelled seafood before Roheim *et al.* (2011).

<sup>4</sup> Information Resource Inc.

<sup>5</sup> MSC and KRAV ( a Swedish ecolabel)

<sup>6</sup> Swedish Agency for Marine and Water Management.

In contrast to the production level evidence from Blomquist *et al.* (2014), Asche and Guillen (2012) had already studied price differences in the monthly data categorized according to the type of fishing gears in the Spanish hake market in Barcelona. It is known that MSC certifications are also associated with the type of fishing gear method, but this study was not based on MSC certified products. It is included due to its relevance in capturing the premium for various fishing gears. The more detrimental gears, trawl and gillnet were discounted at a premium of 1.74 euros and 4.39 euros per kg (approximately 15% and 50% respectively) compared to the long-line capture. Asche and Guillen (2012) indicate the implication is that, the perceived quality reduction when a trawl is used is assumed to be substantially less than the effect of gillnet.

A major limitation on the use of scanner data is its inability to provide the type of ecolabel affixed to the product, requiring Roheim *et al.* (2011) to resort to arduous means to discover such information. Hence Sogn-Grunvåg *et al.* (2013) made use of in-store observations from seven different retail supermarkets in the UK. Premiums were estimated for one of the sustainable capture methods, “line-caught” and MSC-certified chilled pre-packed cod and haddock products. Hedonics estimation revealed “line-caught” was rewarded for its sustainable concept with a premium of 18% and 10% for cod and haddock respectively. The MSC-ecolabel commanded marginal values of 10% premium on haddock products, a value that corroborates Roheim *et al.* (2011). Similarly in another study in the UK-Glasgow, Sogn-Grunvåg *et al.* (2014) conducted another in-store observation on cod and haddock. Considering the same sustainable features of the products, line-caught attracted a high premium of 24.6% over the fishing gear trawl. MSC labels were commanding a premium of 12.7%, also closer to previous estimations. The exceptional feature of this study was distinguishing between the value placed on private uncertified ecolabels such as “Forever Food” and “Birds Eye”. These products turned out to be 10% cheaper than products without the ecolabels. An indication that there are some hidden complexities in the supply-demand relationships within and among the major processors or alternatively indicates a significant sensitivity to third party verifications.

The organic seafood (farmed fish) market in the UK was studied by Asche *et al.* (2012). Evidence revealed organic fish attracted a premium of 25% while MSC labelled products had a premium of 13% for a wide range of fresh chilled and frozen farmed and wild salmon products. This differential in premiums between the two ecolabels is expected as it is more costly to provide organic seafood given its comprehensive requirements. The authors observe however, a substantial variation in MSC premiums across retail chains while organic premiums remained stable. The summary of findings for revealed and stated empirical studies for seafood is shown in Appendix 1 while the premium range for this subsection is presented in Table 3.1.

How sensitive are consumers to price premiums of ecolabelled seafood. Studies analyzing quantity-price sensitivities in the framework of demand systems for sustainable seafood rarely exist. However, it could be inferred that sustainable fishery practices could lead to better fish quality in the context of EU freshness grading. Hence Roth *et al.* (2000) explored the demand for fish quality in Denmark using an inverse almost ideal demand system to estimate price flexibilities. It was revealed that for cod and salmon, own price flexibilities were larger for Quality-Extra (-0.8 and -1) than A-quality (-0.4). The reverse was seen for plaice and mackerel with the respective Quality-extra of (-0.3,-0.8) and A-quality (-0.7,-0.8) own price flexibilities. By inversion, the lower the price flexibility the higher the elasticity and a value of less -1 indicate that price is flexible.

Table 3.1 Summary: Revealed Premium Range for Seafood

Type of Ecolabel	Premium Range (%)
Organic Aquaculture	24 - 38
MSC in Fisheries	10 - 13

### 3.2 Revealed Agriculture Price Premiums and Demand Elasticities

How much premium has been paid on agriculture food products produced from ecologically sound practices? Beginning with the hedonic related modeling of price premiums, Galarraga and Markandya (2004) observed prices from five UK retail markets between 1997 and 1998. Analysis of the data revealed consumers were paying a premium of about 10.7% for fair-trade/organic coffee compared to their conventional counterparts. On the Italian market, Carlucci *et al.* (2013) identified yoghurt to be a highly differentiated product such that the products price formation was influenced by a number of functional attributes. Among these, it was evident that consumers pay a marginal price of 28% if the yoghurt was labelled as organic in the retail stores.

In a comparative study of the actual household demand for organic food products in Denmark and Great Britain, Wier *et al.* (2008) estimated the average premium of organic products as compared to the conventional variants of the same product and for different user groups. The average price premium for organic milk was considerably higher in Britain (40%) than Denmark (15%) and the difference was explained by the excess supply of organic milk due to favorable government subsidies in Denmark at the time. In Denmark, the highest premiums were organic fruit (43%) followed by eggs (40%). In Britain eggs accounted for the highest premium of 133% followed by vegetables (73%). Generally, premiums ranged from 25 to 133% in Britain and 13 to 43% for Denmark. These countries compared to other European countries sell greater share of organic food products through the mainstream conventional retail channels. As indicated by Hamm *et al.* (2002) supermarket chains in Denmark have been much quicker including organic product lines in their shelves than other countries and this has the advantage of selling at a lower price premium. According to Økologisk Landsforening (2013), 90% of organic food in Denmark is sold via discounters, supermarkets and warehouses along with conventional while less than 10% are sold in specialized organic food alternative joints.

Baltzer (2004) use actual purchasing weekly data from COOP Denmark A/S to estimate the marginal willingness to pay for egg varieties in the framework of the Almost Ideal Inverse Demand System. Among the varieties of eggs, organic eggs commanded the highest marginal willingness to pay premium of 58%, barn eggs, 43%, free-range eggs 15% and pasteurized eggs 28%. The barn eggs and free-range varieties indicate various degrees of animal welfare in the production process, which is valued less compared to the organic. Similarly, Smed (2005) identified consumer willingness to pay organic premiums for GfK scanner data for the period 2000-2002 for skimmed milk to be 7%, 21% and 8% in three periods where different milk varieties were introduced to the market. Respectively, organic light milk attracted 9%, 14% and 7% while organic whole milk attracted 12%, 11% and 21% premiums in the periods. At least in Denmark and most countries, the premiums on ecolabelled products are estimated to be positive, indicating consumers are rewarding production practices that internalize environmental costs.

But how sensitive are consumers to the price of ecolabelled products? Wier *et al.* (2001) estimated elasticities for organic foods using the GfK store level scanner data from 1997-1998. Results showed that quantities demanded were more sensitive to own price changes for organic foods (-2.27) than for conventional foods (-1.13). A sensitivity analysis showed that a decrease in the price premium of 20% increases the consumption share of organic dairy and meat products from 10% – 15% , bread and cereal products increase from 5% - 7%, fruit and vegetable products increase from 4% - 6%. This indicates that price is an obstacle to organic consumption as lower price premiums induce considerable portion of consumers to buy more organic products. In both a standard and variety demand models, Baltzer

(2004) show evidence of elasticities greater than unity for all egg varieties. At low levels of demand, organic eggs were valued highly than welfare (barn and free-range) and pasteurized eggs while at high demand levels, egg varieties appear to converge at low price premiums. Similarly in the Danish milk market, Smed (2005) showed that the elasticity of demand for organic light and skimmed milk were higher than their conventional substitutes except for whole milk.

Does the above trend apply to other European markets? Jonas and Rosen (2008) used GfK data from the period 2000-2003 from the German milk market to determine price elasticities. In their result, own price elasticities for conventional milk was almost unity (-1). The demand for organic milk on the other hand was estimated to be highly price-elastic product (-10). Monier et al. (2009) similarly explores the French market for organic milk and eggs from the TNS Worldpanel data for 1998-2005. For the two products, conventional demand were more or less unitary price-elastic (-0.78 for eggs and -1.02 for milk). In the organic market, situations contrasted as demand was more price elastic for eggs (-2.38) and price-inelastic for milk (-0.38). The French market typically contrasts the German milk market for organic milk. In a more recent market analysis Schröck (2012) also contrasts the findings of Jonas and Rosen (2008) in the German milk market using the same GfK Homescan panel data but for a latter period (2004-2008). Estimated own price elasticities for both organic and conventional milk were less than unitary. Though the contrasting elasticities in Jonas and Rosen (2008) and Schröck (2012) could be due to differences in methodologies and assumptions towards elasticity estimation, one could also ask if consumer behavior is changing over time due to some structural changes.

Fourmouzi *et al.* (2012) relied on the Taylor Nelson Sofres (TNS) British household panel data from 2005-2006 to analyze demand systems for organic and conventional fruits and vegetables. The conventional and organic groups of each product appeared to be direct substitutes, and the organic were seen as luxury goods. With respect to each product's own price elasticities, conclusions showed organic vegetables and fruits were highly price elastic compared to their non-organic counterparts. The respective estimated own price elasticities for organic fruits and vegetables were -1.59 and -1.39. The conventional on the other hand was -0.50 for both products. Generally, the sensitivity of demand to prices varies from consumption markets due to differences in methodological estimations and consumer preference heterogeneity. However, evidence revealed here suggests that the demand sensitivity to prices of ecolabelled food products is higher<sup>7</sup> than the conventional substitutes. Implying that the ecolabelled product price development presents an interesting mechanism as significant fall in prices would increase demand, all things being equal.

Table 3.2 Summary: Revealed Premium Range for Agriculture

Type of Ecolabel	Premium Range (%)
Organic in Agriculture	10 – 50 (133)
Welfare related	15 - 40

Value in parenthesis is extreme upper bound premium

### 3.3 Stated Seafood Ecological Premiums

Knowing how much consumers have been paying on food products labelled to be ecological, we review evidences on the stated premiums. Thus, how much did consumers indicate they were willing to pay on food products that address their concern relating to environmental and ethical issues? Beginning with Olesen *et al.* (2010), the authors applied a non-hypothetical choice experiment to evaluate how much consumers in Norway were willing to pay for organic and welfare-labelled farmed salmon. All

<sup>7</sup> Except for the French milk market in Monier et al. (2009) and Shrock (2012) in Germany.

things being equal, consumers were willing to pay a price premium of 15% and 17% respectively for organic and welfare-labelled salmon as compared to the conventional alternatives. Premium for the organic salmon however varied by color, such that, a paler organic salmon<sup>8</sup> resulting from the restrictive pigment additives in feed led to a price less than the conventional and welfare-labelled salmon. The colour of food is used as an indication for food quality and so though premium foods may be desired by consumers, a resulting reduction in the aesthetic property could significantly lead to discounts. As further indicated by Olesen *et al.* (2010), the 2% premium difference is an indication of close substitutability and/or diminishing marginal returns for added attributes, given the comprehensive nature of the organic salmon compared to the welfare. On the colour effects, Alfnes *et al.* (2006) found the effect of colour on willingness to pay for salmon was concave in nature as colour changes from paler to redder colour. This indicates that the optimal colour to achieve a good price as a producer lies between the extremes; possibly equivalent to the known conventional salmon colour.

Looking at the tradeoff of Canadian consumers in Ontario are willing to make between the types of production and health attributes of salmon, Rudd *et al.* (2011) considers attributes like the local impacts on the environment, level of omega 3 fatty acids, level of PCBs in flesh and the region of origin. Based on internet survey choice experiments, it was shown that producers who reduced the environmental impacts of salmon production attracted modest premiums, thus consumers cared less about the environmental soundness of salmon production. However, they were strongly averse to increased levels of PCBs, such that their willingness to pay tradeoff for reduced PCBs was within the range of 35%-50%. This implied the promising market for salmon production using reduced levels of fish meal and fish oils. In a qualitative study in the neighboring US, O'Dierno *et al.* (2006) estimated qualitatively that about 14 percent of consumers were willing to pay 50% or more premium on organically grown seafood through a telephone survey for selected markets. On the other hand, 21 percent were willing to pay up to 50% more premium over a conventional seafood costing \$1 per pound (identified in females with larger household size). Thus, more consumers are attracted to lower premiums, than higher ones.

Price premiums paid on ecolabelled seafood were shown to be inhibited by the lack of information dissemination to consumers in Uchida *et al.* (2014b) for Japanese consumers. Using a sealed bid second price auction to elicit the willingness to pay for consumers in Tokyo, it was revealed consumers were willing to pay a premium of 20% for MSC ecolabelled salmon. This premium was only observed after participants were provided information on the global status of fish stocks and the purpose of MSC label program. Hence, the key to unlocking the potential in ecological seafood products according to Uchida *et al.* (2014b) is to inform consumers about the need for ecolabelling. Similarly in Denmark, Daugbjerg *et al.* (2014) and Smed and Anderson (2012) confirm this information effect that in order to promote green consumption effectively or increase the probability of organic volume shares, ecolabelling schemes must be accompanied by information campaigns on the production aspects covered by the label to ensure consumer understanding or provide information regarding the negative aspects of the conventional systems. The lack of adequate knowledge may undermine the potential of eco-labelling as an environmental policy instrument. According to Uchida *et al.* (2014a), the ways in which consumers perceive information (positively or negatively) affect their valuation of the ecolabelled product. Perceived positive information (information accepted to be interesting and credible) increases ecolabelled seafood products while exaggerated information has insignificant effect on the willingness to pay. Consumers in Japan were found to be willing to pay 26% for ecolabelled salmon, 44% if ecolabelled salmon was produced locally in Hokkaido.

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<sup>8</sup> Salmon fed from feed approved by the British Soil Association with strict restriction on pigment additives i.e. allow only natural additives.



Though price premiums on ecolabelled food products may serve to encourage the adoption of sound and ethical production practices, consumers react to the magnitude of the premium. For example, Johnston et al. (2001) found in a comparative contingent valuation study that at no premium, the probability of choosing certified ecolabelled salmon and cod was 88% for US consumers and 74% for Norwegian consumers. However, an increase in price premium to 50% for the ecolabelled seafood reduced the US consumers' probability of choosing the premium food to 68% and Norwegians to 32%. This reveals that the sensitivity of consumers to price premium changes is quite heterogeneous across geographic markets. Wessesls *et al.* (1999) also used similar approach and found a positive premium price difference averaging \$1.5 between certified and uncertified cod and salmon in the US. Further analysis showed that consumers were less likely to choose certified products over uncertified products for an increase in premium. This effect was shown to be greater for cod than for salmon. Estimates from a conjoint analysis from Jaffry et al. (2000) indicate that consumers in Denmark and UK were willing to pay a premium of £ 0.7 pounds for seafood certified as coming from sustainably managed fishery, thus, an MSC-like certification system.

Most studies using the stated preference approach provide the general backing that consumers have positive attitudes towards ecologically friendly seafood products. These studies usually estimate the probabilities of choosing such foods, consumers' perception and motivations. For example evidence in the UK suggests that the presence of a label conveying a fish coming from sustainably managed fishery, for cod fillets increases the probability of being chosen by 7% compared to a fish with quality label. This was the largest effect among all attributes and fish species that were investigated (Jaffry *et al.*, 2004). Other studies include Donath (1999), Brécard et al. (2009), Salladarré et al. (2010) and Johnston and Roheim (2006) who show consumers have varying positive attitudes towards ecolabelled seafood products but few estimate willingness to pay premiums for various environmental/ecological attributes.

Table 3.3 Summary: Stated Premium Range for Seafood

Type of Ecolabel	Premium Range (%)
Organic	17 - 50
Chemical Residues	35 - 50

### 3.4 Stated Agriculture Ecological Premiums

For studies based on consumers' willingness to pay premium for agriculture products, a lot of studies have been conducted in many EU countries and around the world. Stated premiums reported from consumers have generally shown a positive support with varying motives and perceptions. Diving peripherally on evidences, Wier and Calverley (2002) provide a review of earlier<sup>9</sup> studies on consumer willingness to pay premiums. It is indicated that 5-30 percent of consumers buy organic food when the premium is higher than 30%, premiums of 10-30% attract 10-50 percent of consumers while premiums between 5-10% attract 45-80 percent of consumers. This illustrates that though consumers indicate positive willingness to pay premiums, they are quite sensitive to prices as lower premiums will increase the patronage of ecolabelled food products.

Among the Danish households, consumer preferences for organic and locally produced apples compared to an apple imported from outside the EU was investigated by Denver and Jensen (2014) in an online panel survey. For high perceived organic consumers, the willingness to pay premium was 12.20DK/kg (174%) for organic apples and 22.60DK/kg (323%) for locally produced apples compared

<sup>9</sup> 2000 and beyond.

to a price of 7DK/kg for conventional apple from outside of EU. The average and neutral perceived organic consumers on the other hand have respective premiums of 5.40DK/kg (77%) and 19DK/kg (271%) for organic and local apples. Janssen and Hamm (2012) advice for organic products to be labelled with well-known organic certification logos that consumers trust. The study which covers selected European countries estimated the willingness to pay premiums for organic eggs and apples. In Denmark for instance, the government organic logo commanded the highest premium of 52% and 54% respectively for apples and eggs as compared with the old EU and Demeter logos for organic. Similar trend was observed in Germany (51%, 92%) and Czech Republic (56%, 53%) respectively for apples and eggs. For UK, Switzerland and Italy, the highest premium was observed for labels that were well-known and trusted with perceived strict organic standards and control systems.

In the cities of Navarra and Madrid in Spain, Gil *et al.* (2000) used a direct contingent valuation method to estimate consumers' willingness to pay premiums for organic food products. For both potential and actual organic consumers, willingness to pay premiums were similar ranging from 15%-25% while the "unlikely consumers" were reluctant to pay premiums. Among the range of products, the premium was higher for meat, fruits and vegetables indicating that organic attributes are more valued in fresh and perishable products. The valuation of meat was attributed to the food scares that had taken place in Europe, like BSE and dioxins. Ureña *et al.* (2008) investigated regular food shoppers for home consumption in Castilla-La Mancha (Spain). Among products analyzed, fruits and vegetables were products for which a higher percentage of consumers were willing to pay a premium with very extreme price sensitivity. Thus, at 5% premium on organic fruits, 83.7% of the respondents were willing to pay a price premium while at 20% premium, only 42.2% showed some willingness to pay. The highest premiums observed for all consumers were fruit (17%), dairy (16%) and vegetable and tubers (15%). Dried fruits, jam and medicinal/aromatic plants attracted lower premiums of 4%, 6% and 7% respectively. The distribution of premiums varied with the type of consumers (regular or irregular organic consumers). The result corroborates the findings of Gil *et al.* (2000) that, valuation of organic products depends on the degree of perishability of the product; as fresh products tend to attract higher premiums.

Table 3.4 Summary: Stated Premium Range for Agriculture

Type of Ecolabel	Premium Range (%)
Organic	10 – 100 (4-330)

Value in parenthesis is extreme lower-upper bound premium ranges

#### 4. Conclusion

Ecolabelling as a tool for managing the environmental impact of the seafood industry has gained immense recognition over the last decade. This has led to the proliferation of various ecolabels used as a means of creating market based incentives to encourage the adoption of ecologically sound practices. Though it is yet to be proven whether these ecolabels have achieved sustainable fisheries, there is no doubt the creation of sustainable fish markets have been successful especially at the retail sector. The success has been driven by firms profit motives and high utility arising from consumption. Ecolabels for aquaculture are also growing. Skepticism limits the adoption of environmentally good practices at the production level due to the fear of not been rewarded with the costs internalized. Studies on green consumerism indicate that consumers are willing to reward producers of eco-products, but whether consumers are actually paying premiums is a concern still in debate. In this study, stated premiums in the seafood industry were compared to revealed premiums and for other ecolabelled agricultural products. Also, consumer responses to premium changes and the price elasticity/flexibility of demand for ecolabelled products were considered.

Findings confirm the general assertion that consumers are willing to pay premium for ecolabelled food to reward producers who adopt sound environmental practices. These positive attitudes have also reflected in actual purchasing behaviors though paid premiums may differ from stated premiums. For example, with the exception of landing prices for MSC-certified Baltic cod in Sweden all ecolabelled seafood certified by a third party has associated positive premiums. For revealed ecolabelled seafood premiums, organic aquaculture premiums lie in the range of 24-38% which was higher than fisheries (especially MSC) with 10-13%. Other sustainable fishing methods like the line caught attracted premiums from 10-25% while unsustainable fishing methods were discounted due to the perceived reduction in the quality of the fish. Another observation was that private ecolabels were discounted since such labels lack third party certification and hence an indication of minimal trusts in the supply system. Value added seafood products can command higher premiums but the type of value addition (processing) could also be perceived as masking bad product quality and lead to a discount.

From the limited stated premium studies, premiums for seafood ranged from 15-50%. Organic labels which have much broader standards tend to be valued higher than labels with narrower standards such as fish welfare. Consumers appear to be willing to place higher values on farm related labels than fisheries while issues of chemical pollutants that affect health through fish consumption tend to be valued much higher than environmental concerns. Within the agricultural sector, organic labels were dominant in studies and values placed on products varied a lot. Many of the actual estimated premiums lied in the range of 10-50% with few extremes. Compared to Aarset *et al.* (2000) on organic products with existence of premiums, the range identified in Europe was 12-50% between 1995 and 1997. One should take these figures with caution since the plethora of studies on organic agriculture could not all be reviewed. For stated agriculture products, premiums varied by the degree of perishability and freshness of the product (thus, valuing as low as 4% or high as 300%). These premium observations were influenced by consumers having in-depth knowledge (information effect) about the ecolabel and maintaining an aesthetic quality similar to the conventional products.

Whereas higher price premiums on ecolabelled products serve as market-based incentives, consumers of ecological food products are more sensitive to the price gap. It was evident that the numbers of consumers tend to increase for reduced premiums. Premiums also varied by consumer segments. Likewise, the price elasticity of demand for ecolabelled non-seafood products was found to be generally more elastic than conventional food products. This has significant implication for policy since mechanisms developed to cause reduction in ecolabelled prices would increase the demand for ecolabelled products. Not the same can be said about the elasticities of ecolabelled seafood products given the nonexistence of related demand system inquiries. A limitation identified in this study was that studies differed spatio-temporally, by the type of product or markets and study methods. This creates difficulty in critical and specific comparison, leading to abstraction of results.

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## Appendix

### Appendix 1 Study Characteristics of Seafood Ecolabelled/Sustainability Premium

Study	Product	Country	Year	Premium	Value Chain Level	Data Source	Type of Sustainable Practice
<b>Seafood: Revealed:</b>							
Aarset <i>et al.</i> (2000)	Fresh Salmon	Norway	1996-1997	24.0	Producer/Processing	Giga-Producer	Organic
"	Smoked Salmon	"	"	38.0	"	"	"
Roheim <i>et al.</i> (2011)	frozen processed Alaska pollock	UK	2007-2008	13.0	Retail	IRI Infoscan	MSC
Blomquist <i>et al.</i> (2014)	Baltic cod	Sweden	2011-2012	10.0	Retail	Personal Store Observation	MSC+KRAV
"	"	"	"	0.3	Landings	Landing ticket+log books	Non-MSC
Asche and Guillen (2012)	Hake	Spain	1998-2004	15.0	Wholesale	Mercabarna Wholesale Market	Long-line/trawl
"	"	"	"	50.0	"	"	Long-line/gillnet
Sogn-Grønvaag <i>et al.</i> (2013)	chilled cod	UK	2010-2012	18.0	Retail	In-store Observation	line-caught
"	chilled haddock	"	"	10.0	"	"	line-caught
"	chilled haddock	"	"	10.0	"	"	MSC
Sogn-Grønvaag <i>et al.</i> (2014)	cod and haddock	UK	2010-2012	25.0	Retail	In-store Observation	line-caught
"	"	"	"	13.0	"	"	MSC
"	"	"	"	10.0	"	"	Certified/Private noncertified MSC
Asche <i>et al.</i> (2012)	wild salmon	UK	2012-2013	13.0	Retail	In-store Observation	MSC
"	farmed salmon	"	"	25.0	"	"	Organic
<b>Seafood: Stated:</b>							
Olesen <i>et al.</i> (2010)	Salmon	Norway	2010	15.0	Retail	Choice Experiment	Animal Welfare
"	"	"	"	17.0	"	"	Organic
Rudd <i>et al.</i> (2011)	Salmon	Canada	2011	35-50	Retail	Choice Experiment	Reduced PCBs
Uchida <i>et al.</i> (2014a)	Salmon	Japan	2014	26.0	Retail	Choice Experiment	Ecolabel
"	"	"	"	44.0	"	"	EcolabelXLocal
Uchida <i>et al.</i> (2014b)	Salmon	Japan	2014	20.0	Retail	Auction	MSC

" indicates – the same value as the previous cell, \* non-ecolabel but relevant for its environmental/ecological implication. A/B indicates the premium of A relative to B (thus, B received a discount).

Source: Author's Compilation