

Perspectives

The Economics of Information: Markets for Seafood Attributes

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Abstract *This paper presents the economic theory of information, reflected by differing demand for and supply of products in the presence or absence of certain attributes. This theory is applied to the market for seafood and reviews the use of this framework in the empirical literature. Product attributes can be search attributes (demand for the product found with the lowest price or contained in preferred packaging), experience attributes (demand for a product because of previous experience with the product's taste or ease of preparation), and credence attributes (preference for products with attributes which must be identified as present by a trusted source, such as safety or recyclability). It is highly likely that, given today's competitive market for seafood and consumers' interest in knowing more about the products they purchase, the market for seafood with desired attributes will continue to evolve.*

Key words Consumer demand, ecolabeling, information, seafood.

Introduction

It should not be news to anyone in the seafood industry or those who study seafood markets that, despite forecasts of declining worldwide seafood supply, selling seafood has become increasingly competitive. Some of the competition has come from the aquaculture sector, which has historically focused on quality attributes of the product. The fishery sector has, on the other hand, only recently paid attention to the quality of their products. As a result, Pacific wild-caught salmon has seen its market shares erode in the world market, particularly in Japan, due in part to increased supplies of higher-quality farmed salmon. However, as management practices have changed, the fishery sector has been able to increase the quality of its products. For example, the quality of product coming from the Pacific halibut fishery has greatly improved since the fishery switched to ITQ management (Homans and Wilen 1997). Formerly supplied as frozen product with a single large pulse into the market, the halibut fishery now provides a higher-quality product available in the fresh market over a longer time period.

In this climate, producers of seafood, both farmed and wild, have begun to differentiate their products with country of origin, brand, nutritional, or environmental labels.¹ This is driven by their belief that consumers prefer some product attributes, such as domestically produced and environmentally benign, more than others. If their product already has such attributes, producers will supply this information as

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¹ See Mariojouis and Wessells in this issue.

long as the marginal cost of providing the information is less than the marginal benefit. Providing this information may increase their market share at the expense of those producers who cannot make the same claims. If their product does not have the desired attributes, then the producer must decide whether or not to invest in changing the attributes of the product.

On the other side of the market, consumers throughout the world have become interested in knowing more about the food products they buy, particularly regarding food safety, but also several other attributes. The success of markets for organic fruits and vegetables and free-range chickens are among the most widely known examples. Consumer boycotts of canned tuna prior to the implementation of dolphin-safe capture is an example where consumer demand for dolphin-safe tuna replaced demand for “dolphin-unsafe.” Another example of consumer demand for information on product attributes was the nationwide attempt by consumer advocate groups in the U.S. requesting that the federal government require labeling milk as to whether it came from hormone-treated dairy cows. In this case, the consumers wished for a regulatory solution, rather than a voluntary solution, by the milk industry. However, the U.S. Food and Drug Administration (FDA) decided that there was no public benefit in providing that information on milk cartons, as there are no known health risks of drinking milk from bST-treated cows. Thus the initiative failed, even though there was consumer demand for this information.

Consumers may be concerned about the impact of fishing practices on dolphins, seals, sea lions, or other marine mammals, and be willing to search for and possibly pay more for seafood products that do not impact these animals. It is, however, possible that in some cases increased information on attributes of some products will not yield additional value to the consumer or change consumer behavior. Consumers may not be at all concerned that some fishing practices kill significant numbers of sharks and that the availability of clearly identified products from fisheries with lower shark bycatch will not change their purchasing behavior. In yet another example, the “cuteness” factor may come into play. Marine mammals tend to be perceived as “cute and cuddly,” whereas a mackerel is not. There may be more public sentiment for the cute and cuddly mammals versus the scale-covered fish. Thus, additional information on the environmental impacts of some fisheries is likely to be valuable to consumers for some marine species, but not necessarily for all. This, of course, will vary by consumer.

The purpose of this article is to present the theoretical framework for the economics of the market for information regarding product attributes, and to reveal the use of this framework in the empirical literature related to seafood. This article is organized in the following manner. First, the economic theory of information is discussed, providing the framework for analyzing consumer demand for information. Next, a discussion of the market for attributes is offered, along with a categorization of types of food attributes typically of concern to consumers. A brief review of the empirical literature on consumer preferences for seafood attributes is presented. Finally, conclusions of this discussion on labeling in seafood markets are summarized.

Economics of Information

The underlying economic theory for labeling products can be traced back to Stigler’s (1961) work on the economics of information. Stigler portrays information as a valuable resource. The focus of his paper is on the search for the lowest market price. Determining the pool of sellers, and prices demanded by each seller for a good, is a time-consuming task. Thus, there is a “search cost” attributable to time and energy expended by the consumer in determining the seller with the lowest

price. Of course, the higher valued the good is, the greater might be the benefit of searching; conversely, the higher one's income, the higher the opportunity cost of searching for the lowest-priced seller. In other words, the more valuable one's time is, the more expensive the search cost becomes. According to Stigler, then, a consumer searches for information until the marginal benefit of additional information is equal to the marginal cost of obtaining the additional information. As a result, there is a willingness to pay for information, and a marginal cost of obtaining it.

Stigler did not discuss search costs in the context of finding the highest quality product. Search cost for quality was addressed by Nelson (1970; 1974). The difficulty of determining product quality in the market is even greater than that of determining price levels, since information about quality is usually more difficult to obtain. In addition, since it is often impossible for buyers to tell the difference between good products and bad products, there are incentives for sellers to promise high-quality products but market poor-quality products, as pointed out by Akerlof (1970).

Nelson distinguished between two types of products, search goods and experience goods. Search goods are those that one can determine the quality of by searching, where quality for seafood might be defined as price, color, or smell. One discerns quality of experience goods by experiencing the taste, durability, or preparation.

Search and experience goods may be advertised by producers to provide consumers with information on the lowest prices and highest quality among stores in their area along with other information. This will lower the consumer's search costs. Search characteristics, which can be readily checked by the consumer before purchase, are hypothetically the most accurately advertised. The producer elects to undertake the advertising as long as he sees this as a means to increase market share. Consumers' acceptance of producers' claims will vary by the nature of the characteristic advertised, since producers will generally disclose only information advantageous to them. This competitive disclosure process results in explicit claims for all positive aspects of goods, and causes consumers to be suspicious of goods without claims (Aldrich 1999).

Darby and Karni (1973) expand the categorization of goods to include credence goods. Credence goods are more complicated in that consumers cannot determine the product's quality even after they buy and consume it. In this case, we truly have an imperfect market because first, there is asymmetry in possession of knowledge between producer and consumer, and second, because it is not practical for consumers to assess the quality of the product. For example, it is impractical or impossible for consumers to perform laboratory tests for the safety and nutritional value of seafood they purchase. Similarly, the environmental friendliness of a good is an attribute of credence goods, since it is, in general, infeasible for the consumer to observe the production process. According to Caswell (1998), labeling can transform credence attributes to search attributes that allow the consumer to judge quality of the good before purchase.

For credence goods, one may rely on producer claims, but generally consumers place more trust in an independent third party to provide truthful information on quality. In this case, either a third-party private certification is used, or there may be government regulations mandating certain product characteristics be revealed to the consumer by means of government testing or inspections.

Demand and Supply of Attributes

Hooker and Caswell (1996) created a list of examples of food product quality attributes, which is reproduced in table 1. These attributes apply equally to seafood

Table 1
Quality Attributes of Food Products

1. Food Safety Attributes

- Foodborne pathogens
- Heavy metals
- Chemical residues
- Food additives
- Naturally occurring toxins
- Veterinary residues

2. Nutrition Attributes

- Fat
- Calories
- Fiber
- Sodium
- Vitamins
- Minerals

3. Value Attributes

- Purity
- Compositional integrity
- Size
- Appearance
- Taste
- Convenience of preparation

4. Package Attributes

- Package materials
- Labelling
- Other information provided (recipes, *etc.*)

5. Process Attributes

- Animal welfare
- Biotechnology
- Environmental impact
- Chemical use
- Worker safety

Source: Hooker and Caswell (1996).

and other food products. The table has a mix of search, experience, and credence goods. For example, all the food safety, nutrition, and process attributes could be labeled as credence goods, while some of the value attributes (*e.g.*, size and appearance) are search attributes. Experience goods may include taste, convenience of preparation, and package attributes.

Recognizing that attributes like these have value to consumers, Lancaster (1971) characterized consumer demand for products instead as consumer demand for a bundle of attributes, where each product has one or more attributes. The essence of Lancaster's framework is that a good by itself does not yield utility, but it

possesses characteristics (attributes) that create it. Therefore, there is a demand for attributes in the marketplace. There is also a supply of attributes. On the axes of figure 1 are the prices of different quantities of an attribute per unit of food, and quantity as measured by the quantity of an attribute per unit of food (A/Q).

The various demand function, D, represents consumers' willingness to pay for various amounts of attributes at different income levels. The demand curves are downward sloping to signify that for any level of income, the lower the price of quality per unit of food, the more consumers are willing to purchase. The line D₃ represents the highest income level, while D₁ represents the lowest. Thus, if increasing environmental friendliness is a superior product, then demand will shift up as the consumer becomes more affluent. If we return to the earlier example that consumers may not have a demand for shark-safe seafood, then one would not expect to see a demand curve in figure 1. Thus, there may be no market for shark-safe seafood.

In this graph, S represents supply of the attribute per unit of food. The attribute might be increasing levels of quality as measured by environmental friendliness, and the growth of marginal cost implies an increase in marginal costs as the industry supplies more environmental friendliness. Environmental friendliness is not a discrete choice, but instead a continuous range of friendliness. An example to consider might be a groundfish fishery. The cost of reducing marine mammal bycatch might be relatively low. Additional costs are incurred if the fleet also reduces incidental take of non-target species. Finally, even greater costs would be incurred if, in addition, gear type was changed such that there was no damage done to the ocean floor by draggers. These costs are not likely to be fixed costs, thus, as environmental friendliness (or protection of the marine ecosystem) grows, the marginal cost of supplying it increases. In contrast, quantity of fish sold will shift the supply curve up and down if the size of the stock affects the cost of supplying various levels of environmental friendliness.

Alternatively, perhaps the only criteria for environmental friendliness that a fishery must meet is to avoid overfishing. In other words, the fishery is either envi-

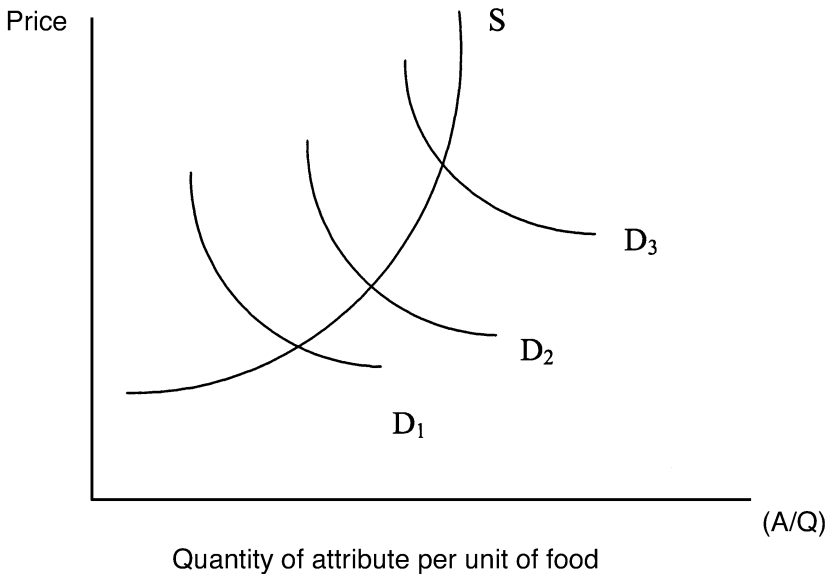


Figure 1. Demand and Supply of Food Attributes

ronmentally friendly or it is not, where that level of friendliness is measured by whether or not the fleet catches too many fish. Then, the marginal cost of providing more “environmental friendliness” is constant. No matter what the price, the level of environmental friendliness will not change; *i.e.*, the industry either fishes too much or it does not. If it meets those criteria, then the supply curve for quantity of attribute in figure 1 becomes a vertical line, and it is only the demand for environmental friendliness that determines the market price. One can argue that this is the case for ecolabeled seafood products under the Marine Stewardship Council’s (MSC) program.² The cost of certifying a fishery is fixed, as there is one level of environmental friendliness — that the fishery is well managed as defined by the MSC’s standards and criteria. The level of environmental friendliness is constant. There is no gradation of being “somewhat well managed.” Thus, the supply curve in figure 1 will be vertical. If the size of the fishery matters to the cost of supplying a well-managed fishery, then the supply of environmental friendliness will just shift the curve left or right.

Finally, on the supply side of the market there are the issues of producers choosing not to supply product attributes in the cases where their private marginal costs outweigh their private marginal benefits, although the social benefits of the provision of both attributes and information about the attribute outweigh social costs. Asymmetry of information and a market failure to supply that attribute and/or information to the public becomes the main issue. Food safety is a classic example.

Review of Empirical Literature on the Market for Seafood Attributes

On the demand side of the market for product attributes, Lancaster’s work has been the underlying theory that is used to couch much of the economic analysis that has been done evaluating consumers’ preferences for seafood safety,³ seafood ecolabeling,⁴ and other seafood attributes.⁵ By viewing the characteristics of a seafood product as quality, safety, price, production process, taste, color, *etc.*, one can use Lancaster’s theoretical framework on which to base empirical studies of the marginal value of each attribute to the consumer.

One approach is to analyze the value of individual food attributes using hedonic price models. Hedonic analysis relies on having data on product prices and the presence or absence of the individual product’s characteristics that go into determining that price. Such data are often very difficult to find, and thus limit our ability to determine values of attributes in the market. In spite of that, a recent example of a data-intensive hedonic model is presented in Carroll, Anderson, and Martinez-Garmendia (2001), who evaluate the relative value of particular attributes in determining prices of Atlantic bluefin tuna in the Japanese wholesale market. The basic methodology of hedonic analysis is to estimate an equation using cross-sectional price data regressed on variables representing the presence and absence of specified attributes where each fish is an observation. A large dataset on prices attained in the Japanese market, by agent, as well as the attributes of each fish sold enabled the researchers to uncover unprecedented information about the value of each attribute compared to the other attributes. Results indicate that attributes, including freshness, fat content, color, and shape, had the largest influences on the price level for bluefin

² For more information on the MSC go to www.msc.org.

³ Wessells, Kline, and Anderson 1996.

⁴ Johnston *et al.* 2001.

⁵ Holland and Wessells 1998; Carroll, Anderson, and Martinez-Garmendia 2001; Wirth, Halbrendt, and Vaughn 1991; Anderson and Bettencourt 1993.

tuna sold in the Tsukiji Central Wholesale Market in Tokyo. For example, fish with the highest fat content grade were estimated to receive a price 76% higher than that of the lowest grade. Fat content in bluefin tuna on the Tsukiji market is an experience attribute, since the buyers know to look for the fish with the highest fat content (holding everything else constant). It is also a search attribute, since the buyers test each fish to determine its fat content grade. Even the name of the broker handling and selling the fish had an effect on the price paid. Thus, hedonic analysis can reveal the value of information, but is limited to the success of the data set in its ability to differentiate the various pieces of information that might be pertinent to the determination of product price.

In cases where the market does not exist, for example when the product with certain characteristics has not reached the market, the framework used has been conjoint analysis or contingent choice. Studies of product differentiation using these approaches include Wessells, Kline, and Anderson (1996), Holland and Wessells (1998), Holland and Wessells (1998), Anderson and Bettencourt (1993), Wirth, Halbrendt, and Vaughn (1991), and Johnston *et al.* (2001).

Characteristic of both conjoint and contingent choice approaches is that consumers reveal preferences as each is presented with tradeoffs among product attributes. In conjoint analysis, a survey is presented to respondents in which they rank product choices, based on the bundle of attributes representing the products. For example, in Holland and Wessells (1998), 9 hypothetical fresh salmon products were presented to each of more than 1,500 survey participants. Respondents were asked to rank these products from most to least preferred (1 to 9). Product attributes that changed were price, production information (farmed vs. wild vs. no information) and seafood safety inspection information (U.S. Department of Agriculture (USDA), FDA, or no information). For example, out of the 9 products, a consumer may have chosen as his/her top choice the lowest-priced salmon with no information on production process but inspected by the FDA, followed by a second choice of the medium-priced salmon that is identified as being farm-raised and inspected for safety by the USDA, and so on.

Estimation using a rank-ordered logit model (Beggs, Cardell, and Hausman 1981) showed the attribute that was most important to those respondents, by far, was seafood safety inspection. Any inspected salmon portion was much more likely to be ranked first than another, regardless of production method or price. Seafood safety is certainly a credence good, but the respondents were mostly indifferent to which agency did the inspection. Information on farmed and wild-caught production are also credence goods at the retail level, since there is generally no means by which a consumer may determine the production method themselves. Price, on the other hand, remains a search good, as in Stigler.

Another methodological approach chosen for empirical analyses of consumer preferences for seafood has been to use contingent choice models. Johnston *et al.* used contingent choice as the methodology to discern consumers' tradeoffs between products with different attributes, particularly ecolabeling. The primary reason for using contingent choice is that there does not exist market data from which we can compare consumer demand for ecolabeled seafood to non-ecolabeled seafood.⁶ Ecolabeled seafood was defined as a product that came from a fishery which was certified not to be overfishing its stock. In this case, a series of paired comparisons

⁶ Canned tuna is somewhat an exception, in that it is possible to estimate demand for dolphin-safe canned tuna using supermarket scanner data, as in Tiesl, Roe, and Hicks (1997). In this case, however, there is no choice that consumers can make between dolphin-safe tuna and "non-dolphin-safe," such that Tiesl, Roe, and Hicks can only report that demand for canned tuna shifted post-1989 after only dolphin-safe tuna products were available in supermarkets.

for ecolabeled versus non-ecolabeled seafood products was devised in surveys of 1,640 U.S. and 2,000 Norwegian consumers. In this project, the respondent was asked to indicate which of two hypothetical products (s)he would choose to buy, where one choice may have been certified cod for \$5.49 per pound versus non-certified cod at \$4.99 per pound, in the U.S. survey. Similar questions were also posed for shrimp, and prices were changed to Norwegian kroner for the Norwegian survey.

Johnston *et al.* (2001) find substantial divergence between Norway and the U.S. concerning the impact of a wide range of variables. Using a logit model, choice of certified is regressed against price, demographic attributes, preference attributes, and environmental purchasing behavior of the respondents. The findings are that consumers do choose certified seafood over non-certified, although an increase in the price premium has a negative impact on consumers' likelihood of choosing ecolabeled seafood. Although the effect holds in both countries, it is more pronounced in Norway. Therefore, in this hypothetical case, there is an implied value to the consumer of sustainability, which in our earlier context is a credence attribute.

There is another determinant of the value of the credence attribute, sustainability. Namely, how much trust is placed in the truth of the sustainability claim? With seafood safety, it was determined that the credence attribute was important, but which of the two possible agencies provided it (FDA or USDA) was minimally important. This survey on ecolabeling asked respondents to indicate which of a list of agencies would be most trusted to guarantee certification. U.S. respondents could choose among the World Wildlife Fund (WWF), the MSC, and the National Marine Fisheries Service (NMFS). Norwegian respondents were given a choice among WWF, the MSC, and the Norwegian Fisheries Directorate (NFD).

Of the agencies considered by U.S. respondents, NMFS garnered the highest trust ratings, with 49% of respondents indicating that they would trust this agency most to provide certification. WWF was chosen by 23% of respondents, and MSC by 5%. The remaining 23% indicated that they were unsure of their most trusted agency. Approximately 81% of Norwegian respondents indicated that they would trust the government agency most to provide certification. WWF was chosen by 16% of Norwegian respondents, and the MSC by 3%. Private (*e.g.*, seafood industry) certification organizations were not considered, as prior research regarding seafood safety indicates that seafood consumers place relatively little value on guarantees offered solely by industry groups (Wessells and Anderson 1995). Model results support the hypothesis that certifying agency is important, but only for Norwegian consumers. More specifically, in cases where the agency identified by the respondent was also the most trusted agency specified as guaranteeing seafood certification, Norwegian respondents were more likely to choose the certified product than U.S. consumers.

Thus, the empirical literature on the demand side of the market for seafood attribute information is well established, although there are many more questions yet to be studied and answered. The other side of the market for attributes, the supply side, has not been investigated. There are studies of the cost of providing food safety in, for example, the meat protein markets, and of providing the information regarding the safety of the products (Caswell 1998). There have not been any studies determining the cost structure of supplying seafood safety, environmental friendliness, or other attributes, nor have there been studies of the costs of supplying this information to the consumers. Perhaps more importantly, the question whether the marginal costs of supplying such attributes outweigh the marginal benefits of doing so has been neglected. As the seafood industry continues to become more competitive, obtaining answers to these questions will become more pressing.

Conclusions

This paper has presented the economic theory of information from the context of the value of information to consumers, reflected by differing demand for products in the presence or absence of certain attributes. These attributes can be search attributes (demand for the product found with the lowest price, or contained in preferred packaging), experience attributes (demand for a product because of previous experience with the product's taste or ease of preparation), and credence attributes (preference for products with attributes which must be identified as present by a trusted source, such as safety or recyclability). There is a resulting market for attributes, for which there is market demand as well as market supply.

As applied to seafood markets, demand for attributes certainly exists, as does the demand for information about those attributes. In the empirical studies discussed above, there is a demand for information on product quality, seafood safety, environmental friendliness, and even the name of broker of the individual bluefin tunas sold in Tsukiji market. The analyses indicate that these attributes are valuable to the consumer, and they are willing to pay for them. However, demand is subject to the nature of the attribute. In other words, there are some attributes consumers may attach value to, and some they may not. In that case, there is no market for information, or in other words, figure 1 has no demand curve.

Although not included in the list of empirical studies, the supply side of the market for attributes also exists, but there are no empirical studies to date examining this portion of the seafood market. We know from the economic framework that producers may supply attributes and inform consumers of them only when the private marginal costs are less than the marginal benefits. However, in contrast to the lack of a market for attributes when consumers do not have a demand, in cases where the supplier does not enter the market for attributes does not necessarily mean, therefore, that there is no market. If the government perceives there is a social benefit to the provision of product attributes or information, then there may be regulatory steps taken that force producers to expend resources to do so, and this action may lead to the presence of a marginal cost curve in figure 1 regardless.

It is highly likely that, given today's competitive market for seafood and consumers' interest in knowing more about the products they purchase, the market for seafood with desired attributes will continue to evolve. As a result of this, consumers may find themselves inundated with information. For example, one can look at the salmon market. Within a short while, it is likely that consumers will be able to buy salmon with a variety of attributes, including wild, farmed, organic, ecolabeled, Atlantic, Pacific, Alaskan, Chilean, Canadian, Norwegian, Irish, Scottish, quality control measures, and nutritional content. Some of these attributes may have a value for which the consumer is willing to pay. Equally, there is a potential for confusion if there are too many labels. For example, what is the difference between organic and ecolabeled? The extreme case of confusion is a lack of interest on the part of the consumer. Then, the framework presented above tells us that there will no longer be a market for attributes or information. Based on the empirical analysis discussed above, this would truly be unfortunate.

References

- Akerlof, G.A. 1970. The Market for 'Lemons': Quality Uncertainty and the Market Mechanism. *Quarterly Journal of Economics* 84:488-500.
- Aldrich, L. 1999. Consumer Use of Information: Implications for Food Policy. Food and Rural Economics Division, Economic Research Service, U.S. Department of Agriculture. Agricultural Handbook No. 715.

- Anderson, J.L. and S. Bettencourt. 1993. A Conjoint Approach to Model Product Preferences: The New England Market for Fresh and Frozen Salmon. *Marine Resource Economics* 8(1):31–49.
- Beggs, S., S. Cardell, and J. Hausman. 1981. Assessing the Potential Demand for Electric Cars. *Journal of Econometrics* 17:19–20.
- Carroll, M., J.L. Anderson, and J. Martinez-Garmendia. 2001. Pricing U.S. North Atlantic Bluefin Tuna and Implications for Management. *Agribusiness* 17:243–54.
- Caswell, J.A. 1998. Valuing the Benefits and Costs of Improved Food Safety and Nutrition. *The Australian Journal of Agricultural and Resource Economics* 42:409–24.
- Darby, M.R., and E. Karni. 1973. Free Competition and the Optimal Amount of Fraud. *Journal of Law and Economics* 16:67–88.
- Holland, D., and C.R. Wessells. 1998. Predicting Consumer Preferences for Fresh Salmon: The Influence of Safety Inspection and Production Method Attributes. *Agricultural and Resource Economics Review* 27:1–14.
- Homans, F.R., and J.E. Wilen. 1997. A Model of Regulated Open Access Resource Use. *Journal of Environmental Economics and Management* 32:1–21.
- Hooker, N.H., and J.A. Caswell. 1996. Regulatory Targets and Regimes for Food Safety: A Comparison of North American and European Approaches. *The Economics of Reducing Health Risk from Food*, J.A. Caswell, ed., pp. 1–17. Storrs, CT: Food Marketing Policy Center.
- Johnston, R., C.R. Wessells, H. Donath, and F. Asche. 2001. A Contingent Choice Analysis of Ecolabelled Seafood: Comparing Consumer Preferences in the United States and Norway. *Journal of Agricultural and Resource Economics* 26:20–39.
- Lancaster, K.J. 1971. A New Approach to Consumer Theory. *The Journal of Political Economy* 74:132–57.
- Nelson, P. 1970. Information and Consumer Behavior. *Journal of Political Economy* 78:311–29.
- _____. 1974. Advertising as Information. *Journal of Political Economy* 81:729–54.
- Stigler, G. 1961. The Economics of Information. *Journal of Political Economy* 69:213–25.
- Tiesl, M., B. Roe, and R.L. Hicks. 1997. Can Ecolabels Tune a Market? Evidence from Dolphin-Safe Labeling. Paper presented at AAEA Annual Meeting. Toronto, Canada, 27-30 July.
- Wessells, C.R., and J.G. Anderson. 1995. Consumer Willingness to Pay for Seafood Safety Assurances. *Journal of Consumer Affairs* 29:85–107.
- Wessells, C.R., J. Kline, and J.G. Anderson. 1996. Seafood Safety Perceptions and their Effects on Consumption Choices under Varying Information Treatments. *Agricultural and Resource Economics Review* 25:12–21.
- Wirth, F.F., C.K. Halbrendt, and G.F. Vaughn. 1991. Conjoint Analysis of the Mid-Atlantic Food-Fish Market for Farm-Raised Hybrid Striped Bass. *Southern Journal of Agricultural Economics* 23:155–64.