

Marketing of Safe Food Through Labeling

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After a series of food safety crises during the 1990s, regulators, producers, and retailers alike are trying to regain consumer confidence by redesigning legislation and quality-assurance programs. These programs focus on process innovation, traceability, and identity preservation of products. This paper reviews current developments in the European food and retail industry. Hypotheses on the link between structural adjustments in the food production and marketing chain and the provision of safe food emerge. In addition, we report results from a survey on consumer perception of food-safety attributes and discuss the opportunities for and limits of marketing safe food through labels.

A series of food-safety crises has reduced consumers' confidence in the food system's ability to deliver safe, high-quality food. As a result, regulators, producers, and retailers alike are trying to regain consumers' confidence by redesigning legislation and quality-assurance programs. These efforts can only succeed in restoring consumers' confidence if new standards of process and product attributes are successfully communicated. Product labeling is one way to accomplish such communication.

Food-safety characteristics can be defined in a variety of ways. A narrow definition of food-safety attributes focuses on product attributes causing adverse health impacts. A broader definition includes all attributes that influence consumers' perception of food safety. In the context of marketing safe food, it seems more appropriate to focus on this wider definition that comprises all signals informing consumers about food safety.

Some quality attributes serve as food-safety signals even when there are no strong cause-effect relationships between the signaling attribute and the resulting product quality. Hence, consumers also look for process attributes as signals of product quality. Such behavior was observed, for example, in the increased demand for organic products after the dioxin crisis in Belgium and after the BSE crisis. Although the Nitrofen scandal in Germany in 2002¹ demonstrated that organic agriculture is not immune to food safety risks, consumers consider it less prone to systemic failure.

Labeling food-safety attributes requires some particular considerations. Food-safety attributes are credence attributes that cannot be directly assessed

by consumers. Therefore, firms that wish to credibly communicate the safety of their products must rely on third-party accreditation or government enforcement. The direct labeling of food-safety attributes, however, has proven difficult. Natural processes, governed by stochastic relationships, are involved in producing the final product, scientific uncertainties exist about cause-effect relationships, and safety attributes consequently are variable. Furthermore, the labeling of product attributes can be costly if expensive tests are necessary to confirm a food's safety characteristics. Responding to these difficulties, firms and regulators have extended their labeling and product differentiation efforts to process attributes. Examples are the labeling of organic and GMO-free food.

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Markets for Safe Food

If a food's risk or safety were perfectly observable to consumers, markets for food safety would work well. Consumers willing to pay for safer foods would express this demand in the marketplace. Producers could choose to offer safer and higher-quality goods as long as it was profitable to do so.

Markets for safe food, however, tend not to work perfectly (Caswell 1998). They fail due to information asymmetries and consumers' difficulty in assessing a product's safety. Furthermore, even producers may find quality difficult to assess. Food production often involves a number of successive

¹ In 2002 the carcinogenic pesticide Nitrofen was found in organic feed, organic eggs, and organic broiler and organic turkey meat in Germany.

production stages, and information asymmetries along the supply chain make it difficult for individual producers to assess the quality of inputs being used.

A possible market solution to this problem of asymmetric information consists of investing in product labeling. Brands and labels conveying quality information enable the market to provide consumers with the level of information they desire, thus transforming credence and experience attributes into search attributes. Given the severe market disruptions caused by food-safety incidences and the increasing interest of food producers and retailers in food labeling, regulators have become increasingly involved in setting the rules for labeling. Indeed, governments need to enforce labeling if consumers do not trust privately sponsored labels. Intervention may also be required when labeling is not in the firm's interest and when a private solution to the signaling problem does not exist.

Furthermore, governments play a role in assuring the quality and truthfulness of information transmitted via private labels (Caswell and Mojuszka 1996). Regulating information transmitted via private certification and labeling programs allows governments to circumvent costs associated with mandatory labeling. Crespi and Marette (2001) provide a welfare analysis of food-safety-certification financing under different forms of competition among sellers and certifiers. In the case of maintained competition among sellers, a voluntary certification funded by a per-user fee is efficient. Policy recommendations change in a non-trivial way if food producers or certifiers exert market power.

Signaling Food-Safety Attributes Via Labeling

Consumers choosing among competing food products face difficulties in assessing quality, particularly with respect to safety attributes. These attributes are not readily assessed by consumers, who must rely on expert information. However, consumers may use heuristics as quality signals. As Dawar and Parker (1992) point out in a literature review on quality signaling, these signals include brand names (Akerlof 1970; Ross 1988) or brand advertising (Milgrom and Roberts 1986), product appearance (Nelson 1970), price (Milgrom and Roberts 1986), and product or retail reputation (Cooper and Ross 1985).

Signals mostly help consumers who lack expertise, who need to reduce the risk of an ill-suited purchase, or who face difficulties in assessing the objective quality. Quality signals can be intrinsic (tangible) or extrinsic (intangible) to a product's quality. Intrinsic signals relate directly to the product itself. They are important if they concern search attributes such as physical appearance. However, quality judgment based on post-purchase experience and extrinsic signals, such as brand names and retail reputation, is more important if product attributes are less tangible. When consumers have to rely on expert assessment, reputation can only be built by third-party involvement, which enforces the credibility of the quality signal.

An important heuristic for food quality is the product's origin. Labels designating geographic origin establish and protect reputation on behalf of a collective of firms. They rely on voluntary participation, and in the EU they are strongly protected by government regulation (e.g., 2081/92/EC and 2082/92/EC). Consumers use information about the collective of firms to assess the quality of an individual firm (Tirole 1996) or to connect the product to geographical origins, physical production environments, and traditions of agricultural and product-transformation practices. Studies have shown that regional labels can be important in consumer choices (Landon and Smith 1998; Luz Loureiro and McCluskey 2000).

Labeling programs marketing safe food often concentrate on communicating the improved level of safety. However, firms are also interested in assuring homogeneity in quality. Given that food-safety attributes are often subject to natural variability—e.g., microbial contamination—safety attributes may vary to a significant degree. Many quality-assurance programs thus attempt to homogenize products and to control the production process to limit the risk of a future food-safety incidence.

Developments in Food and Retail Markets

Private Labels in Food Retailing

In recent years the use of private labels in the food-retailing sector has increased. Private labels developed by retailers, also called store brands, serve different purposes. They may serve to promote the store, build customer loyalty, and signal quality and credence attributes (Treis and Gripp 2001).

Furthermore, the retailing industry increases its independence from food manufacturers (Dobson 1997). Private-label products represent an increasing share of food products sold. In the UK, the share has reached 30% of value sold and in France and Germany it is 17% and 15%, respectively (Breithor et al. 2001). While the first generation of private brands was placed within the low-price segment and has served a price-promotion strategy, retailers have commenced developing private labels in the premium segment of food products. An example is store brands of organic foods.

A recent survey of European retailers by the Private Label Manufacturers Association (PLMA) found that retailers continue to develop private-label products with particular focus on high-quality products (Briem 2002). When asked about the factors currently influencing their private-label policy, food safety was named by 53% of the respondents and ranked second after customer loyalty (54%). In France, food-safety issues were mentioned by 80% of the interviewees. Three-fourths of the respondents declared that their companies will focus on the introduction of high-quality products; one in three mentioned the introduction of organic foods and non-food items as store-brand products.

Based on case studies of the European food industry, Traill and Meulenberg (2002) pose the hypothesis that private-label suppliers are mostly process-oriented while at the same time they emphasize the development of new products. Successful brand manufacturers, in contrast, are predominately product- or market-oriented. Therefore, it does not seem surprising that the increasing development of private-label products has led to increased efforts in quality-assurance and certification schemes.

Occasional supply relationships impose high information costs on firms at the lower end of the supply chain. Hence, downstream firms will seek closer arrangements with their suppliers to reduce these transaction costs. For example, there is a trend in the British beef industry to source beef through partnership agreements and groups of farmers. As argued in Loader and Hobbs (1999), one cause for this action by retailers may lie in the asymmetric liability hazard in the supply chain that is imposed on retailers by the UK Food Safety Act of 1990. By becoming more active in the development of their private-label products and by increasing the quality of these products, retailers can build a reputation for quality.

Traceability Systems

Marketing and regulating food safety increasingly involves traceability systems, product segregation, and identity preservation. Traceability is defined as the ability to trace back the components of a particular product from retailers to suppliers, down to the farm level. From a food-safety perspective, a traceability system serves two distinct purposes. First, it improves the likelihood of isolating the cause of a food-safety incident and facilitates necessary intervention and product recalls. Second, it enables the identity preservation of individual products; as a result, it also may increase the effectiveness of liability rules in the regulation of food-safety risks. Recently, the European Union passed traceability requirements for genetically modified (GM) foods. In addition, the EU has enacted mandatory labeling of beef to indicate the place of slaughtering, processing, and production (1760/2000/EC).

Parallel to mandatory traceability systems, the private sector is developing its own quality-assurance and traceability systems. For example, a German supermarket chain has been developing an online traceability program for beef based on DNA information. As Golan, Krissoff, and Kuchler (2002) point out, the private sector may have somewhat different motivations to implement traceability systems. The food sector may want to differentiate its products in the market for credence attributes, to facilitate the trace-back of food safety and quality attributes, and to improve its supply management. Producing evidence for the existence of credence attributes may require further segregation and identity preservation.

Sector-wide Quality Assurance and Certification Schemes

Changing food-safety requirements and supply relationships require process innovation. In response to food-safety incidences and new food-safety legislation, branded products may adapt more easily than generic products because they are largely differentiated. They also may more readily show compliance with new requirements. It is more difficult for producers of generic products to assign responsibility and to point out that steps have been taken to ensure higher safety levels (Loader and Hobbs 1999). Thus it may be necessary to develop a suitable "brand" image, even for generic products.

This may to some extent explain the observed trend to higher-quality private-label products.

The farm-to-table approach propagated by governments in the U.S. and in Europe is also followed by private business. Quality production does not only involve signaling to the final consumer but also to subsequent processors in the production chain. Quality-assurance systems in the food industry have developed from generic standards such as ISO 9000 and HACCP to systems that are specific to the food industry and its subsectors. New national and international rules require increased vigilance on the traceability and quality of inputs. Examples include the Dutch QC standard (Quality Control of Feed Ingredients for Animal Feed), the British Retail Consortium (BRC) technical standard for companies supplying retailer-branded food products, the Global Food Safety Initiative (GFSI), and the German Quality and Safety standard (Qualität und Sicherheit GmbH, QS).

These systems build on quality-management principles developed within the ISO 9000 system and the HACCP concept. They involve quality-management principles in processing and distribution as well as good practice for agriculture. Parallel to the BRC standard, the German retail sector currently is developing an international standard for auditing private-label products. By outsourcing audits to third-party certifiers, one hopes to reduce the need for and the costs involved in individual audits of private-label manufacturers.

The adoption of quality-assurance systems is motivated by internal factors, improving the productive efficiency within a firm, and by external factors that relate to market access. Transaction-cost reductions drive the adoption process (Holleran, Bredahl, and Zaiabet 1999). Tracing products and proving due diligence is easier when supplier information is readily available.

To restore consumer confidence in meat products, the German meat sector has created the Quality and Safety (QS) label. This label involves farm suppliers, individual farms, slaughterhouses, meat processors, and retailers. Launched after the BSE crisis in 2000/01, QS introduced a system of process control and traceability for meat and meat products. It requires documentation and consists of three layers of control: self-audits, firm audits by independent auditors, and accreditation of auditors. As of March 2003, 869 companies have enrolled in the QS system (QS GmbH 2003).²

Critics claim that standards within the QS system do not go far enough beyond legal requirements. The system as such does not lead to a differentiated, high-quality product. The recent case of dioxin-contaminated feed in eastern Germany has shown that the QS system leaves gaps in the supply-chain management of quality. Although the feed producer in Thuringia who was identified as the source of the dioxin contamination was not certified under the QS system, he delivered feed ingredients to mills participating in QS (*Handelsblatt* 2003). Additional problems relate to the fact that the system attempts to cover all actors in the meat production chain. As a result, vigilance may not be at its best and moral-hazard problems prevail, reducing care-taking efforts of participating firms. Due to its wide scope, the differentiation of products does not seem possible and, because of free-rider problems, the investment in reputation is at risk.

To improve the safety in the overall system it may be necessary for some firms to take leadership roles and to push for higher safety efforts. Leadership on the part of one or several firms may reduce market failure in the system (Hennessy, Roosen, and Miranowski 2001) and can be fostered by regulatory intervention, e.g., liability laws, or by active participation of some members of the supply chain.

Consumer Attitudes Toward Food-Safety Signals

After having reviewed recent trends in the management of food safety in the supply chain, questions remain regarding the types of signals consumers seek in their purchasing decisions. In a survey conducted in spring/summer 2000 in France, Germany, and the UK, randomly selected households were asked about their food-safety concerns and their reliance on quality signals in their beef-purchasing decisions. Some results are summarized here; for more details, see Roosen, Lusk, and Fox (2003).

The survey was sent to a random sample of 1,000 consumers in each of the three countries. The response rate was 12%, 7%, and 15%, respectively. The survey revealed that concern for food-safety

² Among these are 298 feed producers, 95 organizations representing about 32,000 farms, 343 slaughterhouses representing 243 firms, 207 meat processors, and 26 retailers representing about 8,600 retail outlets.

issues, ranked on a scale from 1 (not important) to 5 (very important), was generally high. Bacterial contamination ranked highest among all issues in the UK followed by concern about the use of biotechnology. Bacterial contamination was also of great concern to consumers in France, but much less so in Germany. Use of hormones and biotechnology triggered a high degree of consumer concern, with both factors among the top three in all three countries, particularly in France. Food spoilage raised less concern in Germany than in France or in the UK. Marbling was more important to German consumers, whereas color played a more important role for consumers in France and the UK. Price received a higher score in the UK than in Germany or France.

One portion of the survey focused on how extensively product labeling is used by consumers in their purchasing decisions. One variable asked respondents about the importance they place on the brand of beef being purchased; a second asked about the importance given to its origin. Interestingly, the origin of beef received the highest rating of all attributes in both France and Germany, above price, marbling, or fat. In the UK, origin received a medium score. For consumers in all three countries, beef brands were of lesser importance than origin labels.

The results were analyzed using an ordered probit model. The probability that brand and origin label ranked high was regressed on socio-demographic variables and variables measuring food-safety concerns. In this analysis, food-safety concerns were aggregated into two variables. One variable represents concern for food spoilage and bacterial contamination; a second variable indicates concern about food production methods using pesticides, additives, antibiotics, irradiation, hormones, and biotechnology. Results suggest that concern about biological food-safety hazards does not influence the level of importance consumers place on brands; however, biological concerns positively influence the level of importance consumers place on origin. Concern for production technologies was positively associated with consumers who view branding and origin labeling as very important. Estimates suggest that a marginal increase in concern about production technology has a larger impact on the perceived level of importance of origin labels, as compared to branding.

Discussion

This paper reviewed issues involved in private marketing efforts for safe food, including changes in the production and retail environment as well as the resulting development of new labeling initiatives. Marketing of safe food has become a central issue for retail firms and is linked to the development of private-label products by retailers. Changing the supply relationship between food manufacturers and retailers, private labels offer retailers more control over production processes and help them increase customer loyalty and consumer confidence.

Sector-specific food-safety-certification schemes are being developed to avoid transaction costs due to additional audits. The analysis shows, however, that if newly developed labels are not accompanied by effective sanctions, moral-hazard and safety problems may persist.

Past experience suggests that food-safety issues have had an impact on product differentiation and label development. How this differentiation impacts the competitive structure of the industry remains open to future research. Studies on the competitive impact of the introduction of quality-differentiated private-label products may give some indications (e.g., Cotterill, Putsis, and Dhar 2000).

Results of the consumer study show a potential for product differentiation with regard to some food-safety issues. This particularly holds in relation to process attributes that consumers perceive as meaningful signals of food safety. As a result, private markets may exist for these types of information. Other issues cannot be dealt with on a voluntary basis. Government action will be required to protect consumers from false claims and to support the credibility of a labeling system. Governments also must act to reduce the risk of information overload for consumers. Where a multitude of labels and claims exists, markets may become too fragmented to function efficiently.

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