Standards and supply chain management
– theoretical aspects and evidence from the agrifood sector

Eric Giraud-Héraud, Ruben Hoffmann, Cristina Grazia, Sylvaine Poret

The objective of this research program is to examine the economic efficiency of standards developed by companies in response to consumer concerns pertaining to food quality and food safety and as a complement to and/or in response to existing and anticipated public policy. In order to explain when and how different standards emerge a theoretical framework in which alternative vertical relationships between companies (between processing firms and their suppliers or between processing firms and retailers) play a crucial role is developed. Case-studies found in the agro-food sector serve as a starting point for this work although the framework will be applicable to other sectors as well. Food safety (improving the internal production process and coordinate the interaction within the chain), the taste and nutritional quality of products (reducing inputs with negative health effects) and the ethic behaviour of firms from a social perspective (fair trade, improved working conditions, etc) are aspects that will be highlighted in examining the economic efficiency of standards. The theoretical framework will sometimes differ substantially depending on which of these aspects is the focus of the analysis as e.g. incentives and information structure may differ substantially.

The efficiency of the standards used by firms naturally depends on the perception and behaviour of consumers. Hence, we in a first step in [1] and [2] analyze consumer perception and behaviour with regards to quality and food safety in an experimental setting. In the food sector, quality is often taken to refer to “experience characteristics” such as taste, while safety relates to “credence characteristics” which are not necessarily observable. This inherent difference is explored using experimental economics and it is shown that consumers' willingness to pay (WTP) for improving taste characteristics may be greater than the WTP for improving the safety characteristics of a product (e.g. reduction of pesticides in agricultural production). Hence, the results indicate that there may be a large difference between providing information concerning the absence of negative aspects (safe) – implying that the information may be used to define a minimum essential standard consumers are not willing to pay a premium for - and providing information concerning positive aspects – implying that consumers use such information to better match their personal preferences with the product offered and thus are willing to pay a premium.

In order to develop standards that effectively improve food safety, firms have to take into account such potential misperceptions by consumers in a way that combine the food safety characteristics and the taste characteristics of a product. In [3] and [4] we develop an original framework to better understand the development of brands, taking into account the misperception consumers may have concerning sanitary risks. In this context we show how adopting a standard may involve standardisation of raw materials thus requiring some kind of vertical relationship between processing firms and their suppliers. We show how downstream (processing or retailing) firms may be prompted to play an active role with respect to food safety, either by selecting only the safest upstream producers or by encouraging suppliers to invest so as to improve the safety of their produce. If consumers overestimate the risk the downstream firm may adopt the former strategy while if consumers underestimate the risk a downstream firm may adopt the latter strategy. Furthermore, it is shown that the actual contamination risk is not necessarily decreasing in the level of the food safety standard.

Given the importance of the information structure and the heterogeneity of firms we in [5] examine how the vertical organizational structure of firms and the costs of providing quality affect the pricing strategy of firms when consumers may have imperfect information about quality. The conditions under which a firm with a premium brand charges a higher price than a firm with a generic brand and when it only markets a larger quantity while charging the same price are analyzed. Examining the equilibrium outcomes it is shown in what way this depends on the degree of product differentiation, the proportion of uninformed consumers, the cost of quality and the structure of the firms.

Drawing on the results discussed above we in the following focus on the issues of when and how different standards emerge. In order to obtain a certain level of safety in a market, policy makers can either stipulate a minimum standard through legislation or they can introduce rules of liability leaving to firms to define what standards to implement and how to do it. In recent years the use of firm-specific assurance schemes has increased. Furthermore, it is becoming more frequent that firms cooperate and implement a common standard. Some of these joint private standards are characterized by open access, i.e. all companies that wish to enter are allowed to do so. This relatively new kind of standards is interesting because they potentially involve a large part of the industry. Hence, the question arises whether such standards could be an efficient substitute for publicly regulated minimum standards.

In order to analyze the phenomenon of joint private standards in depth we initially in [6] develop a general theoretical model of vertical relationships in which a group of downstream firms impose a more stringent standard on upstream suppliers. The probability of failing to provide safe goods in the final market is endogenously determined by the investments made by upstream producers and a cost of liability based on a “due diligence principle” is taken into account and modeled as a function of the level of the standard adopted. The influence of the liability rule on the adoption of the standard and the market share of standard are examined and discussed. The conditions under which the probability of a failure to provide safe goods decrease are examined and discussed. It is shown that the safer the products are (i.e. the higher the level of the standard) the less widespread will the standard be and hence the risk of failure in the final market does not necessarily decrease with a higher standard. Consequently, a higher level of the standard does not necessarily imply a safer market. Furthermore, it is shown that with a penalty cost of failure all downstream firms, those adopting the standard as well as those not adopting the standard, are better off if at least one upstream producer invests in order to adopt the standard.

Several potential extensions of the research outlined above may be considered. It would be interesting to explore how and when collective private safety standards emerge taking into account the difference in the incentive structure of firms producing premium brands and firms producing generic brands. Another interesting area for further research would be to analyze the difference between initiatives to promote healthier foods through public voluntary schemes (eg. the Swedish “Keyhole”, the French “Programme National Nutrition Santé”) and collective private schemes (eg. the “Choices” program initiated by Unilever). It seems reasonable to assume that standards pertaining to health implies that the incentive structure of and the information available to firms, policy makers and consumers differ substantially from that of standards pertaining to safety. Hence, analyzing such standards would require a different theoretical framework which needs to be developed. In such a framework the vertical relationships are likely to be of considerably less importance. Finally, standards pertaining to the ethic behaviour of firms from a social perspective will be explored.

References

[1] Combris, P., Seabra Pinto, A. Fragatta, A., Giraud-Héraud, E., (2007), “Does Taste beat Food Safety? Evidence from the "Pera Rocha" case in Portugal”, *in* Canavari M., Regazzi D., Spadoni R. (eds., 2007). International Marketing and International Trade of Quality Food Products. Proceedings CD-ROM of the 105th Seminar of the European Association of Agricultural Economists , Bologna, March 8-10, 2007.

[2] Seabra Pinto, A., Combris, P., Fragata, A. & Giraud-Héraud, E. (2007). Willingness-to-pay for safety and quality attributes of Rocha' Pear. In: Proceedings of the 10th International Pear Symposium, 22-26 May 2007.
[3] Giraud-Héraud, E., Grazia, C., Hammoudi, A., (2007), "Strategies for the development of brands in the agrifood chains", Workshop INRA-IDEI "Geographical indications and brands: firms strategies and brands: Firms strategies and public policies", *Toulouse, June 14-15, 2007*
[4] Giraud-Héraud, E., Grazia, C., Hammoudi, A. (2007), "Agrifood safety standards, market power and consumer misperceptions", *in* Canavari M., Regazzi D., Spadoni R. (eds., 2007). International Marketing and International Trade of Quality Food Products. Proceedings CD-ROM of the 105th Seminar of the European Association of Agricultural Economists , Bologna, March 8-10, 2007.
[5] Hoffmann, R., Andersson, H., (2007), Pricing Strategies – Effects of Consumer Uncertainty, Vertical Integration, and Costly Quality, mimeograph.
[6] Giraud-Héraud, E., Hammoudi, A., Hoffmann, R., Soler, L.G., (2007), Vertical Relationships and Joint Private Safety Standards, 2nd International Symposium on Economic theory, policy and applications, Athens, 6-7 August 2007.