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Food quality, imperfect information and the role of markets and the state

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Measures of agricultural and food policy in industrialized countries are increasingly targeted at food quality. Regulation by governments to guarantee food safety are at the heart of the public debate. Public instruments of quality assurance are introduced on markets via certification and labelling. Public support for organic production or guaranteed regional origin shall provide quality signals for consumers. Arguments for consumer protection, such as the Precautionary Principle, are stressed but they may serve as a rationale for non-tariff barriers to agricultural and food trade, too. In addition to the public activities a large number of private initiatives for quality assurance does exist in the food industry.

So far, a comprehensive economic evaluation of the policy measures directed at food quality, the private-sector quality assurance initiatives, and their interaction is not available. Such an analysis has to account for consumers' incomplete information, uncertainty about food quality as well as consumers' information behaviour.

Given this background, this special issue shall contribute to a well-founded economic evaluation of the role of markets and the state in assuring food quality. The following collection of papers covers a variety of important issues relating to food quality, consumer behaviour and the role of markets and the government as regards food safety. Case studies refer to a number of industrialized countries, namely the European Union, the US, Japan and New Zealand. Despite the variety of topics and case studies discussed, it is a common feature of all papers that they have a methodological focus – either in theoretical or quantitative analysis or both. In that sense, the authors show convincingly that analytical economic research can be applied fruitfully to food-quality and food-safety issues in the future, as it has to price analysis and agricultural market policy in the past.

The first paper, by Charles B. Moss, Troy G. Schmitz and Andrew Schmitz, is titled "The brave new world: imperfect information, segregation costs, and genetically modified organisms". It deals with genetically modified (GM) foods where consumer resistance has been particularly high, especially in Europe. In a microeconomic framework, the authors argue that consumers' willingness to pay for GM-free products will lead to a market segregation between GM and non-GM foods. Simulations with their model indicate that segregation costs and the magnitude of the supply shift are crucial for the economic impacts of market segregation. Moss, Schmitz and Schmitz elaborate those combinations of market segregation costs and increased supply due to the

new technology under which the society's welfare remains unchanged or improves.

Adequate responses to food safety concerns among consumers are increasingly important for political and business strategies targeted at consumer information. The next two contributions investigate survey and experimental data which can provide valuable insights for designing such strategies. First, Jochen Hartl and John Fox address the issue of consumer acceptance of new technologies in "Estimating the demand for risk reduction from foodborne pathogens through food irradiation". Applying a double-bounded dichotomous choice model to data from a mail survey in eight US states, they investigate consumers' willingness to pay (WTP) for reduced risk from foodborne pathogens. They find that the median WTP exceeds the additional cost of irradiation, but that the "embedding effect" is also present so that WTP only partially reflects the extent of risk reduction. In their analysis they also test for isolated and combined impacts of further individual characteristics and design factors, providing insight in various topical and methodological issues related to the demand for risk reduction in foods. So, despite the fairly restricted use of food irradiation in the EU, the European audience receives information that will be relevant for further developments and research.

Second, Michele Graffeo, Lucia Savadori, Luigi Lombardi, Katya Tentori, Nicolao Bonini and Rino Rumiati present results from an experimental study in their paper on "Trust and attitude in consumer food choices under risk". With this contribution, the European experience of declining consumer trust due to various food safety crises is taken into consideration. The authors test with a structural-equation model for different hypothesized causal linkages between specific elements of attitude, antecedents of trust in the food chain system, and food choice as the dependent variable. Their analysis identifies two affect-based elements of trust and attitude, respectively, i.e. perceived shared values and food consumption as a positive experience, as key factors determining food choice in the context of a food scare. However, overall trust in the food chain system does not have a significant impact on participants' choices, thus questioning attempts in the EU to generally regain consumer trust.

"Relating diet, demographics and lifestyle to increasing US obesity rates" is the contribution of Christiane Schroeter. Obesity is linked to the quality and quantity of foods consumed and it has become a major threat to human health in industrialized countries. Schroeter analyzes data from the

U.S. National Health and Nutrition Examination Survey (NHANES) within a multivariate analysis to investigate how obesity can be explained with these cross-sectional data. A major result is that a number of dietary, demographic and lifestyle variables affect the body-mass index. The author cannot confirm, however, the causality often postulated between fast-food consumption and obesity.

An interesting Californian case study is then presented by Henrich Brunke, Julian M. Alston, Richard S. Gray and Daniel M. Sumner: "Industry-mandated testing to improve food safety: the new US marketing order for pistachios". Food safety events in pistachios have occurred on several occasions since 1997 and in various countries, when aflatoxin levels were too high. Established as a US federal marketing order by the Californian pistachio industry, the new US marketing order for pistachios is a form of collective action. The marketing order contains standards and controls to reduce the likelihood of dangerous pistachios and further food safety events. The authors present simulations with a pistachio market model indicating that the net welfare effect of the new marketing order is in all cases positive. The marketing order, according to Brunke et al., raises the benefits of consumers **and** producers by guaranteeing a safer product.

The following paper by Sayed H. Saghaian and Michael R. Reed analyses the "Demand for quality-differentiated beef in Japan", a country where consumers have very discriminating tastes and are willing to pay very high prices for high-quality food. This is clearly shown by large price differences between four origins, two domestic beef types plus imports from Australia and the US, reported by the authors for four different beef cuts. Based on a model of vertical product differentiation, Saghaian and Reed estimate an inverse demand system for each beef cut, which allows to capture non-price quality competition. Their analysis shows that Japanese consumers prefer domestically produced beef to imported beef and that quality-related substitution effects exist among the various origins. This paper clearly stresses the need for market analyses based on more detailed data, in particular for marketing applications.

The final paper, by Mohammed Khaled, Vhari McWha and Ralph Lattimore, is titled "Fragmenting markets and quality change in New Zealand foods: empirical analysis with a Rotterdam model". The authors estimate a demand system, present a comprehensive set of food price and expenditure elasticities and analyze structural changes in New Zealand's food demand over the last two decades. Various trends, like the increasing household consumption of fruits and vegetables, poultry and food away from home, are related to changes in consumers' perspectives of food quality. Additionally, Khaled, McWha and Lattimore show that the consumption of major foods like fish, poultry, and meat or meals away from home have become more price elastic compared to earlier studies. The authors address this to increasing market fragmentation, i.e. the development of increasingly heterogeneous markets as a consequence of more differentiated consumer preferences.

In general, the set of articles in this special issue covers many interesting topics and raises new questions. Therefore, we hope that the methodological approaches and the issues covered here will stimulate future economic research on food quality and food safety.

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