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Economic assessment of food safety standards: Costs and benefits of alternative approaches

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ABSTRACT

This article provides an overview of economic methods to measure costs and benefits related to food safety issues. After an introduction on general economic principles, including the distinction between social and private costs and benefits, the article highlights the various methods for calculation of costs and benefits, including "willingness to pay", amongst others. Particular attention is paid to the "quality-adjusted life years" (QALY) method for quantitatively expressing health impacts. The practice of Regulatory Impact Assessments as carried out by the UK authorities is explored in more detail as an example of cost–benefit analysis of regulatory measures. The applicability of the approaches to the various stages of the SAFE FOODS model is highlighted.

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1. Introduction

Formal assessment of the economic impacts of regulation is an increasing component of governments' desire for evidence-based policy making. In particular, formal consideration of economic issues, quantification of these where possible, and publication of findings and their underlying assumptions are vital to transparent and accountable policy making. With this in mind, Guidelines have been formulated at EU and Member State levels (see for example BERR, 2008; European Commission, 2005). In some Member States, formal, quantified Regulatory Impact Assessments are becoming routine and influential. The European Commission guidelines are intended for the assessment of proposed policies and legislation, but the recommendations have not systematically been extended to the implementation of legislation and decision-making on specific risk issues. In particular in the area of food safety there is a lack of detailed policy guidance for the formal and systematic consideration of the distribution of risks, costs and benefits (environmental, economic and social), and consequently there is a lack of transparency how such considerations are weighed into decision-making (Koenig et al., 2008). The SAFE FOODS project goes further than the various sets of guidelines in proposing that economic, social and environmental aspects of food safety should be considered throughout the risk analysis process: during problem framing, assessment, evaluation, decision-making, monitoring and review.

The aim of the present paper is to review alternative approaches to the economic analysis of the distribution of costs and benefits from a conceptual and a pragmatic perspective. We indicate how and where the economic approach fits within the overall SAFE FOODS framework and how it contributes to transparent and accountable risk management. We also highlight tensions in setting common standards appropriate to all Member States and in conformity with WTO treaty obligations.

This paper is not a comprehensive review of food safety economics which has many strands beyond economic evaluation of proposed regulations. These include: the use of food safety regulations as non-tariff barriers, especially to developing countries (e.g. Henson & Loader 1999); methods for the assessment of compliance costs of alternative food safety approaches such as HACCP (e.g. Boland, Hoffman, & Fox, 2007); alternative mechanisms for food safety control such as legal liability (e.g. Kolstad, Ulen, & Johnson, 1990); analysis of how firms respond to food safety regulations (e.g. Caswell & Johnson, 1991); and the political economy of food

Abbreviations: BSE, Bovine spongiform encephalopathy; CIAA, Confederation of the food and drink industries of the EU; COI, Cost of illness; CUA, Cost utility analysis; EFSA, European Food Safety Authority; ERS, Economic Research Service of USDA; EU, European Union; FSA, Food Standards Agency (UK); HACCP, Hazard Analysis Critical Control Points; NICE, National Institute for Health and Clinical Excellence (UK); NTD, Neural tube defect; OECD, Organisation for Economic Co-operation and Development; QALY, Quality Adjusted Life Year; RIA, Regulatory Impact Assessment; UK, United Kingdom; USDA, United States Department of Agriculture; VSL, Value of Statistical Life; WTO, World Trade Organisation.

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safety regulation (e.g. Henson, Loader, & Traill, 1995). A recent book by Hoffman and Taylor (2005), also addresses many of these issues.

2. Overview of economic assessment

2.1. Basic economic principles of resource allocation

Markets work by coordinating the tastes and technology of consumers, producers, middlemen, and sellers given well-established property rights set by government. Markets exist for all types of foods (e.g. burgers, chips, restaurant meals, take-aways, food ingredients); and markets also exist for gyms, taxis, bicycles, health services, weight-loss clinics, and insurance. The power of the marketplace rests in its ability to help people make trade-offs such that goods and services move from low valued uses to higher value uses. The market price is the key here—the price reveals the relative scarcity of the good or service based on the classic ideas of "supply and demand". If people demand more of a good (holding supply constant), the price goes up and, as a consequence, more resources are allocated to production of the good.

Economics makes the point that when markets work, they work well—they lead people to decisions that maximize the benefits to society. If all the key conditions to support a well-functioning market exist, economics tells us markets should be left alone and the final market equilibrium would reflect the best possible outcome for society given the distribution of income.[1] People achieve the best outcome through self-interest regulated by competition. Key conditions include well-defined property rights (and the means to enforce them), no externalities, no monopoly power, and nobody holds an information advantage so as to distort market prices. However, for some products and services, these market conditions are more applicable than for others.

If these conditions are not applicable, markets can fail. In these cases, equilibrium prices and quantities do not capture the total social costs and benefits; some form of governmental intervention is needed to rebalance the equation between private desires and social goals. The critical question becomes understanding exactly how the market has failed, and what governments can do to realign private and social costs and benefits without generating unintended consequences of otherwise well-aimed policies, and ensuring intervention is cost effective. (There are, however, also other reasons for which policies can fail, the topic of flawed policies and government failure is, however, beyond the scope of this paper.)

For market failures in relation to food safety, *Information problems* are usually the main cause. In a well-working market, full information is available to all market participants. In the case of food safety there are two possible information problems, the first, *asymmetric information*, when the seller is better informed than the buyer and could, in principle, pass off unsafe food as safe. Due diligence laws with legal liability, and the costs to firms of lost reputation make this unlikely in developed countries. The second, *imperfect information,* means that consumers are unable to tell by inspection whether food is safe; possible solutions include labelling (e.g. in relation to allergens) and standards (product or process).

It is widely accepted that food safety is a clear example of an imperfectly functioning market and that governments have an important role to play in regulating food safety. A critical issue is: what is the appropriate level of safety governments should establish? It is widely accepted that zero risk is unachievable and attempting to achieve zero risk would be a waste of valuable resources. Economists consider there is an optimal level of food safety at which the additional (marginal) costs of a higher level of safety are equal to their additional (marginal) benefits. Fig. 1 (from Henson & Traill, 1993) is the usual representation showing that the additional cost per unit to achieve ever higher levels of safety is an increasing function (the marginal social cost curve is upward sloping); in other words it is cheap and easy to improve safety from a very low level, but additional improvements are ever more costly. In contrast, the marginal social benefits which represent society's additional willingness to pay to avoid ill-health and the costs of treating ill-health fall as the level of safety increases, represented by the downward sloping marginal social benefit curve; the more unsafe food is, the more people would be willing to pay for a small increase in safety, but once food is already relatively safe, people are less willing to pay for improvements.[2] At a point such as A in Fig. 1, the amount society is willing to pay exceeds the amount it would cost to improve safety, so it is worth allocating resources to produce more safety; at B, costs exceed benefits, so too many resources are being devoted to safety. Only at Q_m are costs equal to benefits per unit of safety representing efficient resource allocation (P_m is the corresponding 'shadow' price per unit of safety, the implicit value attached by society to safety).

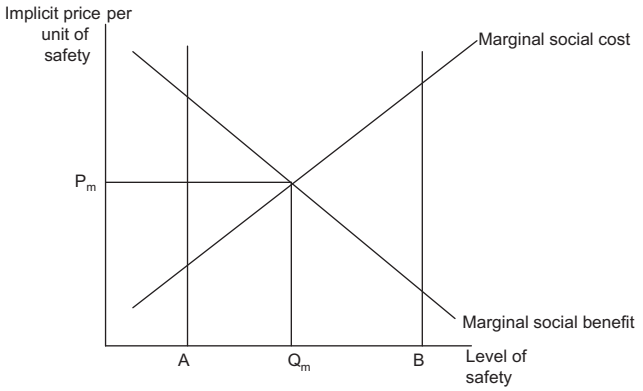

Fig. 1. Demand for and supply of food safety.

2.2. Cost–benefit analysis

The absence of a well functioning market for food safety necessitates the measurement of marginal social costs and benefits to determine whether a higher level of safety provided by a proposed regulation is justified. This is the basis for an economic cost–benefit assessment as part of the assessment and evaluation of regulatory options in food risk analysis. We proceed to discuss measurement approaches for cost–benefit assessment. Many of the alternative techniques for evaluating policies, such as cost-effectiveness, cost-of-illness and cost-utility analysis consider, for simplicity and practicality, only a sub-set of the costs and benefits. By discussing the 'complete' list of costs and benefits first we are in a better position to judge how much information is lost in the simpler approaches.

Economists generally consider cost–benefit analysis to be the gold standard in measuring the impact of a policy intervention, but it must be recognised that it does not consider everything that politicians, industry and other stakeholders may consider important; for example it is a static measure that does not consider the impact of an intervention on economic growth through slowing

[1] Economic theory suggests income redistribution is better achieved through fiscal policy instruments than through sectoral policies.

[2] Note that the curves correspond to supply and demand curves in a conventional market and have the same interpretation.

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