Gabriele Jahn, Matthias Schramm
and Achim Spiller

The Reliability of Certification: Quality Labels as a Consumer Policy Tool

ABSTRACT. Given the large number of certification systems in the food industry, it is surprising that there are only a few research approaches to the economics of certification. Certification schemes are used to ensure marketing claims for unobservable quality attributes. Under asymmetric information, process-oriented quality characteristics such as organic farming, animal welfare, or fair trade raise the question of mislabelling. In the long run, only a reliable control procedure can reduce the risk of food scandals. The article presents a model which includes several starting points to enhance the efficiency of certification systems and the corresponding labels. On the whole, tendencies towards price wars on the certification market and considerable differences in performance reveal the necessity of institutional changes. Strategies for reducing auditors' dependence, intensifying liability, increasing reputation effects, and minimizing audit costs are suggested. Finally, policy implications for public and private monitoring are discussed.

Numerous crises and scandals (BSE, FMD, etc.) have shaken the European food sector over the past few years. In spite of far-reaching regulations and governmental control, most of the causes were not detected until after the crises had occurred, leading to a decline in consumer confidence in the safety and quality of many food products (Hobbs, Fearne, & Spriggs, 2002; Sporleder & Goldsmith, 2001). As a consequence, many EU countries developed consumer protection strategies such as new quality labels based on neutral control throughout the whole value chain. At first sight, the labelling approaches seemed to be an adequate policy tool as they ensured high-quality food and at the same time relieved public authorities of an additional financial burden (Caswell & Mojduszka, 1996). However, it is evident that the reliability of the quality labels and their effectiveness in consumer policy strongly depend on the type of external audits and their implementation. Usually the control process is carried out by independent inspectors (certifiers) who in turn have to fulfil criteria laid down by rule-making agencies. Only if the certifiers succeed in revealing critical aspects and opportunistic behaviour will quality

Journal of Consumer Policy (2005) 28: 53–73 © Springer 2005

assurance concepts be able to build up the reputation necessary to serve as a reliable quality signal.

From experience, we know that certification systems are susceptible to opportunistic behaviour. In 2000 about 10% of organic corn sold in Germany came from "conventional" agriculture despite the existing control scheme (Baummann, 2001). Rough estimations for the southern states of the EU allege frauds in organic labelling between 15% and 40% (Giannakas, 2002). Other examples of imperfect monitoring standards can be found in Anania and Nisticò (2003), GfRS (2003), and McCluskey (2000).

Furthermore, the current crisis in financial auditing reflects the potential shortcomings of third party control procedures. Scandals such as Enron or Parmalat caused a deep loss of confidence in the quality of financial auditing (Nussbaum, 2002; Thomas, 2002; Vinten, 2003). In contrast, research and public discussion about the audit quality within the food sector are still in early stages. The assumption of perfect certification is implicitly or explicitly part of most research models dealing with credence goods (Giannakas, 2002).

In a market in which the company to be supervised can choose its own auditor, misleading incentives may occur. A cheap certification can be a decisive competitive advantage in certification markets (Barrett, Browne, Harris, & Cadoret, 2002). Low-cost strategies can significantly affect the quality of inspections. The underlying institutional structure can considerably influence the effectiveness and reliability of the whole certification system. Only if the label is recognized as a valid signal by the customer will there be a lasting quality increase (Golan, Kuchler, Mitchell, Greene, & Jessup, 2001; Nayga, 1999). This paper analyses the core structure of certification systems and tries to evaluate the respective instruments to enhance audit quality.

INFORMATION ASYMMETRY, PRODUCT QUALITIES, AND LABELLING

According to the traditional economic model, the market is the meeting point of supply and demand with the aim of exchanging homogeneous products. The (neo-) classic model implies that both suppliers and buyers are fully informed about all commodities concerned. In fact, neither are all traded goods homogeneous, nor are all participants equally well informed. Market activities are often characterized by far-reaching information deficits that impede the smooth

functioning of markets (Akerlof, 1970; Spence 1976). Depending on the degree of information asymmetry between supplier and customer, different types of goods can be identified according to the dominant quality attributes (cf. Figure 1) (Antle, 2001; Darby & Karni, 1973; Nelson, 1970).

In Figure 1, another quality dimension is added to the classical information economics typology of search, experience, and credence attributes. "Potemkin" attributes (Tietzel & Weber, 1991) are characterized by the fact that neither the buyer nor external institutions are able to carry out controls through laboratory analyses at the end-product level. This holds true for nearly all process-oriented attributes (e.g., organic production, animal welfare, kosher foods, dolphin-safe tuna, fair trade). In the case of credence attributes, in contrast, fraud and mislabelling can be revealed by inspections carried out by external organizations, public authorities, or competitors (Caswell, Bredahl, & Hooker, 1998; Emons, 1997; Vetter & Karantininis, 2002). Test results are spread among the customers via the mass media. The likelihood of detecting firms falsely claiming specific credence qualities depends on (a) the amount of monitoring in the respective product category and (b) whether the company is famous enough for newspaper reports. Assuming a strict third-party monitoring and a high disclosure rate, credence goods could theoretically be treated as experience goods (McCluskey, 2000). Third parties supplying customers with information about credence goods result in reliable quality signals. As a consequence, specific marketing investments (advertising, branding) bind manufacturers although high information asymmetries create strong incentives for cheating (Ippolito, 1990; Kirchhoff, 2000).

Search attribute	Experience attribute	Credence attribute	Potemkin attribute
Qualities, which are known before purchase	Qualities, which are known only after consumption	Qualities, which can be observed by a single customer only to prohibitive costs, but buyers can rely on third-party judgements	Process-oriented qualities, which are hidden for third parties as well as for customers at the end product level
Freshness, appearence	Taste, shelf life	Nutrition, contamination	Animal welfare, fair trade

Increasing information asymmetry

Figure 1. Typology of goods based on Information Economics.

The information asymmetry related to Potemkin attributes can, however, not easily be bypassed by classical quality signals such as advertising, branding, and guarantees. Quality characteristics are closely connected with the production process that is hidden to the outside observer. The only way to detect fraud is the direct monitoring of the company's internal production process. For most third parties, for example, consumer agencies or other stakeholders, this is not feasible, as only public authorities have the right to conduct investigations within a company. Additionally, these rights are restricted to cases of suspected contravention (e.g., threats to food safety, environmental harm). Furthermore, for a comprehensive control to be exerted, sufficient public manpower and budgetary means must be available. In case of private standards there is no legal basis at all for public or private control of the production process.

Finally, in the case of Potemkin attributes quality statements can be made with hardly any risk of disclosure, as consumer agencies, NGOs, and public authorities are usually not able to verify marketing claims or discover opportunistic behaviour. What is needed to circumvent these fundamental problems is an investigation scheme that covers the whole supply chain and ensures on-site inspections throughout the production process.

Certifying systems are able to guarantee these inspections, which is why they are gaining popularity on all levels of the agri-food chain (Auriol & Schilizzi, 2002). Especially in the field of process attributes, quality labels have become the most popular consumer policy tool (Golan et al., 2001). By means of regular control and – where necessary – additional sampling, neutral inspection institutions monitor the entire supply chain. Once having been awarded the requisite certificate, companies are entitled to make use of the quality label for marketing purposes. Some examples of recent certification systems are the various labels for Organic Farming, Fairtrade, Protected Designation of Origin (PDO), and GM-free. New legal standards such as EC regulation No. 178/2002 on traceability will surely fuel the discussion on those forms of quality assurance which encompass all stages of production (Theuvsen, 2003).

However, certification systems and labelling imply multifaceted problems to which the parties involved have so far paid little attention: The central task of certification, the reduction of information asymmetry within the market, can be fulfiled only if the institutions in charge succeed in assuring certification quality and, thus, the validity

of the audit signal. Only if the underlying organisations succeed in establishing a quality reputation in markets will the corresponding labels be accepted as a quality surrogate. They need to demonstrate a credible commitment towards the principles and specific regulations of the certification system in question.

A closer look from the institutionalistic point of view could be helpful in determining whether the current incentive structures are truly effective in curtailing opportunistic behaviour. A priori it cannot be taken for granted that the certifiers or the companies to be audited will conform to the established regulations. The thoroughness of the audit process often varies considerably as control procedures and occupational qualifications have not yet been sufficiently well defined.

All in all, the aforementioned factors indicate existing problems in the certification processes. Given the rapid growth and the still poorly developed structures of the comparably young certification market as well as the lack of experience on the part of the protagonists, fraud is likely to occur. In the following the institutional structure of certification systems is analysed in detail; the analysis is mainly based on analogies in financial auditing.

INSTITUTIONS AND STRUCTURES OF CERTIFICATION

A Simple Structure of Certification Systems

"Certification is the (voluntary) assessment and approval by an (accredited) party on an (accredited) standard" (Meuwissen, Velthuis, Hogeveen, & Huirne, 2003). A key feature of a certification system is that inspections be carried out by independent bodies (third party audit) beholden to standards laid down by external organisations (Luning, Marcelis, & Jongen, 2002). Basically, all systems have a similar structure as shown in Figure 2. The starting point is the flow of goods between the producer and the customer. The supplier provides a certificate serving as quality signal, which is issued by a neutral certifier based on the quality and certification standards laid down by the standard owner. Certifiers, in turn, have to prove their ability to carry out inspections according to these rules through an accreditation usually given on the basis of the ISO 65/EN 45011 standard (http://www.iso.org) including general requirements for assessment and accreditation of certification bodies. Accreditation is largely a formal

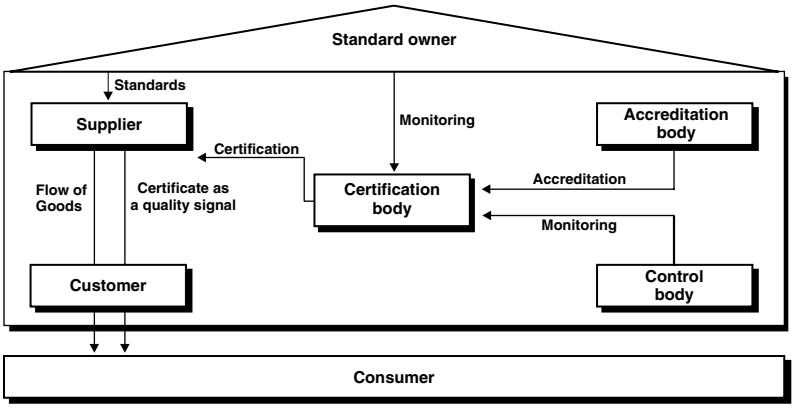

Figure 2. Basic structure of certification.

act and does not include supervision of the real working process. This explains why some of the certification systems intend to introduce a monitoring function ("control-of-the-control") by involving either private institutions or public authorities.

Given the system elements stated above, different certification systems can be described whose central distinguishing criterion is the standard owner responsible for developing standards and control procedures. Basically, there are public (state-run) and private initiatives: Governmental certification systems serve consumer protection purposes by providing quality labels to improve market transparency. In recent years, operative inspection tasks have been delegated predominantly to private certifiers monitored by public authorities (e.g., Organic Farming or PDO labelling). Public standards make it possible to prevent mislabelling through laws and fines enforced by public authorities. As McCluskey (2000) argues, the main disadvantages are a loss of flexibility and innovation, lock-in-effects, and few incentives for overcompliance.

Nowadays, most certification schemes are privately organized. Certification procedures tend to be significantly different depending on whether the certification is to be used for consumer marketing purposes or should meet the demands of institutional buyers. The ISO 9000, for example, is predominantly a business-to-business (B-to-B) marketing tool. Other well-known examples are the EUREPGAP standard, covering agricultural producers, and the British Retail

Consortium (BRC) or its German equivalent International Food Standard (IFS), directed towards the manufacturers of private labels. Most of the B-to-B certifications are based on the retailers' efforts to control the suppliers. Nevertheless, as a countervailing power there are also certification systems initiated by suppliers such as the Assured Farm Standard (AFS) in British agriculture.

Whereas the above-mentioned certifications mainly focus on the supply chain, recent times have seen a shift towards certification labels directed at the consumer. The main practical importance belongs to those meat industry approaches comprising the whole value chain (e.g., the Dutch IKB-system or the German QS-system). Furthermore, club concepts such as the labels of specific associations (e.g., organic producer associations like the British Soil Association) refer to one homogeneous segment of an industrial sector only. The Marine Stewardship Council (MSC) label aiming at sustainable fishing practices and its equivalent in forestry, the Forest Stewardship Council label (FSC), are basically supported by stakeholders coming from different NGOs (environmental, consumer, or development policy). Transfair or Max Havelaar are further examples of this type of labelling. Finally, some individual certifying organisations such as EFSIS or the German Technical Inspection Agency (TÜV) have developed standards of their own. Figure 3 provides a typology of private certification systems.

Institutional Economics Structure

Figure 2 describes the institutions involved in a certification system. In practice, this simplified outline is however blurred, as all parties act as economic players, i.e., aim at maximising their own profit. Therefore, an analysis of certification systems must include tendencies towards

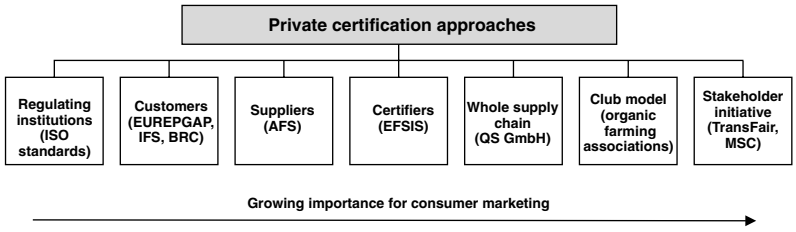

Figure 3. Typology of private certification systems.

opportunistic behaviour, as the intended *de lege* structure of certification systems can deviate from the *de facto* form. These deviations must be considered when analysing options for improving the functioning of certification systems. Figure 4 provides an overview of hypothesized structural components, relations, and contracts.

Considering the great number of customers demanding a certificate, manufacturers are increasingly under (economic) pressure to become certified. Several studies have revealed that suppliers view certifications as externally imposed obligations rather than as intrinsically motivated quality management systems (Beck & Walgenbach, 2002). Hence, it can be assumed that suppliers are not interested in the highest possible standard of inspection. Instead, their main interest lies in acquiring a certificate as easily as possible. As strict inspections lower the probability of successful certification, suppliers have an incentive to select auditors known to employ low inspection standards (Pierce & Sweeney, 2004).

Correspondingly, certifiers will act in the same way assuming a given inspection fee, i.e., will seek to minimise their audit costs. In addition, they often become dependent on their clients through a special form of setting the fee, known in auditing theory as "low-balling" (Calegari, Schatzberg, & Sevcik, 1998; DeAngelo, 1981b). In order to win the contract, auditors set the fee for the first inspection far below their calculated real costs. As profits tend to be realized only in an ongoing business relationship, the annual returns from subsequent inspections represent a quasi-rent since they depend on customer

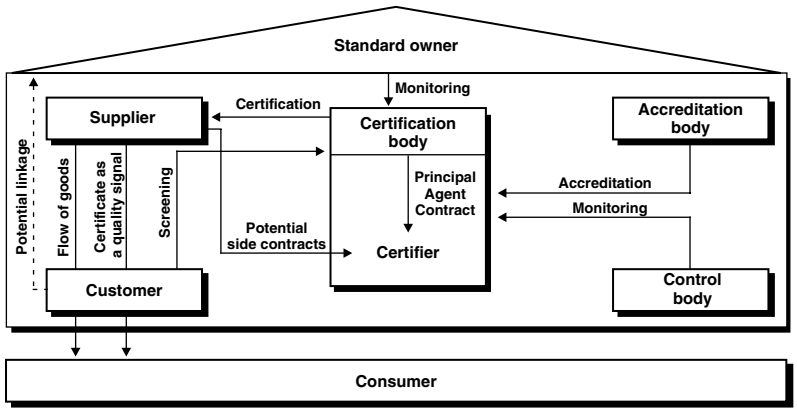

Figure 4. Basic institutional economics structure of certification.

loyalty. Low-balling makes the inspector undesirably dependent on his client (Makkawi & Schick, 2003).

Furthermore as each individual inspector is an agent of a larger certification company, it cannot be assumed that every certifier (agent) is pursuing the same objectives as the certification company (respective principal) (Arrow, 1985; Fama, 1980; Jensen & Meckling, 1976). In fact, the agents are maximising their own profits. In practice, this includes bribery by the company they are ordered to inspect (i.e., side contracts, Pechlivanos, 2004; Tirole, 1995).

FACTORS INFLUENCING INSPECTION QUALITY

A Model of Audit Effectiveness

Despite the complex incentive structure, the following analysis focuses exclusively on the relationship between the standard owner and the certifying bodies. All other factors potentially influencing the quality of certification are regarded as *ceteris paribus* variables. The efforts of the standard owner to create an incentive-compatible inspection standard are crucial. For our purpose we assume that the standard owner is interested in the highest possible inspection standard. Although there may be additional objectives (e.g., agricultural interests may dominate consumer intentions) depending on the economic interests of the standard owner, we will leave such motives out of the initial discussion.

The premise of the model is based on rational and risk-neutral agents tending to act opportunistically. Assuming the existence of a given inspection technology, with heightened inspection intensity the probability of discovering shortcomings grows, as do investigation costs. Certification fees are fixed exogenously. Under these conditions, the certification body acts to minimize costs.

The certifier's optimisation calculus can be represented as follows (Müller, 2004): The certifier's marginal cost (MC_C) arises from the marginal cost of the inspection (MC_I) together with the marginal opportunity cost of the loss of the client (MC_O). The latter pertain to the contingency that a company will replace a certifier it views as too strict with a more lenient one. Against a unilateral minimization of these costs weigh the increasing costs of a deficient inspection being discovered (MC_D), which in turn are composed of the marginal cost of a potential loss of reputation resulting from inadequate inspections

becoming generally known (MC_{R}) and the marginal cost of liability (MC_{L}). MC_{D}, as well as MC_{L}, will increase with decreasing audit quality (q). The costs of liability for example are composed of the probability of being held liable and the amount of the potential sanction. With a higher level of audit quality, the probability of being sanctioned decreases leading to an above average decline of the marginal cost of liability MC_{L}. Thus, the relevant cost functions to be minimized are as follows:

$$MC_C = MC_1 + MC_0,$$
$$MC_D = MC_L + MC_R.$$

From the certifier's point of view, a cost minimum appears at the intersection of the two curves that determines the inspection quality to be estimated by the auditor (cf. Figure 5). From these considerations, we can derive four basic starting points for improving inspection quality: (1) extending the certifier's liability (increasing the marginal cost of potential liability), (2) intensifying the effects on reputation in the certification market (increasing the marginal cost of loss of reputation), (3) decreasing the certifier's dependence on the firm being inspected (reducing the opportunity cost of losing the client) and (4)

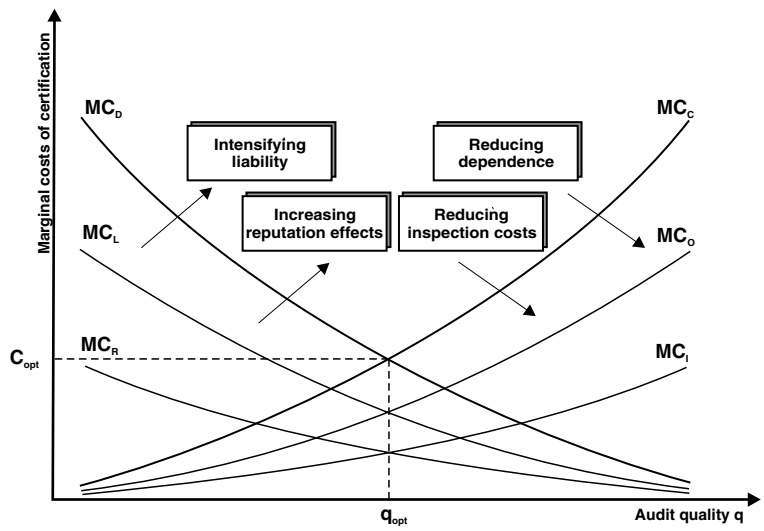

Figure 5. Determination of the cost minimum inspection standard.

reducing the inspection costs by improving certification technology (reducing the marginal cost of the audit).

The described model refers to a variety of research approaches analysing the field of financial auditing. Since the seminal studies of DeAngelo (1981a, b) and Antle (1982), many theoretical approaches to audit quality have been applied, generally based on decision theory, game theory, or agency theory. Besides the more formal research, empirical studies are also widespread. However, an analysis of these empirical findings makes apparent that they are often debatable (see Ashbaugh, LaFond, & Mayhew, 2003; Frankel, Johnson, & Nelson, 2002).

In the following the main results of research on financial auditing are used and transferred to the certification field. Two main differences have to be considered: In certification systems the choice of the auditor is normally taken by the management of the audited company itself. In contrast, in financial auditing the management is not the key player and investors interested in a high-quality audit can influence the choice decisively. Therefore the auditor has to convince the shareholders that his certificate is reliable. In our model suppliers engage the inspector with the only aim of receiving the certificate. The supplier's management has no interest in high inspection quality as this would enhance the risk of not meeting the standard. If managers really want to get informed about the internal status of their quality management, they will employ consultancy agencies.

Further complications to the transfer of existing results are differences in the audit object itself. Whereas certification includes process controls (e.g., field inspections), financial auditing mainly deals with the inspection of documents.

Intensifying Liability

Intensifying the inspector's liability raises the marginal cost of the liability and thus induces the certifier to increase the quality of the inspection. The certifier's likelihood to be made liable for negligent inspection (L_N) is the product of the probability of discovery (P_D), the probability of liability (P_L) and the potential fine (F) (Becker, 1968):

$$L_N = P_D \times P_L \times F.$$

At the moment, in most certification systems the probability of discovery is relatively small and there is, in practice, only a slight threat of liability. For the most part, the standard owner nowadays generally relies on the inspector's formal accreditation. In important systems such as EUREPGAP or IFS, for example, there are no plans to establish a supervisory authority. This is clearly contrary to the current practices in financial auditing. Here, two meta-control approaches can be distinguished: monitoring (in Great Britain and Spain, among others) and peer review (as in France and the United States, Baker et al., 2001). For the monitoring process, quality control is carried out by a professional organisation or public agency while in the case of peer review, colleagues in the profession are involved. Without these meta-controls, the threat of discovery exists only in cases where damage to a customer becomes common knowledge in the industry.

The certifier's probability of liability is relativized by the effective claims of negligence and the apportionment of the burden of proof. In auditing, there is no absolute liability, thus, in each case the certifier's guilt must be proven by the injured party. For outsiders, this is naturally difficult. For this reason, there is currently an intense debate on the preventative effects of absolute liability (Patterson & Wright, 2003; Sunder, 2003).

Furthermore, the costs of non-compliant certifiers depend on the potential claim for compensation. In Germany, as in many other European nations, the certifier's potential fine is not determined by third party damages, i.e., the losses suffered by those who relied on the certification (customers and consumers), and only the contracting party can enforce damage payments. Shared liability on the part of quality certifiers for the enormous damages that would result from a loss of reputation of a well-known brand could significantly contribute to increasing the level of care they would exercise.

The incentive represented by intensified liability is sometimes contested with reference to insurability. Accordingly, stringent liability would only lead to higher insurance premiums and, thus, to higher inspection costs. This argument applies only if insurers have no opportunity to observe the certifier's activities, i.e., to monitor the liability risk. In high-risk cases, this might mean that no insurance policies would be provided. Should this happen, the attendant risk would be intolerable for certifiers, especially if they were made liable not only in cases of opportunistic behaviour but also in those of

coincidental or (for the inspector) unrecognisable errors (inherent inspection risk). Differentiating between these error categories is essential to the practicability of an increased level of liability; otherwise, the certification market might well collapse (Arrunada, 2000).

In addition to costs arising from liability, penalties for non-compliance raise the costs for opportunistic certifiers: In private systems, they might be ordered to pay penalties or even be excluded from system participation. Public certification systems could also use criminal prosecution for fraud. These days, such far-reaching fines are not commonly enforced.

Increasing Reputation Effects

An intensification of the effects on reputation would have a similar impact to that of the threat of liability discussed above (Bauwhede & Willekens, 2004). If there are no effects on reputation, supplier and certifier have a clear interest in superficial certification. The resulting adverse selection will be encountered only if marketing advantages are triggered by an accepted label and/or an inspection through a certifier known to be thorough. In our model we will only analyse the latter, i.e. the chance of achieving a better audit quality by improving the certifier's reputation.

Reputation increases with higher market transparency. At present, consumers as well as professional buyers have only very little information about the performance of different certifying agencies. They cannot judge their work and because of the process attributes, they are unable to evaluate their activities after purchasing the product. Therefore, the disclosure of erroneous certifications by the standard owner would be a conceivable and efficient variation (Ballou, 2001). Nonetheless, this would require the existence of a third level of control. The failed company and the "successful" inspector would have to be named. Rankings based on detected fraud by different certifying agencies would be another alternative to improve market transparency and the effects on reputation.

The size of the certification body and the consequent strengthening of the effects on reputation is an option much debated in the literature on auditing. According to the findings of empirical studies in auditing, internationally renowned CPA groups can command higher auditing fees than lesser-known equivalent auditors (DeAngelo, 1981a; Niemi, 2004). This can be seen as a reputation bonus which would be lost if a

scandal occurs. Therefore, in case of doubt, the shareholder should call upon the company to contract with a highly reputable CPA firm (or certifier).

Increasing Independence and Protecting Quasi-Rents

Protecting quasi-rents, which can be traced back to low-balling as described above, means in essence that the certifier's dependence is diminished. At the moment, in most certification systems, suppliers are free to choose their inspectors and, moreover, to change them at any time, even while the contract is still running. Such changes are not even publicized. Under these conditions, it is easy for a producer to go "opinion shopping" (Lennox, 2000).

A starting point for increasing the certifier's neutrality could be the introduction of a 25% rule, according to which certifiers would not be permitted to accept clients who collect higher shares of their overall turnover. This would reduce dependency structures, but would, admittedly, also contribute to concentration on the certification market.

Separating consulting from certification could contribute to a further mitigation of the distinctly dependent relationship that develops if certifiers are also allowed to function as consultants. If the auditing market functions as an entry into the lucrative consultancy market, the opportunity cost of losing a client increases significantly. However, whether the total impact of a separation will be positive or negative is still a matter of debate in financial auditing (Ashbaugh et al., 2003; Frankel et al., 2002; Windmöller, 2000). On the one hand, prohibition reduces dependencies; on the other hand, knowledge spill-over effects lead to a higher audit quality with same input of resources. In addition, increased reputation effects can be a result of consultancy business combined with auditing. Nevertheless, politics has started an initiative to separate consultancy and auditing (e.g., Sarbanes-Oxley Act (SEC) of 2002 or Commission Recommendation of 15 November 2000 on quality assurance for the statutory audit in the European Union; see, for discussion of changes: Mayhew & Pike, 2004; Rezaee, Kingsley, & Minmier, 2003; Tackett, 2004).

Forced rotation of certifying agencies is another way to minimize the low-balling effect. However, this has the disadvantage of raising the inspection costs, as the accumulation of experience resulting from repeated certifications of the customer is lost (Communale & Sexton,

2003; Myers, Myers, & Omer, 2003). For this reason, it might be worth considering whether inspection contracts should not always last several (3–5) years and include a binding termination date. In this way, the certifier's quasi-rent would be protected while at the same time, learning effects would be achieved (Müller, 2004).

Suggestions that the customer chooses the certifier are far-reaching as, for example, in the German certification system for egg producers KAT e.V., whereby exclusive certifiers are chosen for specific regions by the standard owner. In this case, there ceases to be any harmony of goal between the principal and the agent, and thus there is no longer any dependency. A disadvantage is the limitation on competition, which can lead to higher inspection prices and threaten the neutrality of the certifier, e.g., acting as an agent of the retailing business.

Improvement of Inspection Technology

In the preceding section, we assumed perfect inspection technology. In practice, with the same costs certifiers can have varying levels of success due to different levels of know-how or different software support. Improved inspection technology lowers certification costs and, at the same time, contributes to enhanced certification quality. In addition to vocational training and better technical support, appropriate instruments include risk-oriented inspection approaches and an improved exchange of data and information among the regulatory bodies.

In financial auditing the adoption of "risk-oriented auditing" is a popular method to enhance inspection technology. "Risk-oriented auditing" is associated with a specific classification of clients due to the likelihood of fraud. Higher audit frequencies and deeper audit intensities are necessary in settings with high audit risks. Additional spot checks increase the discovery of errors whereas long audit intervals are only appropriate for companies characterized by a low risk of fraud.

In current certification practice, risk-oriented auditing is but rarely used. An exception is the German QS system in the meat industry in which the frequencies of the audits depend on the last audit report. If a farmer reaches high credits, he will be inspected every three years. Companies with bad results are inspected yearly. Another risk-oriented approach is the Dutch quality assurance scheme (KKM) on dairy farms.

One crucial point of risk-oriented auditing is the definition of the overall risk. Various studies in financial auditing focus on the

identification of risk factors related to management characteristics. The so-called "red flags" are potential risk indicators for fraudulent financial behaviour. The American Institute of Certified Public Accountants (AICPA) gives examples of "red flags" such as certain attitudes of the management toward financial reporting or a high turnover rate of key staff (Grove & Cook, 2004).

Hence, it becomes apparent that referring to former audit results can only be a starting point to integrate risk factors. A study carried out in organic food production reveals the following additional factors: (a) audit results of the last inspection (detected errors, achieved audit performance), (b) the category of food (e.g., shelf life, considering that fresh products decay quickly), (c) the potential benefits of mislabelling (e.g., the price premium in the respective category), (d) potential fines, (e) organizational structure (e.g., company size, complexity, import quota), and (f) the internal quality management system of a firm (GfRS, 2003).

In addition to specific risk factors for the firms, a standard owner has to consider the potential risk of damage (e.g., loss of reputation or health risk) and the amount of public attention in the case of a crisis in determining and weighting risk factors.

The identification of risk leads to different audit intervals, additional spot checks, and suitable inspection methods. The key objective should be the optimization of the cost-benefit ratio associated with the controls by means of an assessment of fraud risks and a particular focus on "dangerous" clients.

CONCLUSIONS

From an economic perspective, the model above shows the inherent risks in certification procedures as well as potential points of departure to increase the quality of auditing. However, the model presented includes an implicit assumption: The actual level of audit quality is suboptimal and, thus, every enhancement of the level of quality will lead to positive welfare effects. Based on the welfare economics point of view, an optimal level of audit quality may exist beyond which the costs of a further increase of quality exceed the additional benefits. Nevertheless, this optimal level is difficult to determine since there is an inherent trade-off between positive and negative welfare effects. On the one hand, a higher level of audit quality is likely to reduce the costs

from food borne diseases (food safety) and in the long run, high quality segments based on Potemkin attributes (origin, organic, etc.) will be protected, if consumers can trust in quality labels. This will prevent market failure and corresponding costs. On the other hand, there are negative welfare effects of enhancing the level of audit quality which are related to the higher auditing costs. They lead to a price surplus and, therefore, to a decreasing demand for products with high information asymmetry. One of the main barriers to the sales of organic products, for example, is still their high price. It becomes apparent that to determine the current level and/or the optimal level of quality, further analyses and empirical data are needed. However, the low costs of certification in most systems (e. g., 100 € in the German QS-system for farms) suggest that the current audit quality level is suboptimal.

In a next step, all instruments to improve audit quality must be subjected to cost-benefit analysis. For instance, in our opinion the meta-control level of the certification concept should be strengthened since it provides a very efficient means for improving reputation effects as well as the likelihood of liability and fines. Other examples with positive effects are stricter requirements for vocational training of certifiers. However, research on financial auditing reveals that empirical cost-benefit analyses are difficult to conduct. The discussion about the separation of consulting and auditing demonstrates that despite a high number of studies the impact is still contended. Such trade-offs are inevitable and cautious progress is recommended.

In the end, the economic analysis shows that determining the optimal level of audit quality as well as choosing adequate policy instruments is a difficult task, as not all relevant trade-offs and interdependencies have been equally well researched. It remains unquestioned, however, that many certification schemes do not fulfil the basic requirements needed to guarantee their reliability. The EU Regulation on the protection of geographical indications and designations of origin (EEC No 2081/92) is a prominent example. Article 10 of the regulation about the required inspection structures indicates that there is still a broad range how to adopt it on national level. Vague guidelines and differences in the concrete enforcement characterize the current situation (e. g., § 134 Markengesetz in Germany).

In conclusion, quality labels have become a central component of modern consumer policy in recent years (Rubik & Scholl, 2002). However, a certification label is an example of a Potemkin good in

itself. In contrast to this, most researchers (implicitly or explicitly) assume perfect certification. Not fully credible standards jeopardize public confidence and lead to market failure on a higher level. Giannakas (2002) analyses the resulting welfare loss of such mislabelling. For example, empirical studies demonstrate that more than 10 years after the EC regulation No. 2092/91 on organic farming, a lack of trust is still one of the most important diffusion barriers. This may be ascribed to insufficient marketing for the label but it also indicates a line of detected frauds. Certification systems mainly depend on trust. Therefore, it is necessary to improve certification and audit procedures. Preventing cheap talk (Farrell, 1993) is the *conditio sine qua non* for successful labelling.

REFERENCES

Akerlof, G. A. (1970). The market for 'lemons': Quality uncertainty and the market mechanism. *Quarterly Journal of Economics, 84,* 488–500.

Anania, G., & Nisticò, R. (2003). Public regulation as a substitute for trust in quality food markets. What if trust substitute cannot be fully trusted. In: *Conference Proceedings, 25th International Conference of Agricultural Economists (IAAE), Durban, South Africa, August 16–22*. URL: http://www.iaae-agecon.org/conf/durban_papers/papers/131.pdf

Antle, J. M. (2001). Economic analysis of food safety. In: B. Gardner & G. Rausser (Eds.), *Handbook of agricultural economics, Vol. 1B,* pp. 1084–1136. Amsterdam: Elsevier.

Antle, R. (1982). The auditor as an economic agent. *Journal of Accounting Research, 20*, 503–527.

Arrow, K. J. (1985). The economics of agency. In: J. W. Pratt & R. J. Zeckhauser (Eds.), *Principals and agents: The structure of business*, pp. 37–51. Boston, MA: Harvard Business School Press.

Arrunada, B. (2000). Audit quality: Attributes, private safeguards and the role of regulation. *European Accounting Review, 9*, 205–224.

Ashbaugh, H., LaFond, R., & Mayhew, B. W. (2003). Do nonaudit services compromise auditor independence? Further evidence. *Accounting Review, 78*, 611–639.

Auriol, E., & Schilizzi, S. G. M. (2002). *Quality signaling through certification. Theory and an application to agricultural seed markets*. Toulouse: University of Toulouse.

Baker, C. R., Mikol, A., & Quick, R. (2001). Regulation of the statutory auditor in the European Union: A comparative survey of the United Kingdom, France and Germany. *European Accounting Review, 10*, 763–786.

Ballou, B. (2001). The relationship between auditor characteristics and the nature of review notes for analytical procedure working papers. *Behavioral Research in Accounting, 13*, 25–48.

Barrett, H. R., Browne, A. W., Harris, P. J. C., & Cadoret, K. (2002). Organic certification and the UK market: Organic imports from developing countries. *Food Policy, 27*, 301–318.

Baummann, P. (2001). Securing against fraud. In: *Proceedings of the European Conference Organic Food and Farming, Copenhagen, Denmark, May 10-11*. URL: http://www.fvm.dk/kundeupload/konferencer/organic_food_farming/temaer/theme3.htm

Bauwhede, H. V., & Willekens, M. (2004). Evidence on (the lack of) audit-quality differentiation in the private client segment of the Belgian audit market. *European Accounting Review, 13*, 501–522.

Beck, N., & Walgenbach, P. (2002). ISO 9000 and formalization – How organizational contingencies affect organization responses to institutional forces. *Schmalenbach Business Review, 55*, 293–320.

Becker, G. S. (1968). Crime and punishment: An economic approach. *Journal of Political Economy*, *76*, 169–217.

Calegari, M., Schatzberg, J., & Sevcik, G. (1998). Experimental evidence of differential auditor pricing and reporting strategies. *Accounting Review, 73*, 255–275.

Caswell, J. A., & Mojduszka, E. M. (1996). Using informational labeling to influence the market for quality in food products. *American Journal of Agricultural Economics, 78*, 1248–1253.

Caswell, J. A., Bredahl, M. E., & Hooker, N. M. (1998). How quality management systems are affecting the food industry. *Review of Agricultural Economics, 20*, 547–557.

Comunale, C. L., & Sexton, T. R. (2003).Current accounting investigations: Effect on Big 5 market shares. *Managerial Auditing Journal, 18*, 569–576.

Darby, M. R., & Karni, E. (1973). Free competition and the optimal amount of fraud. *Journal of Law and Economics, 16*, 67–88.

DeAngelo, L. (1981a). Auditor size and audit quality. *Journal of Accounting and Economics, 3*, 183–199.

DeAngelo, L. E. (1981b). Auditor independence, low balling and disclosure regulation. *Journal of Accounting and Economics, 3*, 113–127.

Emons, W. (1997). Credence goods and fraudulent experts. *RAND Journal of Economics, 28*, 107–119.

Fama, E. (1980). Agency problems and the theory of the firm. *Journal of Political Economy, 88*, 288–307.

Farrell, J. (1993). Meaning and credibility in cheap talk games. *Games and Economic Behavior, 5*, 514–531.

Frankel, R. M., Johnson, M. F., & Nelson, K. K. (2002). The relation between auditors' fees for nonaudit services and earnings management. *Accounting Review, 77*, 71–105.

GfRS (2003). *Analyse der Schwachstellen in der Kontrolle nach EU-Verordnung 2092/91 und Erarbeitung von Vorschlägen zur Weiterentwicklung der Zertifizierungs- und Kontrollsysteme im Bereich des Ökologischen Landbaus*. Göttingen: Gesellschaft für Ressourcenschutz. Research paper for the German Government.

Giannakas, K. (2002). Information asymmetries and consumption decisions in organic food product markets. *Canadian Journal of Agricultural Economics, 50*, 35–50.

Golan, E., Kuchler, F., Mitchell, L., Greene, C., & Jessup, A. (2001). Economics of food labeling. *Journal of Consumer Policy, 24,* 117–184.

Grove, H., & Cook, T. (2004). Lessons for auditors: Quantitative and qualitative red flags. *Journal of Forensic Accounting, 5*, 131–146.

Hobbs, J. E., Fearne, A., & Spriggs, J. (2002). Incentive structures for food safety and quality assurance: An international comparison. *Food Control, 13*, 77–81.

Ippolito, P. M. (1990). Bonding and nonbonding signals of product quality. *Journal of Business*, *63*, 41–60.

Jensen, M., & Meckling, W. T. (1976). Theory of the firm: Managerial behaviour, agency costs, and ownership structure. *Journal of Financial Economics, 3*, 305–360.

Kirchhoff, S. (2000). Green business and blue angels: A model of voluntary overcompliance with asymmetric information. *Environmental and Resource Economics*, *15*, 403–420.

Lennox, C. (2000). Do companies successfully engage in opinion-shopping? Evidence from the UK. *Journal of Accounting and Economics, 29*, 321–337.

Luning, P. A., Marcelis, W. J., & Jongen, W. M. F. (2002). *Food quality management: A techno-managerial approach*. Wageningen: Wageningen Press.

Makkawi, B., & Schick, A. (2003). Are auditors sensitive enough to fraud? *Managerial Auditing Journal, 18*, 591–598.

Mayhew, B. W., & Pike, J. E. (2004). Does investor selection of auditors enhance auditor independence? *Accounting Review, 79,* 797–822.

McCluskey, J. J. (2000). A game theoretic approach to organic foods: An analysis of asymmetric information and policy. *Agricultural and Resource Economics Review, 29*, 1–9.

Meuwissen, M. P. M., Velthuis, A. G. J., Hogeveen, H., & Huirne, R. B. M. (2003). Technical and economic considerations about traceability and certification in livestock production chains. In: A. G. J. Velthuis, L. J. Unnevehr, H. Hogeveen, & R. B. Huirne (Eds.), *New approaches to food safety economics*, pp. 41–54. Wageningen: Kluwer Academic Publishers.

Müller, C. (2004). Bilanzskandale. Eine institutionenökonomische Analyse. *Perspektiven der Wirtschaftspolitik, 5*, 211–225.

Myers, J. N., Myers, L. A., & Omer, T. C. (2003). Exploring the term of the auditor-client relationship and the quality of earnings: A case for mandatory auditor rotation? *Accounting Review, 78*, 779–799.

Nayga, R. M. J. (1999). On consumers' perception about the reliability of nutrient content claims on food labels. *Journal of International Food & Agribusiness Marketing, 11*(1), 43–55.

Nelson, P. (1970). Information and consumer behaviour. *Journal of Political Economy, 78*, 311–329.

Niemi, L. (2004). Auditor size & audit pricing: Evidence form small audit firms. *European Accounting Review, 13*, 541–560.

Nussbaum, B. (2002). Can you trust anybody anymore? *Business Week*, January 28, 39–55.

Patterson, E., & Wright, D. (2003). Evidence of fraud, audit risk and audit liability regimes. *Review of Accounting Studies*, *8*, 105–131.

Pechlivanos, L. (2004). Self-enforcing corruption: Information transmission and organizational response. In: J. Lambsdorff, M. Schramm, & M. Taube (Eds.), *Corruption and the new institutional economics*, pp. 92–104. London: Routledge.

Pierce, B., & Sweeney, B. (2004). Cost-quality conflict in audit firms: An empirical investigation. *European Accounting Review, 13*, 415–441.

Rezaee, Z., Kingsley, O. O., & Minmier, G. (2003). Improving corporate governance: The role of audit committee disclosures. *Managerial Auditing Journal, 18*, 530–537.

Rubik, V., & Scholl, G. (Eds.) (2002). *Eco-labelling practises in Europe. An overview on environmental product information schemes*. Berlin: Institute for Ecological Economy Research. Schriftenreihe des IÖW 162/02.

Shaikh, J. M., & Talha, M. (2003). Credibility and expectation gap in reporting on uncertainties. *Managerial Auditing Journal, 18*, 517–529.

Spence, M. (1976). Informational aspects of market structure: An introduction. *Quarterly Journal of Economics, 90*, 591–597.

Sporleder, T. L., & Goldsmith, P. D. (2001). Alternative firm strategies for signaling quality in the food system. *Canadian Journal of Agricultural Economics, 49*, 591–604.

Sunder, S. (2003). *Rethinking the structure of accounting and auditing*. New Haven, CT: Yale School of Management. Yale ICF Working Paper No. 03-17.

Tackett, J. (2004). Sarbanes-Oxley and audit failure. *Managerial Auditing Journal, 19*, 340–350.

Theuvsen, L. (2003). Motivational limits to tracking and tracing: Principal-agent problems in meat production and processing. In: G. Schiefer & U. Rickert (Eds.), *Quality assurance, risk management and environmental control in agriculture and food supply networks (Vol. A)*, pp. 187–194. Bonn: ILB Press.

Thomas, C. W. (2002). The rise and fall of Enron. *Journal of Accountancy, 193*(4), 41–48.

Tietzel, M., & Weber, M. (1991). Von Betrügern, Blendern und Opportunisten. *Zeitschrift für Wirtschaftspolitik, 40*, 109–137.

Tirole, J. (1995). Collusion and the theory of organizations. In: J. J. Laffont (Ed.), *Advances in economic theory, Sixth World Congress*, *Vol. 2*, pp. 151–205. Cambridge: Cambridge University Press.

Vetter, H., & Karantininis, K. (2002). Moral hazard, vertical integration, and public monitoring in credence goods. *European Review of Agricultural Economics*, *29*, 271–279.

Vinten, G. (2003). Enronitis – Dispelling the disease. *Managerial Auditing Journal,* 18, 448–455.

Windmöller, R. (2000). The auditor market and auditor independence. *European Accounting Review, 9*, 639–642.

THE AUTHORS

Gabriele Jahn and Matthias Schramm are Research Assistants and Achim Spiller Professor of Food Marketing at the Institute of Agricultural Economics, University of Goettingen, Platz der Goettinger Sieben 5, D-37073 Goettingen, Germany. Fax: +49 551 39 12122; e-mail: gjahn@gwdg.de (Jahn), mschram1@uni-goettingen.de (Schramm), a.spiller@agr.uni-goettingen.de (Spiller).