

“Enforcement of Private Food Standards: A Role for Self-Reporting of Non-Compliance?”

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Selected Paper prepared for presentation at the 2022 Agricultural & Applied Economics
Association Annual Meeting, Anaheim, CA, July 31-August 2

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Abstract:

Private standards have emerged as an important means of food system governance. In the broader context of regulation and standards, they can be characterized as set by a private body, adopted by, and implemented by private firms, evaluated for compliance by a private auditor, and enforced through private certification. This leads to a key question: are there mechanisms ensuring compliance with private food standards? To answer this question, the approach taken in this paper is to adapt and apply the literature addressing optimal law enforcement to certification of private food standards, focusing on deterrence of non-compliance and incentives for self-reporting.

Keywords: Private food standards, compliance, self-reporting

JEL Codes: Q13, Q18, K19

1. Introduction

Private standards have emerged as an important means of food system governance in industrialized countries (Hatanaka, Bain, and Busch, 2005; Henson and Humphrey, 2010; Fagotto, 2014; Rao, Bast, and de Boer, 2021; Hu *et al.*, 2022). Along with the development of private standards, there has been a shift in monitoring of compliance with food standards to third-party certifiers who are responsible for accessing, evaluating, and certifying food product safety and quality claims in terms of a set of standards and compliance methods (Hatanaka, Bain, and Busch, 2005). Certifiers contribute to resolution of the asymmetric information problem associated with credence goods by signaling information about food product characteristics and processing methods (Deaton, 2004), their capacity to do so also depending on their ability to be independent (Tanner, 2000).^{1,2} Getting third-party certification typically involves four steps: first a food processor applies for certification; second, the certifier undertakes an evaluation of the food processor's operations; third, the certifier conducts an audit; and fourth, certification is issued, the food processor being allowed to label its products accordingly (Hatanaka, Bain, and Busch, 2005).

Multiple reasons have been put forward for the proliferation of private standards, including *inter alia*: increased consumer and government concerns about food safety, demands by consumers for a wide range of food attributes, globalization of the food marketing system, and a shift in legal liability for food safety from the public to the private sector (Henson and Humphrey, 2010).³ It is also argued that the aim of private standards is to go beyond public regulations in terms of stringency and application, thereby providing "...additional assurances that rules and regulations will be adhered to..." (Henson and Humphrey, 2010, p.1634).

¹ See Sheldon (2017) for a review of the literature on credence goods.

² See Hatanaka, Bain, and Busch (2005) for a critical assessment of the growth in third-party certification.

³ Other reasons include, food processors minimizing losses/maintaining reputations due to food safety recalls, and limitations to public regulation (Fagotto, 2014).

Placing private standards in the broader context of regulation and standards, they can be characterized as set by a private body, adopted by, and implemented by private firms, evaluated for compliance by a private auditor, and enforced through private certification (Henson and Humphrey, 2010). By contrast in a regulatory setting, public standards are set and adopted by the legislature, implemented by private firms, evaluated for compliance by an official inspectorate, and enforced through the courts (Henson and Humphrey, 2010). This stark distinction might lead one to feel that enforcement of food standards can only work in a regulatory setting due to availability of public (criminal law) sanctions.

However, both political scientists and legal scholars have argued that while there is, *de jure* no obligation to apply a private standard, in practice there is a *de facto* obligation (Blowfield, 2005; van der Meulen, 2011). For example, if an upstream firm signs a contract with a downstream firm to supply a food product certified to meet a specific private standard, in principle, that private contract creates an obligation for the upstream firm to comply with the terms of the contract, and failure to do so may be subject to litigation under private (civil law). In other words, growth of private food standards can be thought of in terms of “private food law” (van der Meulen, 2011).⁴ Naturally this leads to an important question: are there mechanisms that can be applied by third-party certifiers that will ensure compliance with private food standards?⁵

To answer this question, the approach taken in this paper is to adapt the literature addressing optimal law enforcement and self-reporting, and its subsequent application to environmental regulation. The economics of law enforcement has a long pedigree, with Becker (1968) arguing

⁴ Private food law and governance have been critically assessed by, *inter alia*, Fuchs and Kalfagianni (2010). See also the broader discussion of the rise of private regulation in the world economy, e.g., Bütte (2010), Bütte and Mattli (2011), and Verbruggen (2013)

⁵ There is only modest discussion in the literature on the effectiveness or otherwise of third-party certifiers in enforcing compliance with private standards, e.g., Fagotto (2014).

in a classic article that due to enforcement costs, it is not optimal to identify violators all the time. Instead, application of a maximal sanction allows for a given average sanction with a lower probability of violators being caught, but with less enforcement effort. While Becker's (1968) argument has been accepted by many (Polinsky and Shavell, 1979), subsequent analysis by Malik (1990) indicates that due to the possibility of receiving the maximal sanction, violators expend resources to avoid being apprehended. Therefore, the optimal sanction should be reduced, in order that the marginal benefit of the sanction in reducing enforcement costs is equal to the marginal cost of avoidance. Follow-up analysis by Kaplow and Shavell (1994) shows that when self-reporting of violations is added to models of optimal enforcement, enforcement costs are saved, and risk is reduced as those who report violations bear certain rather than uncertain sanctions.

There are multiple examples of US administrative agencies establishing self-reporting programs that mitigate penalties for non-compliance with legally mandated regulations (Toffel and Short, 2011). For example, in its Contractor Disclosure Program, the US Department of Defense will reduce penalties for firms that self-report procurement fraud, while the Leniency Program of the US Department of Justice relaxes sanctions against firms that self-report antitrust violations. Analysis of self-reporting has been extended in the environmental economics literature, due to various US environmental laws, including the US Clean Air Act, requiring firms to self-report violations to the Environmental Protection Agency (EPA), with the potential for sanction relief.

For example, extending the arguments of Malik (1993), Innes (1999a, 2001a, 2001b) shows that self-reporting generates pollution remediation benefits and reduces both avoidance and enforcement costs. There is also a parallel legal and economic analysis of firm-level self-policing and its potential contribution to deterrence. Arlen and Kraakman (1997) argue the magnitude and use of sanctions for non-compliance should be designed to encourage self-policing, while Innes

(1999b) outlines how firms can be prompted to self-police/voluntarily remediate environmental damage through the promise of reduced sanctions. Pfaff and Sanchirico (2000) argue that self-auditing, whereby firms engage in costly efforts to discover their own violations, can be more extensive and efficient than periodic inspections, although firms will not necessarily self-report violations. While empirical analysis of the impact of voluntary regulation on environmental quality finds evidence for effects that are both positive (Innes and Sam, 2008; Sam, Khanna, and Innes, 2009), and negative (Alberini and Segerson, 2002; Lyon and Maxwell, 2007), subsequent empirical research finds that US regulators do shift enforcement resources away from firms that self-report violations, and that self-reporting firms improved both their regulatory compliance and environmental performance (Toffel and Short, 2011).

In this paper, the approach presented in, Kaplow and Shavell (1994) is adapted and applied to enforcement of private food standards, with a focus on self-reporting of non-compliance by food processors. Specifically, risk-neutral food processors are assumed to choose whether to meet a private food standard, which if ignored, generates benefits to a firm(s) and a cost to society. The remainder of the paper is structured as follows: in section 2, a model of private food standards is described, followed in section 3 by analysis of the incentives for compliance by food processors with and without the possibility of self-reporting. A summary of the paper and conclusions are presented in section 3.

2. A Model of Private Food Standards

Private Food Standards and Certification

It is assumed that, in the absence of a private standard, the market setting is one of incomplete vertical contracts, i.e., downstream food retailers and upstream food processors cannot sign enforceable contracts specifying the supply of a customized product, the precise nature of the latter

only being realized *ex post* (Hart and Moore, 1999).⁶ To minimize post-contractual transactions costs, a private standard f_i in industry i is established where a third-party certifier evaluates the product *ex ante*. Following Henson and Humphrey (2009), f_i includes the following: (a) description of the production process firms in i must follow in order to comply with the standard; (b) verification of compliance with the standard through internal documentation by firms in i ; (c) mechanisms of internal audit so that firms in i can self-monitor their compliance; and (d) external audit of any firm in i by a certifier. It is also assumed that third-party certifiers are not subject to capture by the food processors they audit, and that their audits are random.

The private standard f_i describes the product attribute q_i food processors must comply with to satisfy the requirements of downstream food retailers. A food retailer's reputation, indexed by the value of its brand equity B , is a function of upstream food processor(s) compliance with f_i , where $E = e(q_i)$, and $E' > 0$. q_i is drawn from a spectrum of final food consumer preferences for product characteristics, including food safety (pesticide residues), ethical production (animal welfare), right-to-know (genetic modification), and sustainability (environmental impact).

Food Processors

Food processors in i , who are assumed risk-neutral, can choose whether to comply with the standard f_i or not. If they fail to comply, economic damage d is incurred by food retailers in terms of the potential reduction in their brand equity. By not complying with the standard, a food

⁶ The possibility of a tort case is also ruled out by assumption, i.e., a food retailer is unable to determine a tort has occurred, they cannot identify the tort-feasor, and as a result do not sue in court for sanctions against a non-complying food processor. This compares to the standard literature on suit settlement and trial where the existence of a tort and the identity of the tort-feasor are known (see Kaplow and Shavell, 1999). See Innes (2001b) for an interesting discussion of the implications of self-reporting by a defendant if a suit were filed, i.e., the promise of lower court sanctions could elicit self-reporting, with punitive damages only being filed against those who fail to report a harmful act.

processor obtains a benefit $b \in [0, \infty]$ in terms of reduced processing and other costs, where b differs among firms in i , and has a positive continuous density $g(\cdot)$ with a cumulative distribution $G(\cdot)$. For simplicity, the population of food processors in i is normalized to one.

3. Analysis

Enforcement of Private Food Standards – No Self-Reporting by Food Processors

Without self-reporting by food processors of their failure(s) to comply with f_i , a certifier audits food processors with probability p , where the audit accurately establishes the private standard is or is not being met, each audit costing c . If found in non-compliance, the food processor is subject to a sanction s , i.e., it is not certified as meeting the private standard for a specific period, where the maximum level of the sanction $\bar{s} \geq d$. \bar{s} is equal to the financial loss to the food processor of temporarily not being certified, plus any re-certification costs.

The certifier chooses the probability it will audit and the level of the sanction to maximize welfare, i.e., the sum of food processors' benefits b minus the damage incurred by food retailers d due to non-compliance with the standard f_i , plus the auditing costs c . A food processor will not comply with the standard if $b \geq ps$, welfare being defined as:

$$W = \int_{ps}^{\infty} (b-d)g(b)db - pc, \quad (1)$$

where the first term is benefits of upstream non-compliance less the damage incurred downstream, and the second term is the auditing cost, the population of food processors (normalized to one) being examined with probability p , each audit costing c .

As in Becker (1968), the optimal sanction applied against any non-compliant food processor firm is \bar{s} . In other words, if $s^* < \bar{s}$, the sanction imposed by the certifier could be increased and

the probability of audit p lowered, such that the expected sanction $p\bar{s}$ remains constant, i.e., the level of deterrence is preserved, the first term in (1) being unchanged, while auditing costs, the second term in (1), are reduced, thereby increasing W .

Differentiating (1) with respect to p , and assuming $s^* = \bar{s}$:

$$\frac{dW}{dp} = \bar{s}(d - p\bar{s})g(p\bar{s}) - c, \quad (2)$$

the optimal probability of audit p^* being given by:

$$p^* = \frac{d - c / [\bar{s}g(p^*\bar{s})]}{\bar{s}}, \quad (3)$$

with the optimal expected sanction $p^*\bar{s}$ determined as:

$$p^*\bar{s} = d - \frac{c}{\bar{s}g(p^*\bar{s})}. \quad (4)$$

Interpreting equation (4): the left-hand side is the economic loss due to deterring the marginal food processor, i.e., the firm would have gained $b = p^*\bar{s}$ if they had not complied. The right-hand side of (4) is the net gain from deterring the marginal food processor, i.e., the damage d less the costs of deterrence.

There is already an extensive literature on reasons why Becker's (1968) result might not hold, including imperfect information about the probability of apprehension (Bebchuk and Kaplow, 1992)⁷. However, it is worth noting here that the optimal sanction s^* imposed by the certifier may be dependent on the extent of any remediation efforts by the food processor.⁸ For example, if a

⁷ Drawing on Bebchuk and Kaplow (1992, footnote 2), other explanations for non-maximal sanctions include: risk aversion (Polinsky and Shavell, 1979), non-monetary sanctions (Kaplow, 1990), avoidance costs (Malik, 1990), marginal deterrence (Stigler, 1970), and differences in wealth (Polinsky and Shavell, 1991).

⁸ Malik (1990) and Innes (2001b) have also shown that when sanctions against non-compliance are increased, firms have an incentive to engage in activities to avoid being caught. In this case, the optimal sanction should also be set below its maximum level, and the probability of audit increased.

food processor fails to comply with a food safety standard, damage d to a downstream retailer(s) could be mitigated by “clean-up” efforts on the part of the food processor e , which come at a cost c^e , any remaining damages being d^a , i.e., if there is no remediation, $d > d^a + c^e$. Following Innes (1999a), if there are large enough net benefits from remediation by food processors, $d - (d^a - c^e) > 0$, the probability of auditing p should be raised, and the sanction reduced such that $s < \bar{s}$, to secure the benefits of remediation. In other words, a higher probability of auditing increases the likelihood of remediation, generating benefits beyond those due to imposition of sanctions and deterrence of non-compliance.⁹

Enforcement of Private Food Standards – Self-Reporting by Food Processors

If self-reporting of non-compliance by food processors is allowed, and no administrative costs are incurred by food processors through self-reporting, the sanction r imposed by the certifier should be no greater than the expected sanction applied to food processors that do not self-report, $r \leq ps$. Therefore, food processors will report a breach to the certifier if and only if $b \geq \min(r, ps)$, in which case, welfare becomes:

$$W = \int_r^\infty (b - d)g(b)db - pcG(r), \quad (5)$$

the difference to equation (1) being twofold: first, the lower limit of integration is r rather than the expected sanction of ps ; and second, the auditing cost is $pcG(r)$ as opposed to pc , as only those food processors that do not self-report are audited, i.e., when $r > ps$. With a positive probability of auditing, $p > 0$, a sanction of s , and $r = ps$, the same set of food processors fail to comply with the standard with or without the option of self-reporting, i.e., the integrals in equations (1) and (5) are the same. Importantly, with self-reporting by food processors, certifier auditing costs will be

⁹ See Innes (1999a) for a discussion of the full set of conditions under which this result will hold.

lower by the amount $[1 - pG(ps)]pc$. In this case the optimal auditing scheme is one where $r = ps$ and $s = \bar{s}$. If $r > ps$, there would be no incentive for food processors to self-report; and if $r < ps$, the probability of being audited could be lowered, resulting in individuals still self-reporting and paying r , but the cost of auditing would be reduced, thereby increasing W .

Substituting $p\bar{s}$ for r in (5), and differentiating with respect to p :

$$\frac{dW}{dp} = \bar{s}(d - p\bar{s})g(p\bar{s}) - pc\bar{s}g(p\bar{s}) - cG(p\bar{s}), \quad (6)$$

the optimal probability of audit p^* being given by:

$$p^* = \frac{d - cG(p^*\bar{s}) / [\bar{s}g(p^*\bar{s})]}{\bar{s} + c}, \quad (7)$$

with the optimal expected sanction $p^*\bar{s}$ determined as:

$$p^*\bar{s} = d - p^*c - \frac{cG(p^*\bar{s})}{\bar{s}g(p^*\bar{s})}. \quad (8)$$

Like equation (4): the left-hand side of (8) is the economic loss due to deterring the marginal food processor, i.e., the firm would have gained $b = p^*\bar{s} = r^*$ if they had not complied. The right-hand side of (8) is the net gain from deterring the marginal food processor, i.e., the damage d less the costs of deterrence which now has two components: first, the expected cost p^*c of examining the marginal food processor who has been deterred from non-compliance, but is in the pool of food processors that could be audited; and second, the infra-marginal cost $cG(p^*\bar{s}) / \bar{s}g(p^*\bar{s})$ of examining food processors who do comply with a higher probability.

Again, drawing on Innes (1999a), if there are net benefits, $d - (d^a - c^e) > 0$, to be gained from food processors remediating the damage resulting from their non-compliance, the sanction for self-reporting should be equal to the expected sanction from not self-reporting, $r = ps$, whereas for

non-reporting food processors, the sanction for non-compliance should be set maximally at \bar{s} . The argument for this is straightforward: first, if $r < ps$, the probability of audit can be lowered without affecting the incentive to self-report, and undertake remediation efforts; and second, the Becker (1968) result holds, i.e., the sanction for non-reporting food processors is raised to \bar{s} , while the probability of audit p is lowered, preserving the expected sanction for not reporting $p\bar{s}$. As a result, the incentive for food processors to self-report is maintained, the benefits of damage remediation are realized, and certifier auditing costs are lower.¹⁰

Enforcement of Private Food Standards – Self-Reporting and Threat of Food Processor Boycott

In the case of private food standards, certifiers typically apply a gradual system of sanctions against non-complying firms, starting with a warning, through removal of certification, to exclusion from the standard (Fuchs and Kalfagianni, 2010). In keeping with the literature on the economics on law enforcement, an additional sanction equivalent to “imprisonment” is also considered here.

Specifically, it is argued that a certifier can threaten to publicly expose a food processor for failing to comply with a private standard, which could then result in a campaign by a non-governmental organization (NGO)/activist(s). Such a campaign would be designed to encourage consumers to boycott altogether the offending firm’s uncertified product(s), including where available through retailers who do not value compliance with the standard (Hatanaka, Bain, and Busch, 2005). The role of NGOs/activists in promoting boycotts of firms has been analyzed extensively by Baron (2001, 2003, 2011), and Innes (2006). In addition, NGOs/activist groups are on record as advocating the use of third-party certifiers as a means of ensuring private standards

¹⁰ A similar result holds if food processing firms seek to avoid being apprehended for non-compliance (Innes, 2001b). Importantly, compared to Malik’s (1990) finding, with self-reporting, the sanction against non-reporting firms can be raised to its maximal level, without avoidance costs being incurred.

are “...objective, transparent, and accessible to interested parties...” (Hatanaka, Bain, and Busch, 2005).¹¹

Suppose it is possible to stage a boycott of the product(s) sold by a food processor failing to comply with a private food standard, but such a sanction is costly to implement. The monetary sanction for damage inflicted on a food retailer is $s_1 \leq \bar{s}_1$, and the sanction due to a boycott of the offending food processor is the monetary value of a permanent loss of retail shelf space for its product $s_2 \leq \bar{s}_2$. The total cost of sanctions to a food processor is $s = s_1 + s_2$, the cost of imposing a boycott being γs_2 , where $\gamma = [\eta + \pi] > 0$. The NGO/activists organizing a boycott of a specific food product incurs a cost η in terms of the lost opportunities for other boycott activities (Innes, 2006), and the food processor incurs costs π from contesting the boycott (Baron, 2011).

If there is a probability of a boycott in the absence of self-reporting, then $s = \bar{s}_1 + s_2$, where $s_2 > 0$, $0 < p < 1$, and with self-reporting $r = ps$. In addition to the reduction of auditing costs, food processors voluntarily reporting their non-compliance, the social costs of initiating boycotts can also be reduced. With self-reporting, the total sanction $r = r_1 + r_2 = ps = p(\bar{s}_1 + s_2)$, where r_1 and r_2 are the monetary and boycott sanctions respectively. If $r \leq \bar{s}_1$, the certifier should set $r_1 = r$, and $r_2 = 0$, i.e., no boycott(s) will be implemented, generating social cost savings of $p\gamma s_2$. If instead $r > \bar{s}_1$, the certifier should set $r_1 = \bar{s}_1$, and set $r_2 = p(\bar{s}_1 + s_2) - \bar{s}_1$, the savings in social costs being $(1 - p)\gamma s_2$. In other words, the monetary costs of non-compliance, \bar{s}_1 are applied with certainty rather than with probability of p , and the threat of boycott is reduced by $(1 - p)\bar{s}_1$.

¹¹ See also Gereffi, Garcia-Johnson, and Sasser (2001), and Joseph (2002), and Ruggie (2003).

Essentially, a given level of deterrence due to the sanction r , can be achieved at lower cost, with a lower probability of audit, because food processors who do not self-report non-compliance face a greater sanction through boycott of their product(s). If there are benefits from remediation by food processors, the certain sanction applied to food processors that self-report should be set at $r_1 < \bar{s}_1$, while the maximal sanction should be applied to firms that do not self-report.

4. Summary and Conclusions

Use of private food standards in combination with third-party certification of those standards has expanded significantly in the past few decades. Despite the proliferation of private standards, there has been little formal economic analysis of the incentives for food processors to comply with standards, and how the system of third-party certification might operate to ensure such compliance. To provide some initial thoughts, this paper draws from the extensive literature on the economics of crime and law enforcement originally pioneered by Becker (1968).

Specifically, the analysis presented is an adaptation of the optimal law enforcement and self-reporting results due to Kaplow and Shavell (1994), and subsequent application to environmental regulation by Innes (1991a, 1991b, 2001b). The key results of the paper are as follows:

- first, without self-reporting, a third-party certifier audits food processors with some probability, incurring an auditing cost. If a food processor is in non-compliance, they are penalized with a sanction. In this case, the certifying agency chooses the probability of audit and level of the sanction to maximize the sum of food processors' benefits, minus the harm caused from not meeting the standard, and the costs of audit. With a positive probability of auditing, the optimal sanction the certifying agency imposes is a temporary suspension of the offending food processor

from the right to label their product as meeting the private food standard. In the presence of remediation efforts by the food processor, the optimal sanction should be reduced.

- second, with self-reporting, if a food processor voluntarily admits to the certifier that they have not complied with the private food standard, they incur the cost of remediation, and are “put on probation” in the sense that they are automatically audited to ensure the standard is being met. In other words, self-reporting elicits a sanction equal to the temporary suspension of the right to label a product as meeting the private standard. At the same time, there is still a positive probability that non-reporting food processors are audited and penalized with the maximal sanction, although the costs of enforcement are now lower with self-reporting. With remediation efforts by food processors, the optimal sanction should be reduced for those that self-report, but those that do not, the maximal sanction should be applied.

- third, a second sanction can also be introduced into the analysis, equivalent to “imprisonment” in a criminal law setting. Specifically, the certifying agency with some positive probability can reveal to an NGO/activist group(s) that a food processor has not complied with a private standard and has been permanently de-certified from producing the labeled product. The activist group then expends resources on pushing for boycott altogether of the offending food processor’s product(s). The threat of “imprisonment” against those food processors who do not self-report, adds to the efficiency benefits of a self-reporting scheme, i.e., it is less costly for the certifying agency to achieve a given level of deterrence, with self-reporting firms incurring a sanction with certainty, the amount depending on whether there is engagement in remediation efforts.

Necessarily, this is a stylized model of private food standards and third-party certification of those standards, but its usefulness lies in identifying key issues relating to economic incentives for

compliance, sanctions for non-compliance, deterrence, and the costs associated with auditing. It should be noted though that the results reported here also depend on there being no administrative costs associated with self-reporting (Malik, 1993; Kaplow and Shavell, 1994). If they matter, a self-reporting food processor incurs such costs with certainty compared to only a probability with no self-reporting. Therefore, self-reporting only makes sense if the expected damage, and hence the sanction, is large enough relative to the administrative costs (Innes, 2001b). Nevertheless, the analysis does highlight the reputational risks to both food processors and retailers of non-compliance with private food standards, i.e., the threat of a product boycott, and the potential damage to retailer brand equity if standards are not met.

To this point, the focus has been on self-reporting of non-compliance with private standards by food processors, but in describing private standards Henson and Humphrey (2009) state that they can include mechanisms of internal audit so that firms can self-monitor their compliance. Therefore, an extension of the current analysis might focus on an enforcement mechanism that encourages self-policing along with remediation. The empirical results presented in Toffel and Short (2011) suggest that in the case of environmental regulation, self-reporting signals effective self-policing, and that regulators use the fact of self-reporting to identify firms that are substantively monitoring themselves, who then receive audit relief. Innes (1999b) has explored this possibility formally, showing that in an optimal regime, firms that pollute are prompted to self-police through the promise of a reduced sanction, the benefits being increased frequency of remediation and reduced costs of auditing to reach a given level of deterrence. It is an open question whether self-monitoring by food processors in relation to private food standards operate in this fashion.

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