

**Economics of Compliance:
Developing a Theoretical Framework and an Application to Agriculture**

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Abstract

Agricultural production experiences a shift in underlying institutions during the last years. Importance of private stakeholders like retailers, processors, consumers as well as tax payers is emerging. Eligibility for single farm payments and marketing of products is linked to compliance with diverse codes of practice and standards. However, these relationships are highly characterized by information asymmetries. Economic literature offers several approaches to analyse similar relations. The classical approach bases on the assumption of utility maximising agents that will comply with rules as long as the net utility of compliance will be higher than the net utility of an offence. Recent evidence challenges this result. Experiments show that people behave more honest than the classical deterrence model predicts. Main objective of the paper is to compare the various approaches to explain compliant behaviour. Additionally, an outlook for empirical applications of the theoretical framework developed here is given to motivate further research. However, our outlook shows that the selection of appropriate variables to analyse compliance empirically is open to debate. **Keywords:** regulation, cross-compliance, quality standards, compliant behaviour

1. Introduction

Agricultural production faces currently a fundamental shift in underlying constraints. Farmers have to adapt themselves not only to changed price signals, but also to a new institutional arrangement giving agriculture its proper place in society. Judicial regulations are increasingly strengthened by privately agreed regulations or contractual arrangements. Even more important, those regulations and arrangements exhibit a quasi-mandatory character. Examples on which we will focus in this paper are obligatory and voluntary cross-compliance, voluntary standards and privately initiated food quality standards or Quality Assurance Schemes (QAS). Those domains were previously governed exclusively by EU Directives and Regulations as well as national laws on the environment, health and food safety. They should guarantee an equal level of environmental protection and consumer's health within the European Union and at the same time give the producers economic freedom to satisfy the statutory targets.

Two institutional developments over the recent decades introduced a greater variety of production conditions within the EU. Starting with the invention of voluntary programs, like the agri-environmental schemes (AES) in the late 1980s, farmers face additional constraints on production or changed incentives to comply to existing regulations from a policy perspective. With the introduction of compulsory cross-compliance regulations with the 2003 CAP reform agricultural policy provides an additional enforcement system beside existing legislation. More specifically, farmers have to comply with 19 pre-existing legislative acts, also called Statutory Management Requirements (SMR), and codes of good agricultural and environmental conditions (GAEC) to be qualified for the Single Farm Payment (SFP). For an illustration see Table 1, which summarizes best estimated degrees of compliance for a selected set of SMRs and GAECs. Because of the uncertainties and problems with exact measurement general classifications are made rather than reporting specific numbers. The general impression from Table 1 is that compliance is rather high for measures such as groundwater protection and sewage sludge requirements. With respect to the Nitrate Directive and the identification and registration of bovine, ovine and caprine animals compliance rates are significantly below the level of full-compliance.

Table 1: Best estimates of degrees of compliance for selected regulations and EU member states ^{*)}

| | France | Germany | Italy | Netherlands | United Kingdom | Spain |
|--|--|---|---|---|------------------------------------|-----------|
| Environment | | | | | | |
| Birds and Habitat Directives | n.a.; probably very high | management plans not yet in place in most areas | management plans not yet in place in most areas | very high | very high | very high |
| Protection of groundwater | not very high for exhaustible oils | very high | very high | high | very high | very high |
| Sewage Sludge Directive | very high | very high | very high | very high | very high | very high |
| Nitrate Directive | dairy farmers low and beef farmers extremely low | not high | extremely low; national implementation tool place only recently | low, (mainly due to recent change in the regulations) | very high | high |
| Identification and registration | | | | | | |
| Identification and Registration of bovine animals | high, but not always within 7 days | very low | n.a.; databank working since 2005 | very high | low | very high |
| Identification and Registration of ovine and caprine animals | extremely low; new regulation since 2005 | very low | n.a.; databank working since 2005 | high | very high | very high |
| Public, Animal and Plant Health | | | | | | |
| Food Traceability and Food Safety | n.a. | n.a. | n.a. | high | n.a. | n.a. |
| Notification of diseases | high, no precise estimate available | n.a | n.a. | high | n.a.; since 1 January 2006 imposed | n.a. |

| | | | | | | |
|---|---------------------|---------------------|---------------------|---------------------|---------------------|-----------|
| Animal welfare | expected to be high | expected to be high | expected to be high | expected to be high | expected to be high | n.a. |
| Good Agricultural and Environmental Condition | n.a. | very high | n.a. | not high | very high | very high |

Source: Jongeneel et al. (2007), p. 57.

^{*)} Because of uncertainties and measurement problems only general characterizations are given. The following legend was used: Compliance is considered 'very high' if the degree of compliance is greater than 95% (95% of the farmers or more are fully compliant). Compliance is labelled as 'high' in case the degree of compliance is in the interval 90%-95%. Compliance is labelled as 'not high' if compliance rates were in interval 80%-90%. Compliance was labelled 'low' when the degree of compliance was in the interval 70%-80%. It was labelled as 'very low' when the degree of compliance was in the interval 40%-70%. Finally, it was labelled to be 'extremely low' in case of compliance rates below 40%.

The Table suggests that member states, conditions and people are heterogeneous and behave accordingly different. Empirical analysis of farmers' compliance within the different countries of the EU is therefore a promising future step to an improved understanding. A similar point is raised by Torgler (2002) who summarizes evidence of different compliance rates to tax laws even in countries with similar fiscal systems.

Beyond these minimum requirements each Member State has put in place several AES which entitle farmers to additional compensations. Main focus of this instrument mix is to reach environment, biodiversity, food safety, animal welfare and soil conservation related goals. Turning from policy to new institutions invented by trading partners, beside established processor-specific standards in the framework of contract agriculture, food retailers and processors set up standards of Good Agricultural Practices at the end of the 1990s. The majority of them enjoys only limited regional or national relevance. However, it seems that a minority develops as standard of global relevance (e.g., GlobalGAP, BRC). Farmers can, theoretically, freely decide to adopt those standards. But it is quite reasonable to assume that with an increasing spread of those standards they will develop a quasi-mandatory nature at least indirectly or for larger farmers. For instance, 90 percent of the pig meat traded in the Netherlands satisfies the IKB-Pig standard. Meat not having this standard will face obstacles hindering smooth trade. For milk the Dutch dairy farmer's participation in the KKM quality standard is even close to 100 percent (Jongeneel, 2006). Moreover in the UK, today, the most dominant of the assurance schemes (in terms of market share) are those which come under the umbrella of Assured Food Standards (AFS). Food produced to AFS standards carries the 'Little Red Tractor' logo, a registered trademark. AFS schemes have standards relating to food safety, animal health and welfare and the environment and, for the most part, operate to 'baseline' standards i.e. close to minimum legal requirements. While most UK multiple retailers such as Tesco and Sainsburys require their UK suppliers to be members of independently audited and certified farm assurance schemes, some also set their own standards (Farmer et al, 2006, 4).

Economic analysis of these new institutions regard usually the costs and benefits of regulations. A full evaluation and measurement of these costs and benefits (welfare impact assessment) involves great difficulties in practice and is beyond the scope of this paper (Gardner, 2003). But one central element of the effectiveness of regulations is the farmer's behaviour. Farmers can (or have to) adopt the new requirements. However, they do not necessarily adjust their input and output mix to mitigate the impacts of the regulation. Thus, compliance with the imposed regulations/ standards is a critical issue. Non-compliance at a large scale might undermine the acceptance of regulations or even provoke their complete failure.

Analysis of compliance leads to an inherent problem of these contractual arrangements: All of the above mentioned institutions are exposed to information asymmetry and therefore, provide examples of incomplete contracts (Brousseau and Farès, 2000). Whereas compliance to cross-compliance is motivated by two parallel enforcement mechanisms pecuniary incentives for farmers are less clearly posted in the case of private food quality standards or QAS. Whether producers receive higher prices after adoption of QAS is less transparent, but they face certainly higher costs. Monetary benefits of additional incentives like improved market access, new access to certain supply chains or higher consumer trust are difficult to quantify. Incentives for moral hazard clearly exist. Economic literature provides ample rudiments of analysis of compliance. More recently it has been influenced by sociological and psychological findings. Out of this broad literature, Winter and May (2001) haul out three different approaches: calculated, normative and social motivations of compliance. Whereas the first concept is closely related to the expected utility framework, the second term

summarizes approaches that base on agent's internalised values and the third concept refers to agent's desire to earn approval and respect of surrounding people.

Within this paper we review the various approaches to the economic analysis of compliance and translate them to the situation of agricultural producers. Our contribution to the literature is twofold. Firstly, the disparate literature is presented and applied to issues in agricultural production. Secondly, a discussion of a possible empirical analysis is provided. The remainder of the paper is as follows: Section 2 starts with a model of compliance based on neoclassical utility maximising theoretical framework. Underlying assumptions are criticised in Section 3 and other motivations of compliance to regulations are presented. Section 4 aims at comparing the different theoretical approaches. An outlook on possible empirical applications concludes.

2. The standard neoclassical approach

Starting with Becker's (1968) seminal work on the economics of crime, a variety of theoretical attempts to analyse non-complaint behaviour emerged. Applications and further refinements of the Becker model base on the classical utility maximizing theoretical framework. Central element of this neoclassical theory of crime and punishment is the comparison of agent's utility if he complies with his utility in the case of non-compliance weighted with a probability of detection. The described modelling framework is applied to the case of an agricultural producer in the following.¹

According to the standard neo-classical model, farmers maximize their profits subject to a production technology constraint. The standard outcome of this optimization problem is a (short-run) system of variable input demand and variable output supply relationships, which are a function of input and output prices, quasi-fixed factors (capital, land, family labour), and dynamic shifters like technological change and genetic progress. If some inputs or outputs are restricted (e.g., the milk quota) than these restricted variables are also included in the set of explanatory variables. The outcome of the optimization reflects the farmers decisions regarding input and output mix, where increasing costs of production (input price increases) lead generally to a decline in input demand as well as output supply. Increasing output prices, in contrast, show a reversed effect: they lead to an increased output supply as well as increasing demand for variable inputs.

Understanding the impact of regulation within the neoclassical economic framework can be obtained in two steps: Firstly, one could include regulation as further constraints on production possibilities, and therewith as factors affecting the production technology. Secondly, one could allow for the possibility that farmers might violate the regulations or show non-compliant behaviour (Sutinen and Kuperan, 1999).

To begin with the first option, regulation is treated as further constraint on production possibilities, and therewith as factor affecting the production technology. Since imposed regulations reduce the production possibility set (excluding possibilities that were allowed without the regulations being imposed) in general they are expected to negatively affect production or to increase the costs of production. Defining output supply vectors as $q(\cdot)$ and input demand as $x(\cdot)$ a typical solution to this problem would be

$$\text{Max}\{pq - wx \mid f(q, x, t, \bar{r})\} \text{ with } q = q(p, w, t, \bar{r}) \text{ and } x = x(p, w, t, \bar{r}) \quad (1)$$

where p , w and t represent a vector of output prices, input prices, and technical change. Regulatory constraints are represented by the vector r , with the bar indicating that they are

¹ Slemrod (2007) discusses potential differences in compliance between individuals and businesses, e.g., with respect to risk aversion and carriage of penalty. As the overwhelming majority of European farms are run as family business, those differences will be neglected here.

assumed to be binding (i.e. restricting the farmer's behaviour). Substituting the supply and demand relationships into the profit condition would yield the dual (optimum value) profit function $\pi(p, w, t, \bar{r})$ which gives the profits associated with the regulatory regime. As denoted before the profits including the regulatory constraint impact will be lower than without the regulation, i.e. $\pi(p, w, t, \bar{r}) \leq \pi(p, w, t)$. The drawback of this first approach is that it is implicitly assumed that the regulatory constraints are fully integrated in the farmer's behaviour. In other words, regulations are fully respected and there will be full compliance to them.

Secondly, it is allowed for the possibility that farmers might violate the regulations or show non-compliant behaviour. Rather than respecting the regulation the farmer could choose a level $r(>\bar{r})$ rather than the restricted level \bar{r} . For example, the farmer may decide to choose an organic manure application on grassland which goes beyond the regulated level of 170kg N/ha. In this case the difference $(r-\bar{r})$ i.e. the amount of manure application exceeding the imposed standard is illegal. If the farmer violates the regulation there are in principle two possibilities. His violation is detected and then a punishment follows, or his violation is non-detected. If detected a penalty fee is imposed on the farm in an amount given by g , which will usually be a function of the degree of violation, i.e. $g = g(r-\bar{r})$. So if detected

$$g > 0, \text{ if } r > \bar{r}; g = 0 \text{ otherwise.}$$

and

$$\frac{\partial g}{\partial r} \geq 0, \quad \frac{\partial^2 g}{\partial r^2} \geq 0 \quad \forall r > \bar{r}$$

where it is implicitly assumed that $g(\cdot)$ is a continuous function and differentiable for all $r > \bar{r}$.

Let $\pi(p, w, t, r)$ be the (dual) profit function, where r denotes the level of the regulated activity the farmer would choose in the case no restrictions are imposed (i.e. the level corresponding to $\partial\pi/\partial r = 0$, or with a zero impact on marginal profits). More generally the impact of a change in or restriction on r on profits could be derived from impacts on revenues (e.g. yield reduction) and/or costs (including costs due to adjustment to a more expensive input mix, additional labour input, expenses for paper work and record-keeping activities, licenses, charges, certificates etc.). Since in principle variable costs (and consequently also marginal costs and thus supply) are a function of the regulatory constraint, imposing a binding regulation is likely to lead to an upward shift of the cost curves. Given an unchanged product price level output supply will decline. So, as soon as r becomes a regulated factor it will impact on profits and a relaxation of the constraint would create a positive impact on marginal profits, i.e. $\partial\pi/\partial r > 0$.

In an imperfect law enforcement system not every violator is detected. Let the probability of detection be given by θ .² If detected a punishment follows and the farmer's profits will be equal to his profits without taking into account the regulatory constraint $\pi(p, w, t, r)$ less the

² Strictly speaking, it has to be distinguished between the true probability and the perceived probability of detection. With respect to the additional criticism on the neo-classical approach which we will discuss further below this conceptual difference is treated as of minor importance.

punishment fee $g(r-\bar{r})$, or equal to $\pi(p, w, t, r) - g(r-\bar{r})$. If not detected the farmer's profits are $\pi(p, w; t)$. Accounting for the probability of detection, the expected profits are

$$\theta[\pi(p, w, r; t) - g(r - \bar{r})] + (1 - \theta)\pi(p, w, r; t) \quad (2)$$

Assuming farmers maximize expected profits, the first order condition for the optimal r level is

$$\frac{\partial \pi(p, w, r; t)}{\partial r} \geq \theta \frac{\partial g(r - \bar{r})}{\partial r} \quad (3)$$

where the inequality is due to the discontinuity allowed for in the punishment function for the case $r = \bar{r}$. The optimality condition presented in (3) shows that the farmer will evaluate the marginal profits of violating the regulation against the expected marginal penalty. In general he will choose a level of r for which the marginal profits are equal to the expected marginal punishment penalty. Andreoni et al. (1998) show that as long as the expected utility of cheating is positive, everyone is choosing a level of $r > \bar{r}$ in the case of input use restrictions.

Two possible and politically relevant extensions should be discussed in the following. First, the above framework assumes an unlimited budget of the audit agency and therefore an theoretically infinite number of audits. Thus, a fixed budget of the audit agency is introduced to make this model more realistic. Assume that the agency receives a budget B which could be expressed as an amount $b=B/N$ per farmer. Consequently, the probability of detection is modelled as function of available expenditures per farm $\theta(b)$. In general, in case of the cross-compliance regulations 1 percent of farmers eligible for direct payments will be inspected, with probably larger samples for specific cases. Additionally, countries might also have their normal regulatory checks and inspections. Surprisingly, the extension does not alter the general conclusion derived from equation 3. Only the marginal penalty, the right part of the above inequality, will be shifted upwards with a diminishing number of farms as it is the case of structural change in European agriculture. Marginal profits of violating the regulation, the left part of the inequality, will not be affected.

Second, farmers might not face the same probability of detection. Either the audit agency determines audits depending on previously detected non-compliance or runs more audits in ecologically sensitive areas. Ways to incorporate those examples into the model is either the definition of a dynamic relationship where the probability of detection is a function of previously detected non-compliance or the probability of detection depends on the number of imposed regulations $\theta(\bar{r})$. In the latter case it is implicitly assumed that the number of binding regulations will be higher or the degrees of freedom within the regulation will be stricter in erosion risk-prone areas, wetlands or otherwise ecologically sensitive areas. Again an extension like $\theta(\bar{r})$ does not alter the general conclusion derived from equation 3. Only the marginal penalty, the right part of the above inequality, will be shifted upwards with an increasing number of regulations. Marginal profits of violating the regulation, the left part of the inequality, will not be affected. However, introducing dynamic repercussions will also require adjustments on the right-hand side.

Previous empirical research has shown that the (perceived) likelihood of detection, θ , exhibits a greater influence on compliant behaviour than the height of the punishment and the likelihood to be punished (Winter and May, 2001).

The value of the penalty might be difficult to determine. Regarding cross-compliance the penalty for non-compliance consists of a partial loss of the Single Farm Payment. Deductions start at 1 percent of the total SFP. The minimal fine to be executed has been recently set at 100 €. The total payment will be held back for instance in the case of “over-declaration” of land. The European Commission publishes data on control incidence, farmers’ compliance and applied reductions for 2005 (EC, 2007). Non-compliance with resulting reductions of SFP were reported for 12 % of controlled farmers. But 68% of the reductions were applied at the minimum level of 1% of direct payments (EC, 2007; p. 4).

In the case of private food quality standards, e.g., for a GlobalGAP certified farm, non-compliance with a minor requirement might result in a fine but could lead to the loss of the certificate if major requirements are violated. Data are less transparent and hardly available. For instance, the protocols of GlobalGAP recognize three levels of compliance criteria: ‘major must’, ‘minor must’, and ‘recommended’. For the ‘major must’ criteria hundred percent compliance of all applicable major must control points is compulsory. For the ‘minor must’ criteria ninety percent compliance of all the applicable minor must control points is compulsory. For the ‘recommendations’ no minimum percentage of compliance is set. Verification includes annual farmer’s internal self-inspection and external verification by certification body. Farmers can apply individually or as a group. They can apply directly for GlobalGAP schemes, or also (indirectly) apply for GlobalGAP benchmarked schemes. Wherever a non-conformance is detected in a ‘base’ module, this will also affect all livestock specific modules. Non-conformance in one sector specific module will affect only that module, and no others. Within GlobalGAP three types of sanctions exist: warning (allows some time for correction), suspension (GlobalGAP logo suspended for some time) and cancellation (cancellation of contract and prohibition to use license or certificate). If non-compliance is detected with respect to a ‘major must’ immediate complete certificate suspension follows (for a minimum of 6 months). If repetition occurs in subsequent audits the certificate is cancelled. If a farmer or a group of farmers notify non-compliance with a ‘major must’ in advance, before externally detected by a certification body, and put in place suitable corrective actions, then immediate partial suspension of the certificate is imposed. If more than 10% of the applicable minor musts are not complied with a deferred suspension of the certificate is imposed.

3. Weakening of neo-classical assumptions

As indicated above, out of the detected violations of cross-compliance requirements circa 70% of the fines were below 50 Euro. Additionally, the estimated average probability of on-the-spot checks for cross-compliance ($\theta = 0.05$) is very low. Even if audit sampling is risk based and proceeds not randomly, farmers may regularly not expect an audit every year. Thus, the deterrence effect is quite small and according to the expected utility framework a high rate of non-compliance would be predicted. Either farmers operate at very low marginal profits with respect to the total number of regulations, i.e., near their profit maximum, or there are additional reasons for a compliant behaviour. Such anomalous behaviour, people comply at a significant higher rate than expected-utility theory predicts, has been found in various circumstances like tax evasion (Alm et al., 1992) or low probability-high loss events in general (Machina, 1987). The observation that people behave, mainly in experiments, more honest than theory predicts or even completely altruistic has inspired a wide literature. For instance, Alm et al. (1992) obtained a substantial compliance rate in tax payers experiments even without any chance of detection. More formally, the observation that people are thought to behave compliant a large part of their time despite a quite low frequency of surveillance and rarely execution of fines even in the case of detected violations is known as “Harrington paradox” (OECD, 2004). The following discussion will provide possible evidence of

additional motivations to comply. We will concentrate first on critics within the above described economic framework. Research over the last two decades has shown that people do not only care about economic incentives but also the well-being of other humans; they exhibit also social preferences (Fehr and Falk, 2002). Therefore, drivers of human behaviour from a psychological perspective are discussed followed by determinants derived from the sociological literature. We use a very simple rule to discriminate between both strands: All factors that relate directly to individual's attitude are classified as psychological and determinants which shape honesty indirectly via the society around the agent are termed as sociological. Our final concern is the link between institutional quality and compliance. As Starmer (2000) points it out, non-conventional approaches of utility theories which incorporate evidence from psychology and sociology are not able anymore to come up with one single utility function defined over individual prospects. Therefore, we are not able to extent the formal presentation of farmer's compliance decision within the next paragraphs.³

Critics of assumptions of expected utility theory

The following three axioms of agent's preferences related to certain prospects are underlying the expected utility theorem, more specifically the existence of a von Neumann-Morgenstern utility function: ordering, requiring itself completeness and transitivity, continuity, and independence. Whereas the first two axioms, ordering and continuity, are common for every economic model of choice, the independence axiom implies that any prospect that is weakly preferred to another will also be weakly preferred if weighted with the same probabilities (Starmer, 2000). Additionally, it is assumed within the expected utility framework that the agent knows all possible outcomes and related probabilities of his choices. Kahneman and Tversky (1979), Tversky and Kahneman (1986), Machina (1987) and Rabin and Thaler (2001), to name only some examples, provide an ample discussion of those axioms. Especially, experiments show that respondents show no consistent behaviour if faced with non-weighted and weighted prospects. Therefore, most alternatives of the expected utility theory relax the independence axiom. For an extensive review of the literature the interested reader is referred to Schoemaker (1982) and Starmer (2000). In the following, some selected critics which seem to be most relevant for our examples are discussed more extensively but an exhaustive survey of the literature would go beyond the scope of this paper. More specifically, we will discuss the relevance of losses and gains versus changes in wealth levels, the framing effect and problems of deriving objective probabilities of detection.

One of the most prominent alternative developments of the expected utility theory is the *prospect theory* introduced by Kahneman and Tversky (1979). Their work bases on results from various simple choice experiments at three different universities and includes a procedural aspect, assuming that agent's decision follows some heuristics or rules (Starmer, 2000). One central element of prospect theory is the notion that carriers of utility are rather changes in wealth than the final asset position. Thus, respondents order in a first stage the different prospects they face with respect to gains and losses related to a subjectively chosen reference point. They do not integrate previous entitlements and potential gains to determine a maximised outcome as first choice. In a second stage potential outcomes and related probabilities are evaluated and the alternative with the highest utility selected. Consequently, the first phase of decision in prospect theory violates the transitivity axiom of the expected utility theory. Kahneman and Tversky (1979) show that their proposed approach is capable to explain risk-averse behaviour in the case of potential gains but risk-seeking behaviour in the case of potential losses. In a later paper they use the terms 'diminishing sensitivity' to explain

³ In this respect we deviate from the approach by Sutinen and Kuperan (1999). They include a variable of an individual's moral standing as a function of the similarity between regulation and individual's values into their objective function. However, the solution still bases on the expected utility framework.

the convex and concave shape of their value function and ‘loss aversion’ to describe the steeper curve in the domain of losses compared to the domain of gains (Tversky and Kahneman, 1992).⁴ Usually many authors assume the reference point equivalent to a status-quo wealth position. Therefore, it follows from the prospect theory that each farmer will evaluate a certain fixed penalty differently. Implementation of cross-compliance regulation take account of it in executing fines as a percentage of the farm specific Single Farm Payment.

Nowadays the violation of the independence axiom is better known as *framing effect* (Tversky and Kahneman, 1986). Preferences over prospects are not independent of the way how they are presented. Starmer (2000) describes this phenomenon as violation of the description invariance underlying conventional theory. That is, it could be possible that farmers react differently if faced with the options of losing 1% of SFP compared to receiving still 99% of SFP in case of a violation. Similarly, people might react differently on the probability of a penalty and the potential benefit of a higher price. The example of framing in tax law by Schelling discussed in Tversky and Kahneman (1986) has also a high relevance for the case of cross-compliance and their acceptance among the general public. Obviously, payments if expressed as reward for complying with the law will be judged much more sceptical by the non-farmer audience than payments in exchange to farmers’ efforts to reduce negative environmental effects of production activity.

The assumption of *risk neutral agents* is questionable. Risk averse agents exhibit a concave utility function and are known to prefer certain outcomes to any risky prospect with the same expected value. That is, in the case of compliance to regulations risk averse agents weight low probabilities of detection higher than risk neutral agents (Alm et al., 1992). Thus the theoretical framework above does not take risk aversion into account and, therefore, underestimates compliance for risk averse farmers. Finally, people may fail to estimate and revise subjective probabilities for themselves resulting in systematic mistakes. Alm et al. (1992) show that people appear to overestimate the probability of an audit. Similarly, it has been shown that agents subjectively overestimate the expected penalty, too (OECD, 2004).

Dynamic regulator-regulation relationships are neglected up till now. Sample selection for audits often not proceed randomly. In a more realistic manner previously detected violators will be overrepresented in a sample for auditing. Thus, an once detected farmer will face a higher probability of auditing in the future.

Psychological literature

Farmer’s part of compliance unexplained by the above utility maximisation framework might be influenced by external and internal factors. Whereas economic theory focuses almost exclusively on external rewards of human behaviour, psychology is mainly concerned with the internal motivation of certain behaviour. Intrinsic motives are qualified through the absence of any apparent incentive (Frey and Jegen, 2001). Mazar and Ariely (2006) term it as “superego”. In this context, Sutinen and Kuperan (1999) distinguish between two groups of thoughts. The first, so-called instrumental perspective, assumes individuals as driven purely by self-interest. They respond only to changes in the tangible, immediate incentives and penalties associated with non-compliance. Frey and Jegen (2001) summarise sources that explain the possible disincentive effect of external intervention in intrinsic motivation. This effect is known as cognitive evaluation theory in the psychological literature. A beneficial personal motivation, e.g., a positive attitude towards active environmental protection, might

⁴ Additional elements of the prospect theory like the certainty and the reflection effect seem to be of more theoretical relevance and will not be discussed here. See Kahneman and Tversky (1979) for a detailed description.

be corrupted through the introduction of explicit monetary rewards. Frey and Jegen (2001) term it as crowding-out effect and present empirical relevance from several economic studies. The second perspective, called normative, emphasizes what individuals consider just and moral, instead of what is in their self-interest. Individuals tend to comply with the law to the extent that they perceive the law as appropriate and consistent with their internalized norms. The key variables determining compliance in the normative perspective are individuals' perceptions of the fairness and appropriateness of the law and its institutions (Sutinen and Kuperan, 1999). Within this normative perspective the cognitive theory explains the impact of personal motivation and the level of personal development on individual's behaviour. People show pro-social behaviour (Alm et al., 1992).

One illustrative example is the case of the Canadian best management practice (BMPs) programs, which have a similar aim as the EU's Good Agricultural and Economic Conditions (GAEC) standards. Agriculture and Agri-Food Canada (AAFC) (2006) defines Beneficial Management Practices (BMPs) as "farm management practices that: minimize and mitigate impacts and risks to the environment, by maintaining or improving the quality of soil, water, air and biodiversity; ensure the long term health and sustainability of natural resources used for agricultural production; and, support the long-term economic and environmental viability of the agriculture industry. As part of the program, farmers attend an Environmental Farm Plan workshop and complete a workbook designed to assess the current state of the farm and identify areas of concern. Then farmers develop an action plan for addressing the areas of concern. The action plan is confidentially reviewed by a group of locally appointed farmers. Once the Peer Review Committee approves the Action Plan, a farmer can participate in the EFP Cost-Share Program that helps cover a portion of the costs of implementing eligible projects from the action plan. Producers are eligible to apply for cost-share incentives through the Canada Farm Stewardship Program, Greencover Canada, and the Canada Water Supply Expansion Program. Federal government covers up to 60% of the cost of implementing eligible practices. Many practices covered through federal cost share programs are also eligible for funding under different provincial cost share programs. As a result up to 90% of the total project cost can be covered by combining federal and provincial funds. However, the coverage varies depending on farmer eligibility, provinces and type of Best Management Practices. Despite the fact that the implementation of Best Management Practices is not mandatory, there has been a relatively high degree of participation. For example, between 2005 and 2007, more than 11,000 of 57,211 Ontario farmers implemented or were in the process of implementation of BMPs. Even though the implementation of Beneficial Management Practices is partly subsidized by the federal and provincial governments, it is not costless to the farmers. As an example, Ontario farmers bore about a third of the cost of implementation of the management practices eligible for funding. Net costs for participating farmers could amount to about €1000 per farm. The reason farmers are prepared to pay these costs is that they recognize the environmental problems and the societal demands to behave as good citizens that each contribute their 'fair share' (Fox and Rasjic, 2007, 2)

Finally, psychological research has shown that people might behave completely different in situations of emotional engagement that they self-assessed in situations without being emotionally aroused (Amir et al., 2005) ("heat of the moment"). Put differently, despite the cognitive awareness how to treat animals or how to apply chemicals correctly farmers can violate codes of practice in stressful situations or under similar circumstances. Contrary to the factors discussed above this behaviour might increase non-compliance.

Sociological literature

Following Fehr and Fischbacher (2002), the theory of (positive) reciprocity represents quantitatively the most important type of social preferences. The theory implies that people respond positively to some friendly actions without expecting further benefit from their doing. Fehr and Gächter (2000) distinguish between reciprocity and cooperation as the latter requiring a future interaction of the involved agents and subsequently, a positive expected value from today's friendly answer. Applying the expected utility theory, agents would expect to show no friendly behaviour if no further interactions are foreseen. Human behaviour develops over time, probably to a larger extent during adolescence, and is shaped by parents, peer groups or stigmas. Stigma might result as a reaction of the surrounding people to revealed non-compliant behaviour (Deffains and Fluet, 2007). However, different peer groups could have quite opposing influences depending on the involvement. For instance, a farmers association might have a negative attitude towards a stricter environmental regulation, whereas the surrounding non-farming village community might appreciate it. Similarly, social norms or society's expectations with respect to animal welfare conditions or biodiversity differ in many instances from beliefs of a farming peer group. Recurrence to reciprocity might help to solve this discrepancy. However, reciprocity needs a positive incentive. For instance, Bardsley and Sausgruber (2005) state that a reciprocally motivated agent will contribute to a public good only if he receives a benefit from it. The non-binding chosen level of worker's effort, as another example, is shown to be positively related to the principal's wage offer (Fehr and Fischbacher, 2002).

Within the literature about reciprocity, several authors describe the orientation of own behaviour on certain reference groups with the terms conditional cooperation, conformity or the desire of social approval (Fehr and Falk, 2002; Henrich, 2004). Results from various experiments support these concepts. Thus, an individual farmer is expected to be more willing to comply with a regulation if many farmers respect it (Fehr and Falk, 2002) or, similarly, a farmer has a motivation to fulfil social norms or expectations of his peer group (Henrich, 2004). Bohnet and Zeckhauser (2004) and Bardsley and Sausgruber (2005) describe conformity as an incentive to adjust his own behaviour according to "social comparisons" even without material consequences.⁵ Bohnet and Zeckhauser (2004) show that people in ultimatum game experiments don't react to information about randomly chosen offers but revise their action if faced with average offers. That is, information about a certain type of consensus within a group or society act as an incentive to adjust own behaviour. Generally, it is expected that above mentioned factors will be more influential in cooperative cultures with strong communal norms (OECD, 2004).

Turning to empirical support of the theory of reciprocity from cross-country analysis, Frey and Torgler (2007) present several illustrative examples using data from the European Value Survey (EVS). The authors analyse the self-judgment of respondents to cheat on tax declarations. Answers to a second question, which share of your compatriots do you expect to cheat on taxes, help to test for the impact of conditional cooperation. The econometric results point to a significant relation between perceived tax evasion and own readiness to evade taxes. The influence of a society on individual's behaviour is central element of the field experiments by Henrich et al. (2001). The authors find in 15 small-scale societies involved in agricultural production clear evidence of group-level economic organisation and market integration as driver of individual behaviour instead of self-interest. More specifically, two dimensions of societal interaction, payoffs to cooperation and market integration, explain the variation in the results of the field experiments to a large extent. Moreover, none of individual level explanatory variables added a significant contribution to the actor's behaviour in the games. Henrich et al. (2001) conclude from their results that everyday life economic

⁵ Bardsley and Sausgruber (2005) highlights explicitly the difference between the economic concept of conformity and that here applied in calling it "normative conformity".

conditions and social interactions shape individual's preferences and that those are not exogenous.

Institutional quality and compliance

Tyran and Feld (2006) summarise the discussion about mild (without deterrent sanctions) and severe law (with deterrent sanctions). The above mentioned mechanism of conditional cooperation or the own commitment act as motivation for compliant behaviour in the case of endogenously enacted laws. This type of regulation applies more for quality standards as for cross-compliance. Following the results from experiments by Tyran and Feld, (2006) a significantly higher compliance to endogenously introduced laws like voluntary standards should be expected than to exogenously enacted mild laws like cross-compliance. Sunstein et al. (2000) discuss under which conditions non-deterrent sanctions might be superior to deterrent sanctions.

Following Slemrod (2007) agent's behaviour depends on the behaviour of the regulating body (labelling organisation, cross-compliance implementing organisation). The author terms this interaction as reciprocal altruism. Closely related is Levi's (1998) concept of a "contingent consenter" if government is judged as expressing peoples' interest, people cooperate by paying taxes even if free-riding will give higher utility in the short-term interest. Empirical studies underline the influence of the way how regulations are developed, implemented and enforced on the personal motivation to comply with rules and laws. For instance, empirical evidence of higher tax compliance in environments with better institutional quality is given by Frey and Torgler (2007). There is a significant difference in tax morale between Western and Eastern Europe what authors relate to the disruption in the institutional framework. Finally, Frey and Torgler (2007) find a significant lower readiness to cheat on taxes if people have a higher satisfaction with the state of democracy in the country and living in countries with a better institutional quality.⁶

Incomplete contracts are characterised by information asymmetries. Our examples of cross-compliance and food quality standards fit well in the case of incomplete contracts in the provision of public goods (Martimort et al., 2005).

The link between institutional quality and the implementation of EU regulations is nicely illustrated by the different experiences of Member States with the implementation of the milk quota at the beginning of the 1980s. Some Member States, especially Spain and Italy, introduced the necessary regulation very late or didn't properly enforce existing legislation (Williams, 1997).

4. Comparison of different outcomes and outlook for empirical research

Slemrod (2007) (p. 41) cite two figures expressing motives to pay taxes. According to the cited survey 96 percent of answering US taxpayers pay taxes because they feel to ought to and 62 percent pay them due to fears of audits and penalties. The relation nicely illustrates the relevance of psychological and sociological motives in compliance behaviour compared to the determinants brought forward by the deterrence model. Table 2 presents an overview of the most relevant determinants of compliance. The table has to be read in such a way that every new line from the top to the bottom adds additional determinants rather than coming up with a consistent set of competing determinants. All theories, especially the deterrence model and institutional literature, provide tools to explain the emergence of multiple equilibria (Andvig and Moene, 1990; Tyran and Feld, 2006). Thus, different countries can exhibit persistently different levels of compliance.

⁶ Six proxies of institutional quality provided by Kaufmann et al. (1999) covering perceived levels of accountability of political processes, political stability, government effectiveness, regulatory quality, rule of law and control of corruption are used.

Table 1: Determinants of compliant behaviour according to different strands of the literature

| Theory/ Literature strand | Determinants | | |
|---------------------------|---|---|--------------------------------------|
| Expected utility theory | Chance of getting caught/ penalised | Size of penalty | Individual's degree of risk aversion |
| Prospect theory | Gains and losses with respect to reference point | Diminishing sensitivity | Loss aversion |
| Psychological literature | Internalised attitudes "superego"/ personal moral beliefs | Pro-social behaviour | |
| Sociological literature | Reciprocity with principal's action | Conformity with peer group | |
| Institutions | Trust in institutions in general | Satisfaction with institutional framework – "against all" | |

Unfortunately, empirical analyses lack in general the possibility to distinguish between wilful and unintended non-compliance. Above theoretical reflections implicitly assume a rational and deliberate behaviour. In real life, a certain share of tax underreporting or even overreporting is caused by non-awareness or misunderstandings of tax laws (Slemrod, 2007). Also in the case of cross-compliance and food quality standards non-intended non-compliance can not be excluded completely. Moreover, Fehr and Fischbacher (2002) present estimates from various experiments that 40 to 60 percent of respondents behave selfish. Thus, the expected utility theory might explain the behaviour of roughly one half of the population. The remaining approximately 50 percent of the population behave according to the theory of reciprocity.

What lessons can be learned from the approaches discussed above for empirical research on compliance behaviour? First, the neo-classical theory of compliance emphasises the benefit-cost calculation behind compliance behaviour. Whereas the limitations of this framework have been discussed above, it is relevant to include such variables in a model explaining regulatory compliance. What the neo-classical economic approach makes clear is that it is not sufficient to focus on the costs associated with non-compliance only (punishment and probability of violation detection), but that also the opportunity costs of compliance (e.g. forgone profits associated with non-compliance) have to be properly accounted for. Second, the previous exposition makes clear that also variables that are traditionally considered to be non-economic have to be considered. Not doing this would lead to a misspecification in the explanatory model, which is known to lead to biased parameter (or impact) estimates. As regards the factors that have to be taken into account it was argued that the contributions from the psychological and sociological literature should be accounted for, where the first emphasizes the need to consider attitudinal factors or personal motivations and the second points to the role of civic duty, social reciprocity and peer pressure. Also cultural factors were found to play a role, which emphasizes the need for cross-country studies and to be careful with drawing generalisations based on specific case-studies.

Whereas the traditional economic variables are at least conceptually rather clear and associated with a clear (although limited) behavioural framework their operationalisation is relatively straightforward. The costs of non-compliance follow from multiplying the penalty

associated with violating a standard with the probability of detection, which gives the expected costs of non-compliance. The benefits of non-compliance (equal to the forgone benefits of compliance) can be obtained by evaluating the shadow price of the standard (following from differentiating the profit function with respect to the regulatory constraint variable). As regards the 'non-economic' variables the operationalisation is less straightforward. From the theories considered there follows no clear protocol as to which variables have to be included in the analysis. Rather, some general notions are introduced, which have to be measured in an indirect way, most-likely by means of a set of proxy variables. This creates challenges for empirical research not only a set of variables have to be selected, but also a lot of measurement issues have to be solved. The measurement issue here not only refers to finding a proper scale (for example developing Likert scaled survey questions), but also avoiding measurement biases. In a lot of cases measurement of these type of variables has to rely on self-reporting, which is known to be subject to biases like giving 'correct' or socially acceptable answers, revealing of selective information, etc.

In the following first some illustrations are given of typical examples of indicator variables to be included in models aiming at explaining compliance. Subsequently, some remarks are made about prioritisation, taking into account findings from empirical literature. To measure the internal motivation (impact of psychological factors) typically survey questions are used aiming at determining the attitude of the regulated entities with respect to the regulation considered. Typical examples are questions focusing on the rating the (perceived) potential harm as a factor to comply, questions on 'acceptance' (or perceived legitimacy) of the regulation, and questions aimed at tracing the moral convictions (you should obey the law under all or under specific conditions, etc.). The measurement of social factors is different from the internal factors in that it focuses on social phenomena, but the measurement approaches are rather similar. Also in the latter case one is interested to determine to what extent regulated entities are responsive to social factors. The only way to measure this is again by singling out the attitudes of the regulated to these factors. Typical examples of questions aimed at assessing the role of social or environmental factors are questions about the extent to which one believes that others are doing their part, reputation as a compliance-motivating factor, perceived conformity of the standard with generally accepted good practice codes.

As is clear from the previous discussion this kind of empirical research will be quite data demanding. As data are often not available and data generation is costly the question arises whether some priorities can be formulated. In general this is difficult to say. Based on several empirical studies our impression is that impacts of deterrence (in particular specific deterrence aimed at individuals) are observed, but are rare in the practical reality. Monitoring and inspection are costly and often limited in such way as to undermine effective specific deterrent. This emphasizes the need to go beyond the neo-classical economic model in which deterrence plays such a prominent role. As regards other factors motivating compliance the picture is less clear and more case specific. For example, for Danish dairy farmers it was found that about 80 percent of the farmers found a 'strong sense of civic duty to comply' and 'believe others are doing their part' as important and significant motivations to comply. They outweighed the fear of deterrence (May, 2005). However, differences in regulatory contexts preclude simple generalizations.

5. Concluding remarks

This paper started by emphasizing the increasing importance of regulations, which might have either a public or a private origin, with respect to agriculture and the production of food. It emphasized the need for a better understanding of compliance with regulations. This is not only a scientific interest, but in particular public regulations nowadays often require so-called

regulatory impact assessments (RIAs) as part of their introduction and regulatory reforms aimed at simplification and improving effectiveness, consistency, accountability and transparency (e.g., the Commission's White Paper on Governance (EC, 2001, pp.18-20) and the better regulation movement (EC, 2006). One element of such assessments always is the analysis of compliance, although until now they tend to be done badly. This paper contributes to a better understanding of compliance, by exploring and comparatively analysing different approaches to explain compliance found in the literature. It was argued that the classical economic approach, which interprets compliance as a decision based on a costs –(forgone) benefit-decision, is too limited for a full understanding of compliance behaviour. Moreover the limits of the expected utility framework underlying this theory were briefly reviewed and contrasted with results from the prospect theory. It was further argued that alongside this utility framework also contributions from the psychological and sociological literature should be acknowledged. This adds factors such as intrinsic motivations, moral convictions (e.g. obeying laws, stick to one's given word), social preferences, reciprocity and impacts of peer groups. Moreover, it was argued that institutional quality matters as a factor to understand compliance.

Whereas at least at this moment one coherent model integrating all these aspects is lacking we think a first priority is to add more empirical analyses. These analysis should have a broader focus than deterrence-issues. Some suggestions for this are given, although it is recognized that this kind of research will be quite data demanding. However, going this route should in the end contribute to a better selection of appropriate variables relevant to analyse compliance issues. And a better understanding of this is also a crucial element to not necessarily more, but better regulation.

References

- Alm, J., G. H. McClelland and W. D. Schulze, 1992. Why do People Pay Taxes? *J. Public Econ.* 48(1), 21-38.
- Amir, O., D. Ariely, A. Cooke, D. Dunning, N. Epley, U. Gneezy et al., 2005. Psychology, Behavioral Economics, and Public Policy. *Marketing Letters* 16(3-4), 443-454.
- Andreoni, J., B. Erard and J. Feinstein, 1998. Tax Compliance. *J. Econ. Lit.* 36(2), 818-860.
- Andvig, J. C. and K. O. Moene, 1990. How Corruption May Corrupt. *J. Econ. Behav. Organ.* 13, 63.
- Bardsley, N. and R. Sausgruber, 2005. Conformity and Reciprocity in Public Goods Provision. *J. Econ. Psych.* 26(5), 664-681.
- Becker, G. S. 1968. Crime and Punishment: An Economic Approach. *J. Polit. Economy* 76(2), 169-217.
- Bohnet, I. and R. J. Zeckhauser, 2004. Social Comparisons in Ultimatum Bargaining. *Scand. J. Econ.* 106(3), 495-510.
- Brousseau, E. and M. h. Farès, 2000. Incomplete Contracts and Governance Structures: Are Incomplete Contract Theory and New Institutional Economics Substitutes or Complements? In: C. Ménard (ed.), *Institutions, Contracts, Organizations, Perspectives from Now-Institutional Economics*. Cheltenham: Edward Elgar Publisher, pp. 399-421.
- Deffains, B. and C. Fluet, 2007. Legal versus Normative Incentives under Judicial Error. Montréal.
- EC, 2001. White Paper on Governance. European Commission, COM(2001) 428 FINAL. Brussels.
- EC, 2006. A Strategic Review of Better Regulation in the European Union. European Commission, COM(2006) 689 Final. Brussels.

- Fehr, E. and A. Falk, 2002. Psychological Foundations of Incentives. *Europ. Econ. Rev.* 46(4-5), 687-724.
- Fehr, E. and U. Fischbacher, 2002. Why Social Preferences Matter: The Impact of Non-Selfish Motives on Competition, Cooperation and Incentives. *Econ. J.* 112(478), C1-C33.
- Fehr, E. and S. Gächter, 2000. Fairness and Retaliation: The Economics of Reciprocity. *J. Econ. Perspect.* 14(3), 159-181.
- Fox, G. and P. Rasjic, 2007. Estimates of Farmer Costs of Current Environmental Programs and Potential Abatement Costs for Canadian Cereals Growers. Mimeo. University of Guelph, Food, Agriculture and Resource Economics, Ontario.
- Frey, B.S. and R. Jegen, 2001. Motivation Crowding Theory. *J. Econ. Surveys* 15(5), 589-611.
- Frey, B.S. and B. Torgler, 2007. Tax Morale and Conditional Cooperation. *J. Compar. Econ.* 35(1), 136-159.
- Gardner, B. (2003). U.S. Food Quality Standards: Fix for Market Failures or Costly Anachronism? *Amer. J. Agr. Econ.* 85(3), 725-730.
- Henrich, J. (2004). Cultural Group Selection, Coevolutionary Processes and Large-scale Cooperation. *J. Econ. Behav. Organ.* 53(1), 3-35.
- Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., et al. (2001). In Search of Homo Economicus: Behavioral Experiments in 15 Small-Scale Societies. *Amer. Econ. Rev.* 91(2), 73-78.
- Jongeneel, R. (2006). Deliverable 6: Overview of Certification Schemes in 7 EU Countries and 3 non-EU Countries (Deliverable to project no. SSPE-CT-2005-006489). The Hague: LEI.
- Jongeneel, R., Brouwer, F., Farmer, M., Müssner, R., de Roest, K., Poux, X., et al. (2007). Compliance with Mandatory Standards in Agriculture: A Comparative Approach of the EU vis-à-vis the United States, Canada and New Zealand (No. 6.07.21). The Hague: Wageningen UR, LEI.
- Kahneman, D. and A. Tversky, 1979. Prospect Theory: An Analysis of Decision under Risk. *Econometrica* 47(2), 263-292.
- Kaufmann, D., A. Kraay and P. Zoido-Lobaton, 1999. Aggregating Governance Indicators (No. 2195). Washington D.C.: World Bank.
- Machina, M.J., 1987. Choice Under Uncertainty: Problems Solved and Unsolved. *J. Econ. Perspect.* 1(1), 121-154.
- Martimort, D., P. De Donder and E. B. de Villemeur, 2005. An Incomplete Contract Perspective on Public Good Provision. *J. Econ. Surveys* 19(2), 149-180.
- May, P.J., 2005. Compliance Motivations: Perspectives of Farmers, Homebuilders, and Marine Facilities. *Law & Policy* 27(2), 317-348.
- Mazar, N. and D. Ariely, 2006. Dishonesty in Everyday Life and Its Policy Implications. *J. Public Policy & Marketing* 25(1), 117-126.
- OECD. (2004, December 2-3, 2004). In OECD (Ed.), *Economic Aspects of Environmental Compliance Assurance* (pp. 179). Paper presented at the OCED Gobal Forum on Sustainable Development, Paris.
- Rabin, M. and R. H. Thaler, 2001. Anomalies: Risk Aversion. *J. Econ. Perspect.* 15(1), 219-232.
- Schoemaker, P.J.H., 1982. The Expected Utility Model: Its Variants, Purposes, Evidence and Limitations. *J. Econ. Lit.* 20(2), 529-563.
- Slemrod, J., 2007. Cheating Ourselves: The Economics of Tax Evasion. *J. Econ. Perspect.* 21(1), 25-48.
- Starmer, C., 2000. Developments in Non-Expected Utility Theory: The Hunt for a Descriptive Theory of Choice under Risk. *J. Econ. Lit.* 38(2), 332-382.

- Sunstein, C.R., D. Schkade and D. Kahneman, 2000. Do People Want Optimal Deterrence? *J. Legal Stud.* 29(1), 237-253.
- Sutinen, J.G. and K. Kuperan, 1999. A Socio-economic Theory of Regulatory Compliance. *Int. J. Soc. Econ.* 26(1/2/3), 174-193.
- Torgler, B., 2002. Speaking to Theorists and Searching for Facts: Tax Morale and Tax Compliance in Experiments. *J. Econ. Surveys* 16(5), 657-683.
- Tversky, A. and D. Kahneman, 1986. Rational Choice and the Framing of Decisions. *J. Bus.* 59(4), S251-S278.
- Tversky, A. and D. Kahneman, 1992. Advances in Prospect Theory: Cumulative Representation of Uncertainty. *J. Risk Uncertainty* 5(4), 297-323.
- Tyran, J.-R. and L. P. Feld, 2006. Achieving Compliance when Legal Sanctions are Non-deterrent. *Scand. J. Econ.* 108(1), 135-156.
- Williams, R.E., 1997. The Political Economy of the Common Market in Milk and Dairy Products in the European Union. FAO Social and Economic Paper No. 142, Rome.
- Winter, S. C. and P. J. May, 2001. Motivation for Compliance with Environmental Regulations. *J. Pol. Anal. Manage.* 20(4), 675-698.