

**Achieving Compliance when  
Legal Sanctions are Non-Deterrent**

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# Achieving Compliance when Legal Sanctions are Non-Deterrent

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Law backed by non-deterrent sanctions (mild law) has been hypothesized to achieve compliance because of norm activation. We experimentally investigate the effects of mild law in the provision of public goods by comparing it to severe law (deterrent sanctions) and no law. The results show that exogenously imposing mild law does not achieve compliance, but compliance is much improved if mild law is endogenously chosen, i.e. self-imposed. We show that voting for mild law induces expectations of cooperation, and that people tend to comply with the law if they expect many others to do so.

Keywords: Deterrent effect of legal sanctions, Expressive law, Social norms, Public goods, Voting.

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## I. Introduction

The economic analysis of law traditionally emphasizes the deterrent effects of legal sanctions to explain why people comply with the law. According to this view, people rationally calculate the costs and benefits of breaking the law. People are predicted to abide by the law if sanctions are sufficiently severe whereas they tend to break the law if sanctions for doing so are too mild (see Polinsky and Shavell 2000a for a survey).

Recent thought in law and economics has rediscovered the importance of social norms in studying compliance with the law (Ellickson 1991, Tyler 1990).<sup>1</sup> In addition to the direct deterrent effects of legal sanctions, various indirect ways of how lawmaking may affect behavior have been suggested (Cooter 1998, McAdams 2000a, Posner 1998, 2000, Posner and Rasmusen 1999, Sunstein 1996, 1999). However, the relevance of norm-mediated effects of lawmaking (“expressive law”) is contested (e.g. Adler 2000, Anderson and Pildes 2000, Scott 2000). This disagreement is at least in part due to a lack of conclusive empirical evidence on whether and why a law backed by non-deterrent sanctions (henceforth mild law) induces people to abide by the law.

This paper experimentally analyzes the effects of mild law in a simple setting. The law we investigate makes the contribution to a public good an obligation and sanctions free-riding. The main focus of the paper is to investigate under which conditions law induces compliance not by deterrence but by norm-activation. Experimental methods provide the means to measure the effects of lawmaking under controlled conditions. For example, the severity of a sanction is controlled by the experimenter and known by all participants in the experiment. In contrast, people may comply with objectively mild laws in the field because they overestimate the severity of formal legal sanctions or because they anticipate severe complementary informal sanctions (Waldfogel 1994, Lott 1992).

We test whether compliance through norm-activation is induced by mild law and whether compliance depends on mild law being exogenously imposed or endogenously enacted. To test the hypothesis that exogenous mild law activates norms by expressing what one ought to do, we compare mild law to an otherwise identical condition with severe law and

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<sup>1</sup> See also the special issue on Social Norms, Social Meaning, and the Economic Analysis of Law in *Journal of Legal Studies* 27 (June 1998), or Symposium on Social Norms and the Law, *University of Pennsylvania Law Review* 144 (1996), Conference on Legal Construction of Social Norms, *Virginia Law Review* 86(8), (November 2000).

a condition without law. These two conditions serve as benchmarks against which the effects of exogenous mild law can be assessed. To investigate whether the endogeneity of mild law induces compliance with the law, we compare exogenously imposed law and endogenously chosen law. If law is endogenously chosen, people vote in a referendum on whether or not to enact law. If law is exogenously imposed, it is enacted by the experimenter. Compliance may be achieved by endogenous mild law for two reasons. People may feel committed to comply with law to which they consented (McEwan and Maiman 1984) and strong support for a law may signal that others intend to comply with the law. This expectation of law-abiding behavior by others may, in turn, motivate conditionally cooperative types to also comply with the law. Our design also serves to analyze the interplay of these two factors.

Our main results are as follows. Law backed by mild sanctions does not significantly improve compliance and efficiency if it is exogenously imposed. In this case, mild law does not appear to have norm-activating effects. However, if mild law is accepted in a referendum, the public good is much more (about three times more) efficiently provided than without law. We investigate why endogenous mild law is (from an economic perspective) so surprisingly successful. The explanation we suggest has two elements: commitment and conditional cooperation. We show that if mild law is accepted in a referendum, subjects expect others to be committed to comply and not to free-ride. That is, voting for mild law is interpreted as a signal for cooperation, and induces expectations of cooperation. These expectations, in turn, are shown to increase cooperation. As a consequence, subjects tend to comply with the law if they expect most others to comply. However, this logic cuts both ways. If mild law is rejected in the referendum, compliance tends to be lower than without the law. The lack of support for mild law seems to be interpreted as a signal that others intend not to comply, inducing non-compliance in turn.

Note that we analyze the positive question of whether and when law backed by non-deterrent sanctions induces compliance when only mild law is feasible. However, the normative issue of whether non-deterrent sanctions are in some sense superior (e.g. because they are perceived as being more fair) to deterrent sanctions is beyond the scope of our paper (see Sunstein et al. (2000) on this issue). Thus, the treatments involving no law and severe law serve as a mere control and a benchmark against which the effects of mild law can be measured. For example, the treatments with severe law test for whether theoretically deterrent sanctions indeed deter and for whether people are cognitively able to anticipate that they do. The difference in compliance rates between severe and no law provides the range within

which mild law can be effective. Our interpretation of the findings is that making the enactment of mild law endogenous can achieve compliance if only mild law is feasible and if it is expected to enjoy popular support.

We proceed as follows: Section 2 provides a discussion of lawmaking and cooperation norms. Section 3 describes the experimental design, and section 4 presents the results. Section 5 interprets these results and provides some conclusions. In particular, we believe that this study is a contribution to answer the “... core question [of] how potential cooperators signal one another and design institutions that reinforce rather than destroy conditional cooperation.” (Ostrom 2000: 138). Our results suggest that referenda may be an institution allowing citizens to signal one another their willingness to cooperate and to increase efficiency in the provision of public goods.

## **II. Lawmaking and the efficient provision of public goods**

According to standard economics, public goods are under-provided because of free-rider incentives. The resulting inefficiency is seen as one of the major justifications for government activity and lawmaking (e.g., Hardin 1997). In principle, efficiency gains can be reaped by lawmaking if a law makes the provision of the public good an obligation and metes out sanctions to free-riders.<sup>2</sup> Positive prescriptions are found in some laws (e.g. those relating to income taxes) but are rare in criminal law which forbids certain acts and sanctions committing the act. From a theory perspective, the provision of a public good is equivalent to the prevention of a public bad. Therefore, compliance with the law can in many instances be interpreted as a contribution to a public good. The efficient provision of public goods can theoretically be induced if sanctions are set at the optimal level.

The law and economics literature has been much concerned with determining the optimal level of sanctions (see Polinsky and Shavell 2000a). In the standard model, the optimal sanction corresponds to the harm done (i.e. the externality) divided by the probability of sanction. According to this logic, crimes with very low probability of detection should be

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<sup>2</sup> We use the term “law” in the sense the term is defined in the imperative theory of law (see Raz 1980). This theory defines a law as an obligation backed by a sanction.

severely sanctioned.<sup>3</sup> However, fairness considerations may make the setting of such severe sanctions unacceptable. For example, Sunstein et al. (2000) provide questionnaire evidence showing that people do not find it appropriate to increase the level of sanctions to compensate for a low probability of sanctioning. Therefore, severe (i.e. optimally deterrent) sanctions may not be feasible for fairness reasons (Polinsky and Shavell 2000b). We are thus concerned with the question of whether law can achieve compliance through norm-activation rather than through deterrence.

#### *Activation of cooperation norms*

Social psychologists argue that social norms must be activated to affect behavior. For example, Smith and Mackie (2000: 377) note: “Norms must be brought to mind before they can guide behavior. They can be activated by deliberate reminders or by subtle cues, such as observations of other people’s behavior.” Therefore, lawmaking may activate cooperation norms in a direct and an indirect way. First, the enactment of mild law may directly activate cooperation norms and induce law-abiding behavior if the law is perceived as a public expression (a “deliberate reminder”) of what one ought to do. In this case, a mild legal sanction may not just be interpreted as a (low) price to pay for some kind of neutral behavior. Instead, imposing a sanction for free-riding may express that this behavior is unacceptable even for one willing to incur the sanction (Cooter 1984, Kahan 1998). However, the evidence for this type of norm activation is mixed, and some authors have suggested that mild sanctions may be counterproductive and actually de-activate (“crowd out”) cooperation norms (Bohnet et al. 2001, Gneezy and Rustichini 2000).

Second, lawmaking can improve cooperation in an indirect way by activating the norm of *conditional cooperation*. This norm prescribes that one ought to cooperate if others also cooperate. It has been argued that conditional cooperation is the most important cooperation norm (Ostrom 2000), and it has been found to be a robust behavioral regularity in economic experiments (Fischbacher et al. 2001, Keser and van Winden 2000). The two forms of norm-activation through lawmaking therefore interact: Some people may be induced to obey mild law by the “deliberate reminder”-effect, and others may follow their example because of activation of conditional cooperation. As a consequence of this “multiplier” effect, people may obey mild law if they observe that many others do.

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<sup>3</sup> For example, “boiling in oil ... was used [in the middle ages] to punish murder by poisoning; since poisoners were especially difficult to apprehend in those times, a heavier punishment than that described for ordinary murderers was (economically) indicated.” (Posner 1992: 230)

To illustrate, consider the example of littering. Clean streets are a classic public good (Korobkin and Ulen 2000). Given that (the expected value of) fines for littering are usually quite low, i.e. given that anti-littering ordinances are an example of mild law, it is surprising from an economic perspective that not all people litter on streets. However, in real life, not all people are the same. Some people would not litter even if there were no laws against littering. A second group of people would litter if there were no anti-littering ordinances, but may obey an anti-littering ordinance from an internalized respect for the law. Enacting the anti-littering ordinance (a “deliberate reminder”) may activate respect in these people and therefore reduce littering. A third group of people makes their behavior dependent on how other people behave. Observing that other people do not litter activates the norm of conditional cooperation in this group and induce them not to litter. As a result, even though the mild anti-littering ordinance does not deter littering (free-riding), it may nevertheless contribute to cleanliness of streets (increase efficiency in the provision of the public good) by activating cooperation norms. Indeed, controlled field studies have shown that people tend to litter significantly less in a clean environment than in a littered environment (Krauss et al. 1978, Cialdini et al. 1990).

#### *Regulating behavior in large groups and expectations of cooperation*

While the activation of conditional cooperation by observing other people’s actions is relatively easy in small communities (like a village), it may be more difficult in larger communities (like states with millions of inhabitants). In large communities, expectations about how fellow citizens are going to behave may be an important determinant of behavior. Since lawmaking is supposed to play an important role in regulating behavior in large groups, the extent to which lawmaking is successful in fostering cooperation may depend on how it affects expectations about fellow citizens’ commitment to obey the law.<sup>4</sup>

The enactment of a mild law by some government authority may or may not induce expectations of widespread law-abiding behavior. This depends on, for example, how legitimate the enacting body is perceived to be. Such expectations of cooperation, however, could be induced if people express their commitment to obey mild law.

#### *Expressing commitment*

In small communities, people can express their commitment to cooperate in face-to-face communication. Numerous experimental studies have shown that face-to-face communication

significantly increases cooperation in public good games (e.g., Sally 1995, Bohnet 1997). The reason appears to be that people express their commitment to contribute in group discussions (see McEwan and Maiman 1984 for non-experimental evidence). From an economic perspective, these effects are surprising since a public promise to cooperate is just “cheap talk” (Farell and Rabin 1996). While these results are important, face-to-face communication is impractical in large communities. However, voting for a law is a form of expressing support for the law which is practical (and practiced, see Butler and Ranney 1994) in large communities. Expression of support in a referendum can be interpreted as a form of commitment to obey the law, inducing expectations of widespread law-abiding behavior. For example, people may expect that most people will not litter if a referendum to introduce an anti-littering ordinance is accepted by a large majority.<sup>5</sup> As a consequence of the activation of conditional cooperation, a law which is supported by a large majority in a referendum may induce widespread law-abiding behavior.

### **III. An experimental approach to the efficiency of mild law**

We propose an experimental approach to investigate the efficiency of mild law because experimental techniques provide several important advantages over other modes of empirical investigation. The most important advantages of experimental economics result from the ability to control the environment in which decisions are taken. Controlling incentives and information conditions (e.g., the severity of the sanctions) allows us to derive clear economic predictions which can be tested against observed behavior. In experiments, we can easily observe behavior which cannot be observed in the field (in particular, expectations and individual voting decisions). Controlled *ceteris paribus*-variation of experimental treatments is used to identify causal factors for behavior. In particular, the treatment variations explained below serve to investigate under which circumstances mild law activates cooperation norms.<sup>6</sup>

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<sup>4</sup> The idea that visible signs of crime or social disorder (like a broken window) induce a belief that crime is common and that this belief, in turn, increases crime is crucial in the “broken windows theory” (Wilson and Kelling 1982).

<sup>5</sup> Mild law can be interpreted as a “symbol” for what one ought to do. Voting for mild law may be interpreted by others as a signal of willingness to cooperate. Eric Posner states (1998: 767): “Symbols matter because a person’s manifested attitude towards symbols tells others something about that person’s character. People rely heavily on this information when deciding whether to engage in cooperative behavior in all realms of life.”

<sup>6</sup> We compare exogenous and endogenous (self-imposed) mild law while holding the severity of the sanction constant. In contrast, in the field, self-imposed mild law may be more effective than exogenous mild law



Of course, even an experiment does not enable the researcher to directly observe a norm (or its activation). What can be done is to manipulate a stimulus which is hypothesized to activate the norm and then observe whether behavior is in line with the hypothesized effect. Hence, observations consistent with the hypothesis are supportive of the hypothesis, but the evidence could in principle also be consistent with some other (unexplained and untested) hypothesis.

### A. Experimental design

In all experimental conditions explained below groups of subjects play a linear public goods game. Each subject is endowed with a number of points which must be allocated to either a private good or a public good. All subjects simultaneously make this decision under conditions which vary along two dimensions (see table 1).

The law prescribes full contribution to the public good (which is the efficient contribution level, see below). Therefore, a subject is sanctioned if he or she does not contribute the entire endowment to the public good. There are three sanction levels. In the “no law” condition, the sanction for free-riding is zero. In this case, each subject maximizes his or her payoff by fully free-riding. In the severe law condition, the sanction is high enough to deter a rational and egoistic agent from free-riding. In the mild law condition, the sanction is positive but too low to deter a rational and egoistic agent from free-riding.

Table 1. *Experimental design*

	<b>No law</b> (no sanction)	<b>Mild law</b> (mild sanction)	<b>Severe law</b> (severe sanction)
<b>Exogenously imposed</b>	NoEx	MildEx	SevereEx
<b>Endogenously chosen (voting)</b>	NoEnd	MildEnd	SevereEnd

The second dimension along which the conditions vary concerns how law is enacted. The law is either exogenously imposed or endogenously chosen. If the law is exogenously imposed, the severity of the monetary sanction is determined by the experimenter. If the law is endogenously enacted, subjects make decisions in a two-stage game. In the first stage,

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because endogenous law may be enforced more harshly or people might be willing to accept that law will be enforced more severely if endogenously chosen.

subjects vote in a referendum on whether to enact law or not, and participate in the public good game as described above in the second stage. We denote the first-stage conditions as follows: SEVERE for the condition where subjects vote on severe law, MILD for the condition where subjects vote on mild law. The endogenous second-stage conditions, where subjects make contribution decisions are denoted as SevereEnd if severe law is accepted by majority vote, MildEnd if mild law is accepted by majority vote, NoEnd(SEVERE) if severe law is rejected, and NoEnd(MILD) if mild law is rejected by majority vote.

## B) Procedures and parameters

In all conditions, subjects are randomly and anonymously allocated to groups of size  $n = 3$ . Each group member is endowed with  $E_i = 20$  points which must be allocated to a private good ( $c_i$ ) or a public good ( $g_i$ ), where  $E_i = c_i + g_i$ . In the no law condition, the payoff of subject  $i$  ( $\pi_i$ ) comes from the private good and the public good. Each subject's income from the public good is the sum of contributions by all  $j = 1, \dots, n$  group members to the public good ( $\sum_j g_j$ ), multiplied by  $a = 0.5$ , i.e.,  $\pi_i = c_i + a \sum_j g_j = (E_i - g_i) + a \sum_j g_j$ . Complete free-riding ( $g_i = 0$ ) is a dominant strategy for all subjects in the no law condition (see below).

In the conditions where law prevails, each subject  $i$  who does not comply with the law incurs a sanction of  $s_i$  points. In these conditions, subject  $i$ 's payoff function is modified to  $\pi_i = E_i - g_i + a \sum_j g_j - s_i$ , where  $s_i = 0$  if  $g_i = E_i$ , and  $s_i = s$  if  $g_i < E_i$ . Mild law and severe law exclusively differ by the severity of the punishment  $s$  in case a subject does not fully contribute. In particular, in the mild law conditions the sanction is  $s^{mild} = 4$  points, and in the severe law conditions the sanction is  $s^{severe} = 14$  points. Instructions given to participants use neutral wording as is common practice in experimental economics. For example, the public good is called “group account” and the sanction is called “deduction”.

In the exogenous conditions, each subject indicates the contribution  $g_i$  to the public good, and indicates the expected contribution by the other two group members. In each of the endogenous conditions, subjects participate in a two-stage game. In the first stage they decide on the enactment of law by anonymous majority vote and indicate the expected outcome of the referendum in the first stage. Each subject is paid additional 2 points for predicting the outcome of the referendum correctly. In the second stage, each subject  $i$  indicates  $i$ 's contribution  $g_i$  as well as expected contributions by the other group members for all possible

outcomes of the referendum. Each subject is paid 4 points in all conditions for a correct prediction of other group members' contributions (one point was worth €0.50, approx.).

Each subject either participates in the exogenous or the endogenous conditions. The sequencing in the exogenous conditions is as follows: NoEx, MildEx, SevereEx. However, subjects obtained information about the outcome of all conditions only at the end of the experiment. Therefore, the procedure is theoretically equivalent to simultaneous decisions. In the endogenous conditions, the sequencing was MILD, SEVERE. Again, subjects were not informed about the outcomes of either treatment until the end of the experiment. In particular, subjects were not informed about the outcome of the referendum in the first stage before proceeding to the second stage. Instead, subjects had to take second-stage decisions for all possible outcomes of the referendum according to the strategy method. That is, subjects indicate their contribution to the group account given their own voting decision and given that 0, 1, or 2 of the other group members approve. The advantage of the strategy method is that we know each subjects "reaction" to all possible outcomes of the referendum, even those that will not actually materialize. The strategy method allows us to investigate individual behavior in much greater detail and is theoretically equivalent to a sequential procedure. Whether it is behaviorally equivalent is an open issue (e.g. Brandts and Charness 2000, Weber et al. 2004), and seems to depend on context.

An important aspect of our experiment is that subjects play the game only once which is known to all subjects. This is important because rational predictions are clear-cut in one-shot games whereas many outcomes can be rationalized in repeated games (e.g., Kreps et al. 1982). In addition, all decisions are taken by subjects anonymously (single-blind) such that no subject could know the behavior of another subject. Anonymity together with the one-shot procedure allows us to exclude the possibility that subjects obey the law because of fear from informal sanctions like shaming and shunning or because they want to build up a reputation as a trustworthy partner.

### **C) Predictions**

#### *Game-theoretic predictions in the exogenous conditions (one-stage game)*

In the NoEx condition, the material incentives are such that complete free-riding by everyone is the unique Nash equilibrium in dominant strategies. To see why, consider an agent  $i$  who maximizes his or her payoff  $\pi_i = E_i - g_i + a \sum_j g_j = E_i - g_i + a g_i + a G_{-i}$  (where  $G_{-i}$

denotes the contributions of the other group members to the public good). The private marginal return from contributing to the public good is  $a$ , and the marginal cost to provide the public good is 1. Since  $a < 1$ ,  $g_i = 0$  maximizes  $\pi_i$ . Since the game is symmetric,  $g_i = 0$  for all  $i$  is the unique Nash equilibrium in NoEx. Therefore,  $i$ 's equilibrium payoff is  $\pi_i = 20$  points in NoEx (see table 2).

Table 2. Overview over parameters and predictions in the contribution stage

	<b>No Law</b> (NoEx and NoEnd)	<b>Mild Law</b> (MildEx and MildEnd)	<b>Severe Law</b> (SevereEx and SevereEnd)
Group size ( $n$ )	3	3	3
Endowment ( $E_i$ )	20 points	20 points	20 points
Marginal return from private good	1 point	1 point	1 point
Marginal return from public good	0.5 points	0.5 points	0.5 points
$i$ 's sanction for free-riding ( $g_i < E_i$ )	0 points	4 points	14 points
$i$ 's equilibrium contribution $g_i$	0 points	0 points	20 points
$i$ 's equilibrium payoff $\pi_i$	20 points	16 points in MildEx 20 points in MildEnd	30 points

In the MildEx condition, the sanction for free-riding is so low that zero contribution by everyone remains the unique Nash equilibrium in dominant strategies. Since the private marginal return of contributing is smaller than the marginal cost of contributing ( $a < 1$ ), partial contribution is never optimal. Full contribution yields a payoff of  $\pi_i(\text{full}) = a E_i + a G_{-i}$ , whereas zero contribution yields  $\pi_i(\text{zero}) = E_i + a G_{-i} - s^{\text{mild}}$ . Full contribution is rational if and only if  $\pi_i(\text{full}) > \pi_i(\text{zero})$ , i.e. if  $s > E_i(1 - a)$ . However, since  $s^{\text{mild}} = 4 < E_i(1 - a) = 20(1 - 0.5)$ , a rational and egoistic subject does not contribute to the public good in MildEx. By symmetry, zero contribution by all three group members is the unique Nash equilibrium MildEx. Therefore,  $i$ 's equilibrium payoff is  $\pi_i = 16$  points in MildEx.

In the SevereEx condition, the punishment for free-riding is high enough to induce full contribution by all group members to the public good. Agent  $i$  now maximizes  $\pi_i = E_i - g_i + a g_i + a G_{-i} - s^{\text{severe}}$ . Since the private marginal return of contributing is still smaller than the marginal return of not contributing ( $a < 1$ ), partial contribution is never optimal. However,

full contribution ( $g_i = E_i$ ) is rational because  $s^{severe} = 14 > E_i (1 - a) = 20 (1 - 0.5)$ . By symmetry, full contribution by all three group members is the unique Nash equilibrium in SevereEx. Therefore,  $i$ 's equilibrium payoff is  $\pi_i = 30$  points in SevereEx.

*Game-theoretic predictions for the endogenous conditions (two-stage game)*

To derive predictions for the two-stage game in the endogenous conditions, we solve the game by backward induction (see Tyran and Feld 2002 for details). In the first stage, subjects vote in MILD [SEVERE] on the enactment of mild [severe] law. In the second stage, subjects decide on their contributions to the public good according to MildEnd, SevereEnd or NoEnd. The second stage of the two-stage game is the same as the one-stage game described above (i.e., MildEnd is the same as MildEx etc.). Therefore, the same predictions prevail in the second stage of the two-stage game as in the one-stage game.

In the first stage of the two-stage game, a voter can either be pivotal or not pivotal. A voter is said to be pivotal if his voting decision affects the outcome of the referendum. Since the group size is  $n = 3$  and the decision rule is majority voting, a voter is pivotal if exactly one of the other voters approves of the law. In general, a voter who is only concerned with the (instrumental) effect of his voting decision on the outcome of the referendum is indifferent between approving and disapproving if he is not pivotal. That is, Yes and No are best replies for rational non-pivotal voters in SEVERE and MILD.

If voter  $i$  is pivotal in MILD, voting against the sanction is the unique best reply. The reason is that a rational voter anticipates that  $g_i = 0$  is chosen by all  $i$  in the second stage in MildEnd and NoEnd. As a consequence,  $i$ 's payoff from voting No is  $\pi_i(\text{reject}) = E_i$ , and from voting Yes is  $\pi_i(\text{accept}) = E_i - s_i^{mild}$ . Since  $s_i^{mild} = 4$ , a payoff maximizing agent therefore votes No. Therefore, rejection of mild law and zero contribution is the game-theoretic prediction. The intuition for this result is that a rational and egoistic player has no incentive to comply with the law because the sanction is too mild. If all players believe that all other players are rational and egoistic, free-riding is expected to prevail with and without the mild sanction. Therefore, the payoff without the sanction is higher (20 points) than with the sanction (16 points).

If voter  $i$  is pivotal in SEVERE, the unique best reply is to vote Yes. The reason is that a rational voter knows that all  $i$  choose  $g_i = E_i$  in SevereEnd, but  $g_i = 0$  in NoEnd in the second stage of the game. As a consequence,  $i$ 's payoff is  $\pi_i(\text{reject}) = E_i$ , and  $\pi_i(\text{accept}) = 3a E_i$ . Since

$3a = 1.5 > 1$ , it follows that  $\pi_i(\text{reject}) < \pi_i(\text{accept})$ , and a pivotal profit maximizing agent will therefore vote Yes.

To summarize, the game-theoretic prediction for the first stage of the two-stage game is that mild law is rejected and that severe law is accepted. These predictions have been derived assuming that all agents are strictly self-interested and fully rational and that this is common knowledge. Predictions can be much different if we relax these assumptions. For example, assume an agent is strictly self-interested and fully rational, but believes that other agents are conditionally cooperative, and further assume that he believes that others interpret voting for mild law a sign of cooperativeness. In this case, he may have an incentive to vote for mild law, but not to contribute in the second stage (this is the case if voting for mild law is believed to induce other players to contribute at least 8 additional points). Suppose, in contrast, that a player is not strictly self-interested but conditionally cooperative and suppose the player interprets voting for mild law as a signal that others are cooperative. Then, upon observing that others vote for mild law, he may have an incentive to contribute to the public good.

The parameters and procedures of the experiment have been chosen to study the compliance-inducing effects of non-deterrent sanctions and in particular whether the endogenous enactment of such sanctions makes a difference for compliance. To be able to analyze these effects, we have been careful to avoid confound with other issues, and we have deliberately chosen a simple experimental setting. We briefly discuss five such issues.

First, sanctions for free-riding are certain in our experiment to avoid difficult issues of misperception of probabilities and of risk preferences. Second, we investigate a linear public good in which “corner solutions” are optimal. Full free-riding is individually optimal, but not to free-ride at all is socially optimal. In this simple setting, any sanction above a critical level [ $\underline{s} = E_i(1 - a)$ ] is fully deterrent and any sanction below this critical level is non-deterrent. Third, sanctions are only costly in the experiment if they are actually meted out. Hence, fully deterrent sanctions are theoretically costless. In contrast, non-deterrent sanctions are costly if agents rationally decide to break the law. Hence, there is no issue of over-deterrence but there is an issue of under-deterrence.<sup>7</sup> Fourth, we analyze voting in small groups of three to obtain a large number of independent observations. This seems admissible as voting behavior in larger groups (of 30 voters) has been found to be very similar as in small groups (Tyran 2004). Fifth,

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<sup>7</sup> Note that any sanction in excess of 10 points is a theoretically optimal sanction in this experiment. The reason is that such a sanction is fully deterrent (makes free-riding unprofitable) and no sanctions have to be meted out

our design provides voters with a choice between a (mild or severe) sanction and no sanction. We do not analyze the direct comparison between mild and severe law. Hence, we do not analyze whether people prefer non-deterrent sanctions over deterrent sanctions (see Sunstein et al. 2000). The reason is that we are concerned with the effect of norm-activation given that only mild law is feasible.

## IV. Results

In total, 102 subjects participated in the experiment. 42 participated in the exogenous conditions, 60 in the endogenous conditions. Two sessions were conducted in a large lecture hall at the University of St. Gallen. Subjects were undergraduate students of business, law, and economics recruited a few days before the experiment. All procedures were carefully explained to participants in written instructions, and we verified their understanding in several control questions.<sup>8</sup> Subjects earned on average approx. €17 during 80 minutes.

### A) Does mild law induce compliance?

To evaluate whether mild law induces compliance and increases efficiency, we compare it to no law and severe law. To measure efficiency, we use a gross and a net measure of efficiency. While the measure of gross efficiency is concerned with how much subjects contribute to the public good, the net measure is concerned with the final income that subjects obtain. A difference between these two measures of efficiency arises if subjects are sanctioned. A contribution rate is defined as the average actual contribution to the public good as a percentage of full contributions. Since full contribution to the public good is efficient in all conditions, contribution rates provide a gross measure of efficiency. Our measure of net efficiency is the average realized income gain from cooperation as a percentage of the potential income gain from cooperation.<sup>9</sup>

Our main finding concerning the efficiency of *exogenous* mild law is

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(i.e. the mechanism is costless). However, sanctions smaller than 10 points are not optimal since they do not induce optimal contributions and are costly.

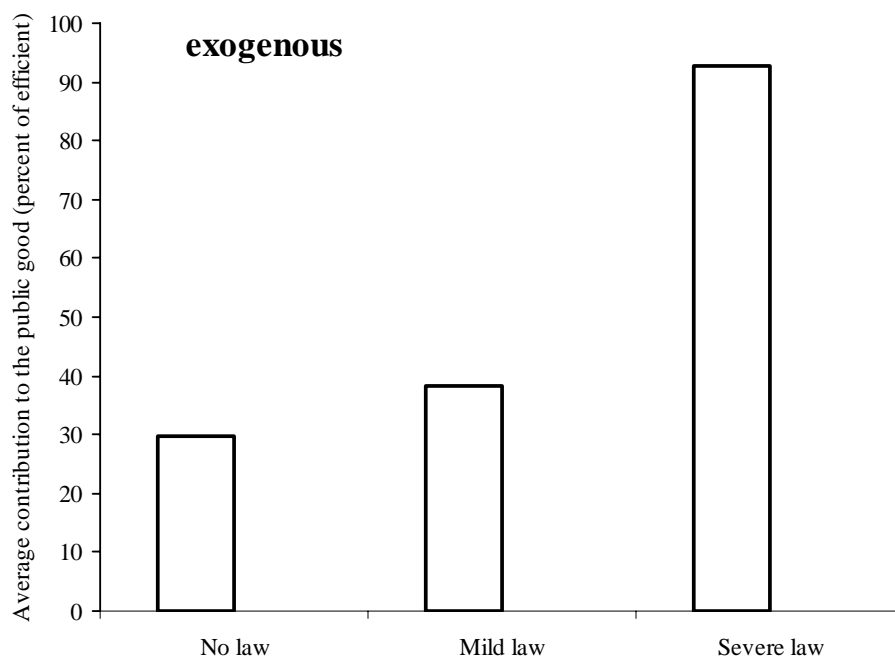
<sup>8</sup> Instructions are available from the authors on request.

<sup>9</sup> Note that we do not redistribute the revenues from fines in the experiment to keep things simple (for participants). Sanctions therefore constitute an income loss to the sanctioned subjects and to the population of subjects as whole. However, this should not be interpreted as indicating that sanctions are necessarily wasteful.

**Result R1** Exogenous mild law does not significantly increase compliance.

Support for result R1 comes from a comparison of the gross and net measures of efficiency in the three exogenous conditions. The contribution rate is 93 percent in SevereEx, 38 percent in MildEx, and 30 percent in the NoEx condition (see figure 1). According to a Mann-Whitney test, contributions are significantly higher in SevereEx than in MildEx ( $p = 0.000$ ) and NoEx ( $p = 0.000$ ). There seems to be a slight norm-activation effect from mild exogenous law, but contributions are not significantly higher in MildEx than in NoEx ( $p = 1.000$ ). In SevereEx, 7 percent ( $= 3/42$ ) and in MildEx 64 percent ( $= 27/42$ ) of subjects do not fully contribute. As a consequence, net efficiency was almost three times as high in SevereEx (89 percent) than in MildEx (33 percent) and in NoEx (30 percent).

*Fig. 1.* Contribution rates in the exogenous conditions (42 subjects in each condition)



The result that severe law almost perfectly deters free-riding is important because it indicates that participants understood incentives and responded to them as predicted by economic theory. Behavior almost perfectly in line with the theoretical prediction (no free-riding) in SevereEx contrasts sharply with the considerable discrepancy between the theoretical prediction (full free-riding) and observed behavior in NoEx. Our NoEx condition replicates the findings from many public good games that people do not fully free-ride even if there is no sanction for free-riding (see Ledyard 1995 for a survey). The comparison of SevereEx and NoEx also reveals that the non-zero efficiency in NoEx is not mainly due to



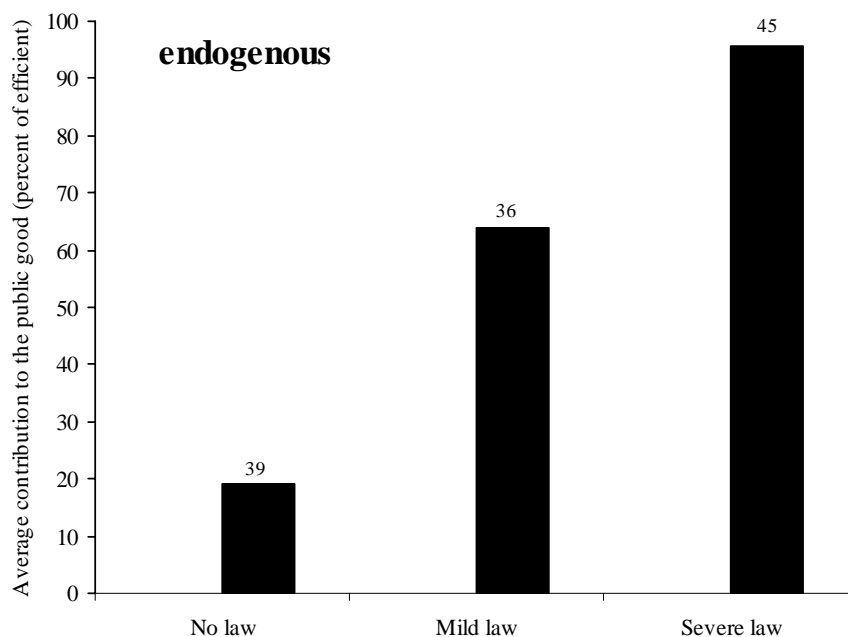
errors or insufficient incentives but to voluntary compliance. While free-riding is not as extreme as theoretically predicted in NoEx, there clearly is a free-rider problem as can be seen from the relatively low contribution rates in the NoEx condition in figure 1.

Our main result concerning the efficiency of *endogenous* conditions is summarized in

**Result R2** Subjects accept mild law in a majority of cases. Efficiency is much higher with endogenous mild law than without law.

In MILD, 50 percent of subjects vote for the enactment of mild law, and given the distribution of Yes-voters over groups, 60 percent (= 36/60) of subjects take decisions in MildEnd. In SEVERE, 70 percent of subjects vote for the enactment of severe law. As a consequence, 75 percent of subjects (= 45/60) take second-stage decisions in SevereEnd.

Fig. 2. Contribution rates in the endogenous conditions (number of subjects above bars)



Contribution rates were about three times as high with endogenous mild law than without it, and more than six times as high with endogenous severe law than without it. In particular, the contribution rate in MildEnd is 64 percent, but only 22 percent in NoEnd(MILD). The contribution rate is 96 percent in SevereEnd, but only 15 percent in NoEnd(SEVERE). Figure 2 shows that both severe law and mild law are more efficient than no law. In particular, contributions are significantly higher if either law was accepted than if it was rejected according to a Mann-Whitney test ( $p < 0.001$ ). However, gross efficiency in endogenous severe law is significantly higher than endogenous mild law ( $p = 0.001$ ).

Including the income loss from sanctioning does not change the overall picture. In SevereEnd 4 percent (= 2/45) of subjects are sanctioned for free-riding, in MildEnd 42 percent (= 15/36). As a consequence, net efficiency is 62 percent in MildEnd, 96 percent in SevereEnd, but only 19 percent in NoEnd.

Given that severe law is endogenously enacted, almost all subjects comply with it. That is, 96 percent (= 43/45) of subjects fully contribute in SevereEnd. Given that severe or mild law is rejected, again most (62 percent = 24/39) subjects take rational contribution decisions and fully free-ride ( $g_i = 0$ ). However, if mild law is accepted, most subjects take contribution decisions which are in contradiction to the economic prediction. In MildEnd, a majority of 58 percent (= 21/36) fully contributes, whereas only 28 percent (= 10/36) of subjects take the rational decision to fully free-ride.

*Causal effects of mild law versus selection effects*

We now explain that the higher efficiency observed in MildEnd as compared to NoEnd(MILD) is due to the efficiency-enhancing effect of mild law, and not due to selection effects. Broadly speaking, a selection effect arises if people with unobservable characteristics are allocated in a non-random manner (“selected”) into “treatment groups”, and if these people differ in an observable way across groups after they received the treatment.

Table 3. *Contribution rates for Yes-voters and No-voters in MILD*

	<b>Yes-voters</b>	<b>No-voters</b>
<b>Accepted</b>	A 62%	B 68%
<b>Rejected</b>	C 17%	D 23%

To explain why selection effects are potentially relevant in our experiment, suppose that subjects are to some extent *unconditionally* cooperative – a characteristic that is not observable ( $x$ ). An unconditional cooperator is a subject who (for whatever reason) contributes in any case. However, we do observe whether mild law is endogenously enacted ( $y$ ), and we observe the contribution rates with and without mild law ( $z$ ). Suppose that unconditionally cooperative subjects tend to vote for mild law. If by chance<sup>10</sup> at least 2

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<sup>10</sup>Note that our experimental design involves randomization (subjects were randomly allocated into groups).

unconditionally cooperative subjects happen to be in the same group, mild law will be accepted and contributions will be high. Similarly, if less than 2 unconditional cooperators happen to be in the same group, the law will be rejected and contributions will be low. We would, therefore, observe that contributions are high if mild law is accepted ( $y$  correlates with  $z$ ), but this may have resulted from selection effects ( $x$  correlates with  $y$ ), and not from the causal effect of mild law ( $y$  causes  $z$ ).

To test for selection effects, we consider the contribution decisions of Yes- and No-voters separately. According to the reasoning in the previous paragraph, selection effects arise if unconditional cooperators also vote Yes. If selection effects were the driving force behind our results in MILD, the contribution rates of, say, Yes-voters should be the same irrespective of whether they happen to be in a group accepting or rejecting mild law. However, this is clearly not the case. Table 3 shows that contribution rates of Yes-voters are high when mild law is accepted, but low if it is rejected. The same holds for No-voters. In particular, both Yes-voters (compare A and C,  $p = 0.04$ ) and No-voters (compare B and D,  $p = 0.01$ ) significantly contribute more if mild law is accepted than if it is rejected according to a Mann-Whitney test. In addition, contribution rates of Yes-voters and No-voters do not seem to be different when mild law is accepted (compare cells A and B), or rejected (compare cells C and D).<sup>11</sup> We conclude that selection effects are not the driving force behind our results. Instead, the acceptance of mild law induced subjects (independent of their own voting decision) to contribute more.

With respect to the comparison of endogenous and exogenous conditions our main finding is summarized in

**Result R3** Efficiency is higher if mild law is endogenously enacted than if it is exogenously imposed.

Support for result R3 comes from a comparison of contribution rates in the respective exogenous and endogenous conditions. Contribution rates in MildEnd (64 percent) are significantly higher than in MildEx (38 percent) according to a Mann-Whitney test ( $p = 0.044$ ). Net efficiency in MildEnd (62 percent) is almost twice the net efficiency in MildEx (33 percent). Hence, endogenously chosen mild law achieves compliance because voting for mild law signals cooperation, as will be explained in more detail below. However, the logic

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<sup>11</sup> Note that groups are independent observations and comparisons across rows (e.g. A vs. C) involve statistically independent observations while comparisons across columns involve dependent observations. We therefore refrain from calculating tests for the latter comparisons.

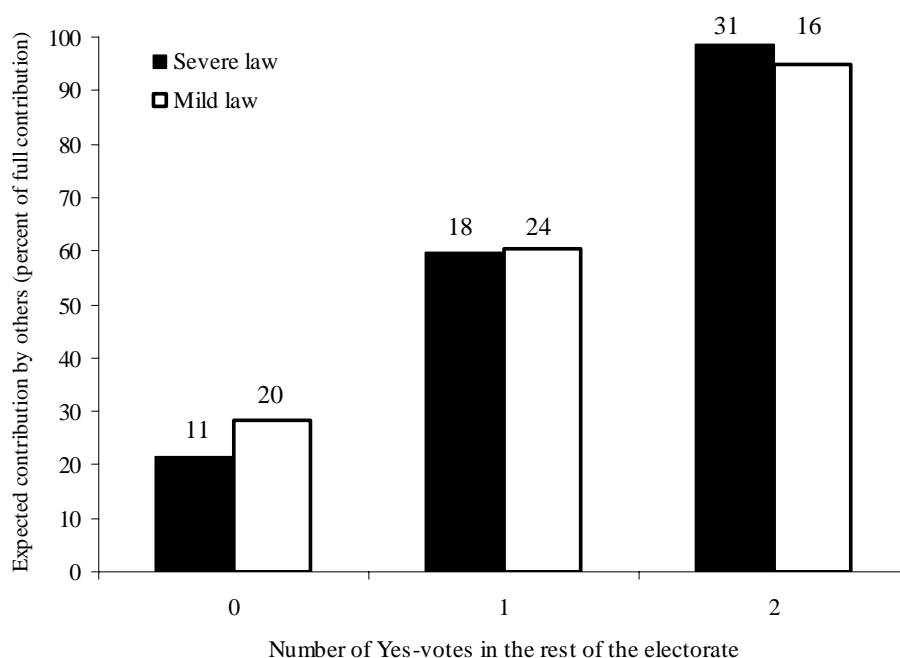
cuts both ways: endogenously rejected mild law tends to reduce cooperation. In fact, Contribution rates are lower in NoEnd (19 percent) than in NoEx (30 percent), and this difference is weakly significant according to a one-sided Mann-Whitney test ( $p = 0.066$ ).

### B) Why do people vote for mild law, and why do they comply with it?

In the following, we focus on subjects' voting decisions in MILD, and on contribution decisions in MildEnd and NoEnd(MILD), while the other conditions serve for purposes of comparison. We show that a combination of conditional cooperation and commitment can explain why cooperation norms were activated.

**Result R4** Subjects expect others to be committed by their voting decisions. That is, subjects expect higher compliance with mild law if many others express support for the law.

Fig. 3. Support for law in the rest of the electorate and expected contributions by others [ $E(G_{-i})$  in percent of full contribution, 60 subjects per treatment]



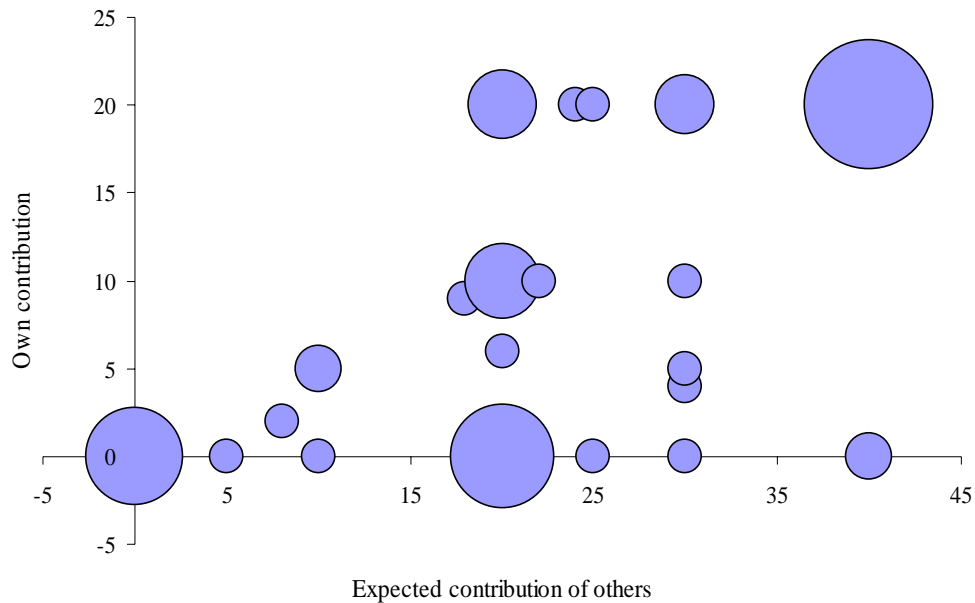
In the following, we denote the expected contribution by others by  $E(G_{-i})$ . Figure 3 shows that subjects on average expect higher contributions by others if the law receives more support in the electorate. In both treatments,  $E(G_{-i})$  rises from about 25 percent of the efficient level if none of the other voters approves to approximately 95 percent if all others express support. This relation is very similar in the two treatments despite the fact that the “rational”

expectations are very different in the two treatments. As explained above, the rational expectation in SEVERE is  $E(G_{-i}) = 0$  if none of the other group members approved, and  $E(G_{-i}) = 100$  percent if all others approved. This is more or less the case (see figure 3). However, in MILD the rational expectation is  $E(G_{-i}) = 0$  at *all* levels of approval which is clearly not the case. In our view figure 3 strongly suggests that subjects interpreted other subjects' expression of support for mild law as a commitment that they will fully contribute to the public good.

**Result R5** Subjects are conditionally cooperative. That is, subjects tend to comply with mild law if they expect many others to comply.

Subjects who expect high contributions by others tend to contribute more in all conditions. For example, figure 4 shows the relation between  $E_i(G_{-i})$  and  $g_i$  in MILD at the outcomes that effectively prevailed. The figure shows that there is a positive overall relation between expected contributions by others and own contributions. The corresponding Spearman correlation in figure 4 is 0.648 ( $p = 0.000$ ).<sup>12</sup> This is clear evidence for the presence of conditional cooperation. That is, subjects are more willing to comply with mild law if they expect many others to comply. This expectation of widespread law-abiding behavior is induced if many people vote for the law (see result R4 and figure 3).

Fig. 4. Conditional cooperation (MILD,  $n = 60$ )



<sup>12</sup> The respective correlations in the other conditions are: MildEx: 0.325 ( $p = 0.036$ ), NoEx: 0.468 ( $p = 0.002$ ). In SEVERE: 0.613 ( $p = 0.000$ ). In SevereEx the correlation is low (0.247) and not significant ( $p = 0.114$ ) since almost all (= 39/42) subjects fully contribute and expect full contributions.

Figure 4 is also interesting because it illustrates that equilibrium expectations and choices (at 0,0) are not totally absent (13.3%), that hope for coordination on the efficient outcome (40, 20) is the most frequent observation (23.3%), but that observations between these extremes are also common.

## V. Summary and conclusions

This paper identifies conditions under which mild law increases efficiency by activating cooperation norms. We show that mild law does not induce widespread law-abiding behavior if it is imposed by an exogenous authority. In contrast, mild law does induce voluntary compliance if it is accepted in a referendum. Therefore, voting may be an institution which allows potential cooperators to signal one another their willingness to cooperate. Voting for the law is interpreted as an act of publicly expressing support for a cooperation norm which induces expectations of higher compliance with the law. Because of conditional cooperation, higher expectations about the cooperation of others translate into higher cooperation rates. In short: mild law achieves compliance if people expect many others to comply. This section provides a discussion of results.

Our first main result is that exogenously imposed mild law does not significantly affect average contributions to the public good. This appears to contradict the norm-activation hypothesis. We can think of three reasons why this result may not translate to lawmaking in more complex settings. First, even though exogenous mild law has been found to be ineffective in increasing cooperation, it may yield considerable efficiency gains in coordination problems (Bohnet and Cooter 2001, McAdams 2000b). Second, in some contexts, framing may be important in the provision of public goods. Cookson (2000) and Liberman et al. (2004) show that framing can affect contributions to public goods in some contexts but Abbink and Henning-Schmidt (2002) find no such effect in a “bribery game”. We use a neutral language in our experiment as is common practice in experimental economics. For example, the sanction is called “deduction” and the public good is called “group account”. However, framing is more suggestive in actual lawmaking (people are “punished for wrongdoing”). Depending on the framing, a (monetary) sanction may be perceived as a legitimate response to unacceptable behavior or as the price to pay for acceptable behavior (e.g., Gneezy and Rustichini 2000, Bohnet et al. 2001, Fehr and Gächter 2001). Third, mild law may have short-run and long-run effects. Mild law may activate pre-existing cooperation norms in the short run but may also shape such norms in the longer run.

Our experiment remains silent on these potential long-run effects since contribution decisions are not repeated (see Cardenas et al. 2000, Huck 1998 or Kahan 2000 on potential long-run effects).

Our second main result is that mild law activates cooperation norms and increases efficiency if it is self-imposed, i.e. accepted in a referendum. The idea that people are more willing to obey self-imposed laws or to comply with regulations to which they have consented is supported by evidence from field studies in various contexts. For example, McEwen and Maiman (1984) show that defendants in small claims courts in Maine were much more likely to comply with mediated outcomes than with judgments imposed by a court. Marks et al. (1986) show that machine operators in a U.S. factory who contributed decisions about their work environment were more productive and less often absent than workers in a control group. Bardhan (2000) investigates factors affecting the quality of maintenance of irrigation systems in India. He finds that those farmers (of the 480 interviewed) who responded that the rules have been crafted by most of the farmers, as contrasted to the elite or the government, have a more positive attitude about the water allocation rules and the rule compliance of other farmers. In these cases, the quality of maintenance of irrigation systems is significantly higher.

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