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The impact of monitoring and sanctions on cheating: Experimental evidence from Tunisia

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Abstract: Using a laboratory experiment in a developing country (Tunisia, North Africa), we investigate whether the *level* of monitoring and both the *nature* (monetary versus moral) and *magnitude* of sanctions influence cheating levels. Our findings show that the introduction of weak monetary sanctions and monitoring is likely to increase cheating. However, a perfect monitoring is found to decrease the level of cheating. Moreover, when combined with a perfect monitoring, moral sanctions matter and may be even more effective than strong monetary sanctions in reducing cheating. We draw some policy implications regarding cheating in various domains.

Keywords: cheating, experiment, monitoring, moral, sanctions.

JEL codes: D01, D03, C91.

The impact of monitoring and sanctions on cheating: Experimental evidence from Tunisia

1. Introduction

Dishonesty is pervasive in many human interactions. Mazar and Ariely (2006) argued that dishonest actions “contribute to the US economy losing hundreds of millions of dollars in tax revenues, wages, and investment dollars, as well as hundreds of thousands of jobs each year”. The conventional economic approach assumes that individuals are dishonest and cheat when it is in their material interest to do so. In other words, individuals consciously and deliberately undertake dishonest actions by comparing the expected benefits and costs of the dishonest action (Becker, 1968; Allingham and Sandmo, 1972). In this perspective, it is generally assumed that people consider three aspects: the expected gain from cheating, the probability of being caught, and the magnitude or level of sanctions if caught. For example, in the employer-employee relationship, employees are frequently considered as rational cheaters, who cheat when the perceived marginal benefit exceeds the marginal cost. Managers respond to this calculus by implementing monitoring and incentive schemes that lessen the attraction of cheating (Nagin et al., 2002).

While capturing an important part of the story, the standard economic approach disregards situations where people, especially employees, can benefit from cheating and do not (Ariely, 2012; see also Rosenbaum et al., 2014 for a comprehensive review). The rationale behind such behavior is that individuals can be intrinsically or morally motivated not to engage in dishonest actions (Gneezy, 2005; Gibson et al., 2012; Pruckner and Sausgruber, 2013; Rosenbaum et al., 2014). An increasing number of experimental economics results also show that people may be reluctant to be dishonest in order to maintain their self-concept –also referred to as self-image and self-identity (Mazar et al., 2008; Fischbacher and Föllmi-Heusi, 2013) – or because they are sensitive to the way others see them. These studies notably stress that the *context of the decision making* can lead to a shift in judgment even when the contextual factors do not affect the expected outcome in monetary terms. The importance of honest behavior is often stressed by stating that opportunistic actions are inconsistent with the individual’s identity (Nagin et al. 2002). According to Ellingsen et al. (2010, see also Ruffle, 1999; Charness and Dufwenberg, 2006), individuals may feel guilty if their actions fall short of others’ expectations. For instance, Utikal and Fischbacher (2013) show that nuns engage in disadvantageous lying (i.e., under-reporting) in order to appear honest. Similarly, using a field experiment on honesty among a sample of 427 Israeli soldiers, Ruffle and Tobol (2014) showed that dishonesty can be attenuated when the outcome of subjects’ (dis)honest decision is observable by others.

Let us briefly distinguish between studies on lies, on the one hand, and studies on cheating, on the other hand, even if these two behaviors can be considered as forms of dishonesty. Lies are most often

studied in two-person zero sum games, where a sender lies to a recipient in order to extract some surplus from the latter (e.g., Gneezy, 2005; Erat and Gneezy, 2012). The interaction between the two players is an important dimension in these experiments. In cheating studies, on which we focus here, subjects play against the administrator of the game. The interaction is much weaker, since participants know that the administrator's wealth is not directly impacted by their decision (e.g., Mazar et al., 2008; Fischbacher and Föllmi-Heusi, 2013).

Mazar et al. (2008) used a matrix task where people have to find in a table a pair of numbers that add up to exactly 10.00 from a matrix of 12 non-integer numbers lower than 10 (e.g., 5.02 and 4.98). People self-report the number of solved matrices and get paid accordingly, which opens room for over-reporting in order to increase gains. They found that "people behave dishonestly enough to profit, but honestly enough to delude themselves of their own integrity". Moreover, the authors show that when participants are reminded of moral standards, such as listing the Ten Commandments, they appear not to cheat at all. In the same vein, using a field experiment in Austria, Pruckner and Sausgruber (2013) show that moral reminders –The paper costs 60 cents, thank you for being honest – are more effective than legal threats –The paper costs 60 cents, stealing a paper is illegal – in encouraging customers to pay for local newspapers sold through the honor system. They argue that messages based on internalized norms outweigh those of reminders of external sanctions in inducing honest behavior. Fischbacher and Föllmi-Heusi (2013) designed a simple game where participants have ample opportunity to cheat without incurring a cost, except a moral cost if any. Participants are simply informed that they must roll a die in private and self-report the found number that will determine their payoff. Given that only the participant can observe the number that was actually rolled, participants have a clear interest to report the number that corresponds to the highest gain. The distributions of self-reported die-rolling outcomes are subsequently compared to the theoretical distribution to deduce the extent of cheating, at the group level. The bad news is that about 20% of participants lie to the fullest extent possible, while 39% of participants were fully honest. They also found that a significant portion of people cheat, but not to the maximum possible extent (partial liars), which is consistent with the theory of self-concept maintenance proposed by Mazar et al. (2008).

Moreover, the standard approach does not consider the counter-intuitive case where the introduction of monetary sanctions and monitoring systems inadvertently pushes people to cheat more. Compared to a situation without sanctions, Tenbrunsel and Messick (1999) found that weak sanctions can lead to a decrease of cooperation and an increase of unethical behaviors because it frames the situation differently and activates a calculative mindset instead of a moral one. In other words, if individuals are honest because they think it is the right thing to do, the implementation of a monetary sanction crowds out their intrinsic motivation and this figure is particularly true if the sanction is weak (Frey, 1994). Using a field experiment in daycare centers, Gneezy and Rustichini (2000) showed that imposing a

small fine on parents who arrive late to pick-up their children leads to an increase in the frequency of late-arriving parents, compared to the situation without a fine. Even if not sanctioned, simply monitoring people can make them interpreting it such that the principal does not trust them which in turn may lead to a counter-productive effect, that is, an increase of the bad deed (Falk and Kosfeld, 1996; Cialdini, 1996). Moreover, Cialdini (1996) argues that in addition to the ‘We don’t trust you’ message conveyed by surveillance systems, practices implying an expectation of undesirable conduct may lead to an increase of that conduct among honest and dishonest employees by producing self-fulfilling and self-sustaining prophecies. More recently, other experiments have looked at the role of monitoring, or at least observability, on honest self-reporting. Fischbacher and Föllmi-Heusi (2013) compared the distributions of self-reported die-rolling outcomes under single versus double anonymity and showed that people do not particularly care about the experimenter’s judgment.

Hence, using experimental data, the objective of this paper is to address the above-mentioned issues by investigating the effect of different types of sanction systems (no sanction versus monetary/moral sanctions) and monitoring levels (no monitoring versus imperfect/perfect monitoring) on individuals’ dishonesty, captured here by their cheating behavior. More formally, we examine whether *(i) the introduction of (weak) sanctions and/or monitoring systems is likely to increase cheating compared to the situations where no sanction/no monitoring is applied*, and, *(ii) whether for the same level of monitoring, a moral sanction can be more effective than a monetary one in reducing cheating*. Unlike the major part of previous literature, we run our experiment in a developing country, namely Tunisia, North Africa. As far as we know, our study is the first to investigate these issues in a developing country context. Our context also partially addresses the issue related to the use of Western, Educated, Industrialized, Rich, and Democratic (WEIRD) participants (Heinrich et al., 2010; Aveyard, 2014). Indeed, the previous authors stated that using samples drawn entirely from WEIRD societies to study human nature can be misleading. Moreover, Tunisia is a more religiously and ethnically homogeneous country, compared to most Western countries, which is likely to increase the effectiveness of the moral/ethical sanctions, at least partly. Indeed, in more religiously and ethnically diverse countries, the set of effective moral/ethical cues to which everyone would respond is likely to be limited. Furthermore, cheating in exams and other domains seems high in Tunisia, as reported in the local mass media (e.g., Ben Hedda, 2014). For instance, the former Tunisian minister of education, Fethi Jarray, recently stated on a radio station that “cheating has become a culture among Tunisian students who continually invent new tricks to cheat”.¹

¹ <http://www.mosaiquefm.net/fr/index/a/ActuDetail/Element/38415-fethi-jarray-la-triche-est-devenue-une-culture-en-tunisie> (Accessed January 08, 2015).

Our paper adds experimental evidence to a growing literature exploring the personal and situational circumstances that play a strong role to determine the point at which a dishonest behavior becomes acceptable for each individual (e.g., Gneezy, 2005; Charness and Dufwenberg, 2006; Ayal and Gino, 2011; Wiltermuth, 2011; Ariely, 2012). In the theory of Self-Concept Maintenance (Ariely, 2012) individuals are only partially honest to convince themselves of their own integrity. There is a trade-off between being honest, maintaining a good self-image (internal gratification) and receiving a material payoff by being dishonest. This partial (dis)honesty is supported by experimental evidence where people cheat, but not to the maximum extent (Fischbacher and Föllmi-Heusi, 2013). In other circumstances, individuals resolve the tension between unethical behaviors and moral self-image by creatively re-interpreting an incriminating behavior as honest (Ariely, 2012), by moral cleansing and/or comparing one's own behavior to that of others (Ayal and Gino, 2012). Interestingly, Aveyard (2014) conducted two experiments among Muslim Middle Eastern students to explore the generalizability of prior research on religious priming and moral behavior. When participants were primed by a sentence unscrambling task with religious or non-religious content (in Arabic), the author found no difference in honesty rates between the two groups. Nevertheless, when using the Islamic call to prayer to prime participants, he found higher rates of honesty (68%) compared to controls who did not hear the call to pray (53%). The author suggests that his results raise the possibility that the psychological mechanisms used by religion to influence moral behavior might differ between religions and cultures.

The remainder of our paper is organized as follows. The next section is devoted to the experimental design and theoretical predictions. Section 3 provides the main results and discusses them. Section 4 concludes and highlights implications.

2. Experimental design and theoretical predictions

In March 2013, we run a paper-and-pencil experiment among 216 students at the University of Economics and Management of Sousse, Tunisia. In a between-subject design, each participant received an envelope containing four sheets of paper: the instructions of the experiment, a test sheet, an answer sheet and a questionnaire sheet. The test sheet consisted of 8 randomly-generated matrices, each composed of non-integer numbers lower than 10 (e.g., 5.74) (Mazar et al., 2008).² An example of a matrix is provided below (Table 1).

[Insert Table 1 around here]

² As far as we know, Mazar et al. (2008) were the first to use this method to investigate cheating.

Participants were asked to find cases where two numbers (one from each matrix) added up to 10 within a time frame of 5 minutes.³ Participants were requested to circle these two numbers in the test sheet. They were also informed of the following payment rule: one Tunisian Dinar (DT) for each (correctly) reported answer. As noticed by Mazar et al. (2008), one of the advantages of this task is that respondents could unambiguously evaluate whether they had correctly solved the question. Participants can cheat by self-reporting a larger number of correct answers, compared to the real number. Depending on the treatment, their statement will be verified and/or sanctioned or not. To define the level of cheating L , let us introduce some notations: let N be the number of actual combinations and R the number of self-reported combinations. All along the paper, we consider the cheating level as $L=R-N$.⁴

In order to test the effect of the sanction type and monitoring level on cheating behavior, we designed nine treatments, each corresponding to a combination of both dimensions (Table 2). Formally, four sanction systems were considered:

- No sanction at all (denoted NS): even when discovered, the participant is not sanctioned.
- A weak monetary sanction (denoted WS): when discovered, participants pay 1 DT for each misreported answer. Of course, in order to not make individuals lose their own money, sanctions are bounded at a remaining capital of 0 DT.
- A strong monetary sanction (denoted SS): when discovered, participants pay 2 DT for each misreported answer. Similarly to the previous case, participants could not lose their own money.
- A moral sanction (denoted MS): when discovered, individuals are reminded a Muslim moral rule⁵ that blames the cheater. Concretely, when delivering the answer sheet, they were requested to read in private the following famous saying of the Prophet Muhammad: “*The one who cheats us is not one of us*”.

Regarding monitoring, three levels were considered:

³ The numbers contained in the matrices change across treatments.

⁴ As suggested by one of the reviewers, it is not the same thing to find 10 correct combinations and to report 12 and to find 4 combinations and to report 6. In both cases the level of cheating is 2, but the relative level of cheating is different. So an important issue emerges: do people feel more legitimate to cheat 2 if they worked hard? This issue captured by L/N can have consequences from the sanction viewpoint. Indeed, a participant with 10 correct answers is richer and can decide to take more (less) risks and cheat, than if he/she has found only 4 correct answers.

⁵ The overwhelming majority of Tunisians are considered Muslims. Yet the recently enacted constitution stipulates that Islam is the religion of the country.

- No monitoring at all (denoted NM): the answers are not checked and participants are paid according to what they report.
- An imperfect monitoring level (denoted IM): participants were informed they have 20% chances to be monitored. In other words, 20% of participants will have all their answers verified.
- A perfect monitoring level (denoted PM): participants know that all their answers will be checked by an experiment supervisor.

[Insert Table 2 around here]

Participants were randomly assigned to treatments. In treatments with a perfect monitoring level (T3, T5, T7, and T9), participants were simply requested to give the questionnaire, table and response sheets to the experimenter. However, in order to get the individual data of the control treatment (T1) and those with an imperfect monitoring (T2, T4, T6, and T8) without violating the anonymity or lying to participants, we used a ‘magic’ pen.⁶ Indeed, the identification number in the test sheet is invisible unless someone reads it under the light of the magic pen torch. Using such a device allows us to guarantee an anonymous procedure and avoid side effects that can be related to being observed by others. We also included in the envelopes small and discreet colored coupons in the treatments with an imperfect monitoring. For example, in the treatment T8, 20% (respectively 80%) of participants received blue coupons (respectively, yellow coupons). At the end of the session, participants with the blue coupons were requested to put the test and response sheets in the envelope intended for the experimenter, while participants with the yellow coupons were asked to put them aside their table sheet. Using the light torch of the magic pen, we matched the table sheets with the result sheets to depict the individual cheating levels. Moreover, in the treatments with a moral sanction (T8 and T9), individuals were clearly informed (both orally and in the written instructions) that when detected, cheaters will be paid according to their reported *correct* answers, but will have to read in private a saying of the Prophet Muhammad, reminding the moral rule (examples of the used instructions are provided in Appendix 1). In these treatments, individuals are aware from the start that the sanction is a kind of blame in the words of the Prophet, even though they do not exactly know which saying will be used. Unlike Mazar et al (2008), where participants are reminded the 10 commandments moral rules before the beginning of the experiment, the moral rule is rather used here as a self-administered blame, a kind of penalty to the cheater. Yet we admit the fact that participants are told about it from the beginning of the experiment may also play as a reminder of the moral rule.

⁶ <http://www.youtube.com/watch?v=FWVCExscyUY>.

Let us now stress some predictions regarding participants' behavior (Table 3). We present both predictions derived from the standard economic approach and those when behavioral considerations (or anomalies) are taken into account. According to conventional economics, people will choose the optimal level of cheating according to a cost-benefit analysis and cheat as much as possible if the expected cost from cheating fully is less than the gain. Nevertheless, some experimental economics results show that people are reluctant to cheat to the highest possible level, notably in order to maintain their self-concept (Mazar et al., 2008; Fischbacher and Föllmi-Heusi, 2013). Indeed, according to the self-maintenance concept, individuals will try to find a state of equilibrium in which they will engage in cheating but only to the extent that it is harmless for their self-concept. Nevertheless, the two approaches do not systematically lead to (largely) different predictions. Economics and behavioral approaches can lead to similar predictions, even if the underlying reasons differ, as in treatment T5 (weak monetary sanction, perfect monitoring) and treatment T7 (strong monetary sanction, perfect monitoring).

[Insert Table 3 around here]

3. Results and discussion

The average earning by participant was 3.66 DT. The average cheating level and quartile boxes by treatment are presented in Figures 1a and 1b (more details are reported in Appendix 2). The bad news is that participants cheated in all treatments and the good news is that the overwhelming majority did not cheat to the maximum extent. Indeed, only 5 participants out of 216 cheated at the maximum level, two of them in the treatment T8 (MS, IM) and three in the treatment T4 (WS, IM).

[Insert Figures 1a and 1b around here]

In general, even if predictions from behavioral economics seem to better fit some of our results, we contend that the two theoretical viewpoints are complements rather than substitutes. *First*, the treatments T4 (WS, IM), T6 (SS, IM), and T8 (MS, IM) correspond to the highest levels of cheating as if imperfect monitoring combined with any form of sanction (monetary or moral) leads people to cheat more. However, using a Wilcoxon-Mann-Whitney test (not reported), the differences between each of these treatments and the control treatment T1 (NS, NM) are found to be not significant. Moreover, unlike the behavioral economics predictions, the cheating level in the treatment T2 (NS, IM), combining no sanction and imperfect monitoring, is lower than the cheating level in T1 (NS, NM), but this difference is also not significant. In short, it seems that imperfect monitoring in the Tunisian context is well accepted and not so badly perceived, which may explain why it does not seem to influence cheating behaviors. Given the suspicion of generalized fraud (e.g., Ben Hedda, 2014), Tunisians frequently require tougher devices to curb dishonesty, such as installing video surveillance

in exam rooms (Arfaoui, 2013). This result also questions the robustness of the result of Tenbrunsel and Messick (1999) in various contexts.

Second, a perfect monitoring device may reduce dishonest behaviors, since individuals cheated less in the treatments T3 (NS, PM), T7 (SS, PM), and T9 (MS, PM), as compared to T1 (NS, NM). However, the difference between cheating levels is only significant when comparing T3 (NS, PM) and T9 (MS, PM) to T1 (NS, NM) (at 10% level).

Third, consistent with the behavioral economics predictions, when combined with a perfect monitoring, *moral sanctions matter and may be even more effective in reducing cheating than strong monetary sanctions*. Indeed, the treatment T9 (MS, PM) leads to lower levels of cheating, as compared to the treatments T6 (SS, IM) and T7 (SS, PM), but the difference is only significant (at the 10% level) between T9 (MS, PM) and T6 (SS, IM). Interestingly, although individuals in the treatment T7 (SS, PM) were aware from the beginning they will be controlled and sanctioned 2 DT for each misreported response while the benefit of being honest is 1 DT, only 8 of them (out of 25) behaved honestly.

Moreover, in order to go a step further with our analysis, let us now examine the impact of each treatment on cheating while controlling for individuals' income and gender.⁷ Given that our endogenous variable, i.e., the observed cheating, is a count variable, we use a negative binomial regression (Cameron and Trivedi, 1998). Unlike other count models (i.e., zero-inflated count models, Poisson regression), negative binomial models assume the endogenous variable is over-dispersed and does not have a large number of zeros. In order to test the effect of monitoring and sanction, separately and in interaction, we created the following dummy variables: *Weak_Sanction (WS)*, equal to 1 in T4 (WS, IM) and T5 (WS, PM); *Strong_Sanction (SS)*, equal to 1 in T6 (SS, IM) and T7 (SS, PM); *Moral_Sanction (MS)*, equal to 1 in T8 (MS, IM) and T9 (MS, PM); *Imperfect_Monitoring (IM)*, equal to 1 in T2 (NS, IM), T4 (WS, IM), T6 (SS, IM) and T8 (MS, IM); and *Perfect_Monitoring (PM)*, equal to 1 in T3 (NS, PM), T5 (WS, PM), T7 (SS, PM) and T9 (MS, PM). Therefore, cross effects are measured as interaction terms between those dummies. For example, the treatment T6 (SS, IM) corresponds to the interaction term between the dummies *Strong_Sanction* and *Imperfect_Monitoring*. The variables *No_Sanction (NS)* and *No_Monitoring (NM)* account for the baseline treatment T1. The variable *Male* is binary, equal to 1 if the individual is a male. The individual monthly income has 4 values: 1 if it is less than 50 DT, 2 if it is between 50 and 100 DT, 3 if it is between 100 and 150 DT and 4 if it is more than 150 DT.

⁷ Given that all participants are undergraduate students with almost the same age, we excluded this variable from the regression.

The results of the negative binomial regression are reported in Table 4 together with the goodness-of-fit measures. We only present the combined effect of sanctions and monitoring. Further estimates of the effect of each variable considered separately and in interaction are provided in Appendix 3. We also report estimates using a linear regression model, which yields quite similar results. The obtained small p-value from the LR test (<0.0003) indicates that at least one of the regression coefficients in the model is not equal to zero. The alpha statistic is found higher than zero, which indicates that our data is over-dispersed and thus a negative binomial model is appropriate. Moreover, given the fact that negative binomial regressions model the log of the expected count as a function of explanatory variables, the coefficients are interpreted in terms of difference in the logs of expected counts of the endogenous variable.

[Insert Table 4 around here]

To some extent, the results of the negative binomial regression are consistent with those reported in Figure 1a. Being in the treatment T4 (WS, IM) significantly increases cheating, compared to the reference treatment T1 (NS, NM). Formally, being in T4 increases the difference in the logs of expected cheating by 0.46 points, *ceteris paribus*. However, being in the treatments T3 (NS, PM) and T9 (MS, PM) significantly decreases cheating, compared to the reference treatment. Concretely, being in T3 (respectively, T9) decreases the difference in the logs of expected cheating by 0.681 (respectively, 0.548) points, *ceteris paribus*. Moreover, examining the incidence rate ratios (IRR) shows that while individuals in the treatment T3 (respectively, T9) cheat about 50% (respectively, 40%) less, compared to the participants to the other considered treatments, individuals in the treatment T4 cheat about 60% more. In other words, a perfect monitoring combined to a moral sanction or no sanction at all is likely to reduce cheating, while a weak monetary sanction combined to an imperfect monitoring device is rather likely to increase the probability of a dishonest action. Finally, looking to the effects of gender and individuals' income suggests that males cheat about 38% more compared to females, while income has no significant effect on cheating.

4. Conclusive remarks

Using a laboratory experiment in a developing country (Tunisia), we investigated the effect of monitoring and monetary/moral sanctions on cheating. Even if results from experiments must be considered with caution in real-world settings, Alm and McKee (1998) argued that many of the results from laboratory experiments regarding tax compliance or evasion are directly applicable to organizational compliance with regulations and compliance with regulations within organizations. In the same line, we contend our experiment offers several valuable managerial insights. We showed that cheating is not only determined by a "rational" cost-benefit analysis. As in Fischbacher and Föllmi-Heusi (2013), we also found that even if a significant portion of people cheat, they do not cheat to the

maximum possible extent (partial cheaters). In some circumstances, using monetary disincentives and monitoring do not decrease (and may increase) cheating. This result can be interpreted in line with Bazerman and Tenbrunsel (2012) who argued that introducing monetary arguments can push people to switch from a moral reasoning to a cost-benefit analysis including opportunism. Consequently, managers have to devote more attention to how a situation is framed or construed in order to activate the adequate mindset, which is consistent with the pursued goal.

Consistent with the previous rationale, we also showed that moral sanctions are an efficient way to decrease cheating. Our results suggest that there may be significant potential for exploiting moral sanctions in the pursuit of both optimal public policy and the pursuit of profits. Moreover, previous literature has generally considered situations where there is a dilemma between gaining more profit and being honest. We showed that even when such a dilemma does not exist and being honest implies more profit, some individuals cheat as if there is an incompressible tendency to cheat, regardless of economic calculus. This result is puzzling, pushing one to ask whether participants really understood the game or trust the instructions. We cannot rule out these concerns, even if we believe that this finding reflects, at least partly, other factors such as cheating considered as a social norm and the default option (Hutton, 2009; Dakers, 2014) regardless of the economic consequences, especially if we consider the game context. Indeed, by cheating in this specific situation, the participant's consequence can be perceived just as not gaining something rather than losing something. Interestingly, recent contributions in various domains provide examples and evidence regarding disadvantageous lies (Utikal and Fischbacher, 2013). Even if their rationales do not always fit our experimental design, they can indicate insightful directions for further research as if some individuals are irrepressible cheaters. Sometimes, there is a pleasure of cheating or being nasty (Abbink and Herrmann, 2011; Knol and Pouchain, 2002), regardless of economic considerations. In other circumstances, people may cheat to manipulate others' perceptions or opinions, by accepting monetary loss as a cost to reach their goals (Utikal and Fischbacher, 2013). Unlike the conventional economic approach, our results suggest that when confronted to a punishment system, individuals behave dishonestly and cheat even when it is not in their material interest to do so. In other words, the fact of being confronted to a sanctioning system may foster the appetite for cheating.

Our findings might have a particular echo regarding the efficiency of the whole legal and institutional arsenal and the huge cost that the different stakeholders bear to enforce it. Our results suggest that a punishment system is not necessarily and always the best candidate to discourage dishonest behavior. To some extent, our findings suggest that it can be more effective to adequately frame the situation to highlight its ethical dimensions. Ingeniously, in the early seventies Schwartz and Orleans (1967) argued that conscience appeal was more effective than a sanction threat in generating compliance to income tax law. Lastly, given that some differences between treatments were not significant and only

indicating possible tendencies, further evidence from larger samples would be a valuable extension of this work to dissipate doubts on the reliability of our results.

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Table 1: An example of the used matrices (here, 5.70 and 4.30 add up to 10)

4.13	5.79	5.70	6.17	4.31	4.30
5.15	4.34	5.40	5.45	4.66	4.40
5.68	4.35	4.92	3.82	5.45	4.58
4.60	4.33	5.34	5.90	6.37	3.96

Table 2: Treatments used in the experiment

	No monitoring at all	Imperfect monitoring (20%)	Perfect monitoring (100%)
No sanction at all	T1: NS, NM n=24	T2: NS, IM n= 24	T3 : NS, PM n= 25
Weak monetary sanction	-	T4: WS, IM n= 24	T5: WS, PM n= 23
Strong monetary sanction	-	T6: SS, IM N= 22	T7: SS, PM n= 25
Moral sanction	-	T8 : MS, IM n= 24	T9: MS, PM n= 25

Table 3: Main theoretical predictions by type of treatment

Standard economic approach	Behavioral economic approach
<i>T1 (no sanction, no monitoring)</i>	
It is rational to cheat. Participants have just to indicate the number of correctly solved matrices on the answer sheet and get cash paid accordingly. The cheating is expected to be at its highest level, that is, 100%.	The framing and absence of sanctions and monitoring is likely to activate individuals' moral values. Thus, the cheating level will not be at its highest level, that is, lower than 100%.
<i>T2 (no sanction, imperfect monitoring) and T3 (no sanction, perfect monitoring)</i>	
It is rational to cheat. However, the cheating level is expected to be at its highest level (100%) because no sanction is applied.	Monitoring can make people feeling as if the principal does not trust them. Monitoring is likely to crowd-out intrinsic motivations to behave honestly. Hence, the cheating level is expected to be higher than in T1.
<i>T4 (weak monetary sanction, imperfect monitoring) and T6 (strong monetary sanction, imperfect monitoring)</i>	
Monetary sanctions and monitoring are likely to reduce cheating, compared to T1, T2, and T3. However, the cheating level is expected to remain high because the potential monetary sanction is combined with a probability of being controlled of only 20%.	Weak monetary sanctions and monitoring are likely to increase cheating because intrinsic motivations are crowded out. Hence, the cheating level is expected to be higher than in T1. However, the strong monetary sanction in T6 may push individuals to consider the situation in monetary terms. In other words, participants should cheat more in T4 than in T6.
<i>T5 (weak monetary sanction, perfect monitoring) and T7 (strong monetary sanction, perfect monitoring)</i>	
It is irrational to cheat given that each individual is monitored and sanctioned for the misreported responses. Given the sanction level in T5 (T7), that is 1DT (2DT) for each misreported answer, cheating is not profitable (costs more than it yields). We expect the level of cheating to be not significantly different from 0.	Even if individuals are morally motivated to be honest, monetary sanctions combined with perfect monitoring may crowd-out intrinsic motivations and push them to frame the situation differently. If they consider the situation in economic terms, cheating is not profitable. Hence, the level of cheating is expected to be very low.
<i>T8 (moral sanction, imperfect monitoring) and T9 (moral sanction, perfect monitoring)</i>	
Given that only monetary sanctions matter, the cheating levels should not be largely different from T2 and T3. In other words, moral sanctions are considered as if there is no sanction.	Similarly to T2 and T3, monitoring is likely to increase cheating, compared to the control treatment T1. However, the moral aspect of the sanction may attenuate such a perverse effect. It is expected that that the cheating levels will be lower than those in T4 and T6.
<i>Summary of the expected levels of cheating</i>	
$\{T5, T7\} < \{T4, T6\} < \{T8, T9\} \approx \{T2, T3\} < T1$	$\{T5, T7\} < T1 < \{T8, T9\} < T6 < \{T2, T3, T4\}$

Figure 1a: Average level of cheating by treatment

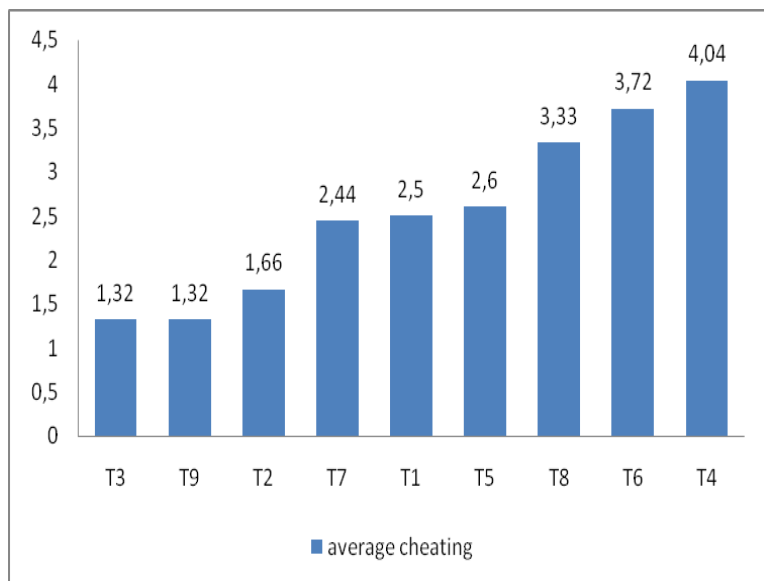
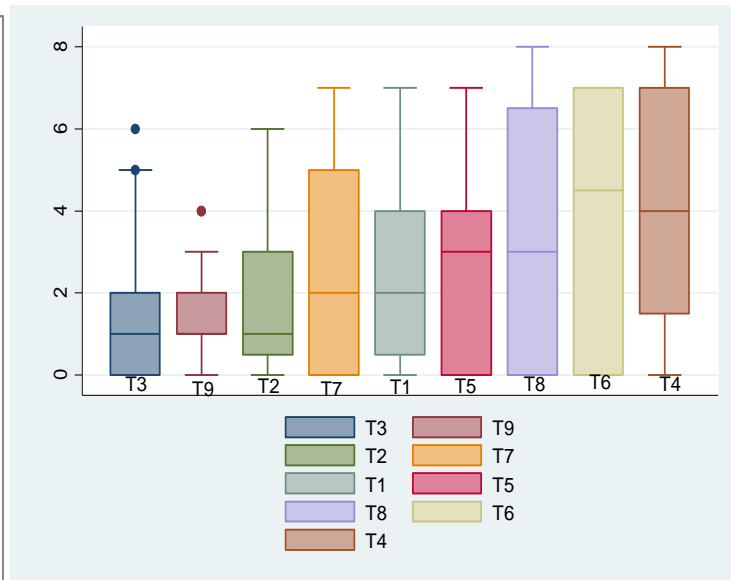


Figure 1b: Quartile boxes by treatment



T1 (no sanction, no monitoring) – T2 (no sanction, imperfect monitoring) – T3 (no sanction, perfect monitoring) – T4 (weak monetary sanction, imperfect monitoring) – T5 (weak monetary sanction, perfect monitoring) – T6 (strong monetary sanction, imperfect monitoring) – T7 (strong monetary sanction, perfect monitoring) – T8 (moral sanction, imperfect monitoring) – T9 (moral sanction, perfect monitoring).

Table 4: Regression estimates of the cheating behavior (N=216)

Variables	Negative binomial regression		Linear regression
	Estimates	IRR	Estimates
NS*IM	-0.371 (0.303)	0.689	-0.638 (0.683)
NS*PM	-0.681** (0.310)	0.506	-1.206* (0.667)
WS*IM	0.464* (0.280)	1.591	1.601** (0.682)
WS*PM	0.001 (0.280)	1.001	0.117 (0.676)
SS*IM	0.381 (0.281)	1.465	1.201* (0.685)
SS*PM	0.028 (0.287)	1.028	0.083 (0.670)
MS*IM	0.343 (0.280)	1.410	0.936 (0.671)
MS*PM	-0.548* (0.310)	0.578	-1.010 (0.669)
Male	0.320** (0.159)	1.377	0.723** (0.361)
Income	-0.001 (0.071)	0.998	0.075 (0.169)
Pseudo R2	0.036		-
Log likelihood	-436.837		-
Lrchi2 (10)	33.15		-
(p-value)	(0.000)		-
Alpha	0.574		-
(p-value)	(0.000)		-
R2	-		0.163
F (10, 205)	-		4.00
(p-value)	-		(0.000)

(*) and (**) indicate parameter significance at the 10 and 5 per cent level, respectively.

Appendix 1: Instructions used in the experiment (for ease of exposition, we only report the instructions in the treatments T1, T4 and T9)

Welcome!

Treatment 1 (no sanction, no monitoring)

General information

In this experiment, you will have to perform a very simple task. If you successfully complete it, you can collect up to 8 Dinars. Otherwise, your gain will be proportional to your performance in this task. We're going to give you a box containing envelopes in which you will find an instruction sheet, a sheet of tables, an answer sheet and a numbered coupon; the number in the coupon will be your number. Do not show it to anyone, except experimenters. Keep this coupon for the payment at the end of the experiment. This experiment is completely anonymous. Thank you to use neither computer nor calculator, nor phone, and do not discuss with others.

Your task

You have 5 minutes to find, in each pair of side-by-side tables, what are the numbers that sum up to 10 (a number of table 1 + a number of table 2 must equal 10). Thank you to circle the numbers that sum up to 10 in each pair of tables. You are required to find a single solution for each pair of tables.

Your payment

For each pair of tables you solve correctly, you earn 1 Dinar. So, if you correctly solve eight pairs of tables, you can earn 8 Dinars. After 5 minutes, thank you to open the envelope results, fill the result sheet (by reporting the number of correct pairs you find) and insert it in the envelope. After putting the sheet tables beside, you put your envelopes on the table of the experimenter. The later will put the money on your envelop according to what you have announced on the result sheet.

Treatment 4 (weak sanction, imperfect monitoring)

General information

In this experiment, you will have to perform a very simple task. If you successfully complete it, you can collect up to 8 Dinars. Otherwise, your gain will be proportional to your performance in this task. We're going to give you a box containing envelopes in which you will find an instruction sheet, a table sheet, an answer sheet and two coupons. One of these two coupons is yellow or green. The other coupon will contain a number. This number will be your number. Do not show it to anyone, except experimenters. Keep these two coupons for payment at the end of the experiment. Do not show them

to anyone, except experimenters. This experiment is completely anonymous. Thank you to use neither computer nor calculator, nor phone, and do not discuss with others.

Your task

You have 5 minutes to find, in each pair of side-by-side tables, what are the numbers that sum up to 10 (a number of table 1 + a number of table 2 must equal 10). Thank you to circle the numbers that sum up to 10 in each pair of tables. You are required to find a single solution for each pair of tables. Among all participants in this room, you have a 20% chance that your responses will be verified as explained later.

Your payment

For each pair of tables you solve correctly, you earn 1 Dinar. So, if you correctly solve eight pairs of tables, you can earn 8 Dinars. After 5 minutes, thank you to open the envelope results, fill the result sheet by reporting the number of correct pairs you find and insert it in the envelope. 20% of participants who are randomly-selected will be monitored and will have to put the table sheet in the envelope. They will be paid according to their effective correct responses. In case you are monitored, you will lose one Dinar for each misreported answer. The rest of the participants will put their sheet table beside (a place where all the participants put their sheet tables) and then will be paid according to what they reported in the answer sheet.

Treatment 9 (moral Sanction, perfect monitoring)

General information

In this experiment, you will have to perform a very simple task. If you successfully complete it, you can collect up to 8 Dinars. Otherwise, your gain will be proportional to your performance in this task. We're going to give you a box containing envelopes in which you will find an instruction sheet, a table sheet, an answer sheet and a numbered coupon. The number in the coupon will be your number. Do not show it to anyone, except experimenters. Keep this coupon for the payment at the end of the experiment. This experiment is completely anonymous. Thank you to use neither computer nor calculator, nor phone, and do not discuss with others.

Your task

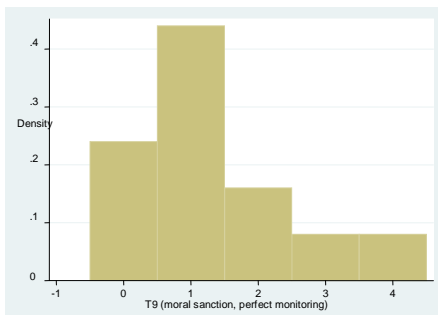
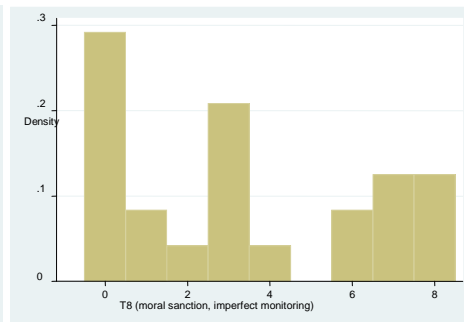
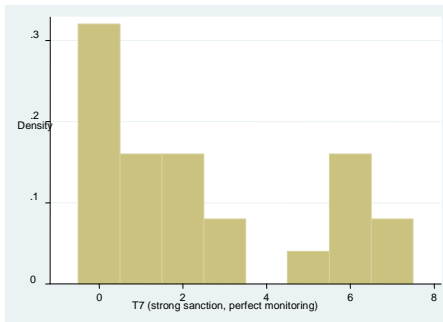
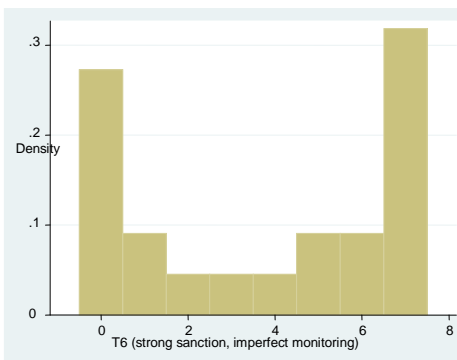
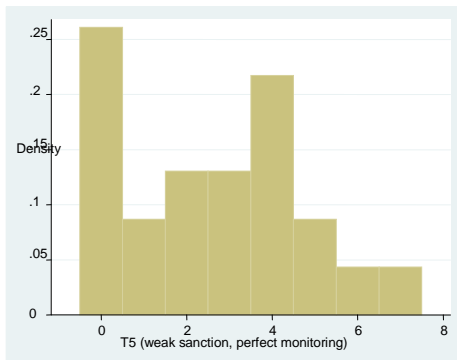
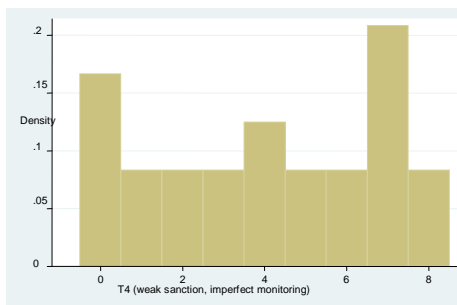
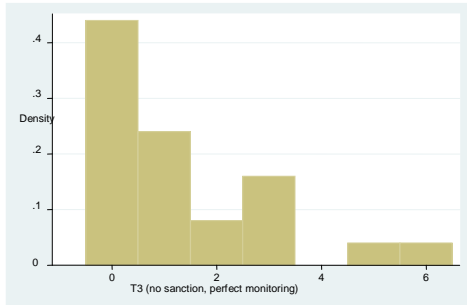
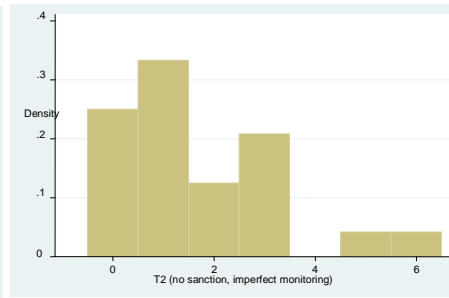
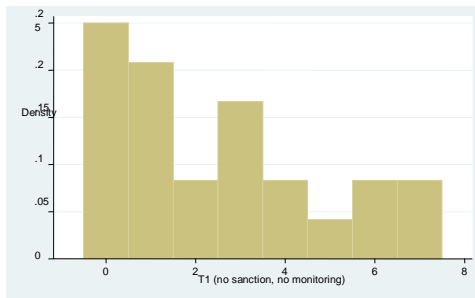
You have 5 minutes to find, in each pair of side-by-side tables, what are the numbers that sum up to 10 (a number of table 1 + a number of table 2 must equal 10). Thank you to circle the numbers that sum up to 10 in each pair of tables. You are required to find a single solution for each pair of tables. All your responses will be verified.

Your payment

For each pair of tables you solve correctly, you earn 1 Dinar. So, if you correctly solve eight pairs of tables, you can earn 8 Dinars. After 5 minutes, thank you to open the envelope results, fill the result sheet by reporting the number of correct pairs you find. Insert the table and answer sheet in the envelope. Put your envelope on the experimenter's table. He will verify your answers and if you misreported, he will remind you a saying of the Prophet that blames the cheater.

Good luck.

Appendix 2: Average cheating by treatment



Appendix 3: Estimates of the effect of sanctions and monitoring separately and in interaction

Variables	Coefficients and significance								
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8 ^a	Model 9 ^b
WS	0.762*** (0.213)	0.251 (0.243)	0.344 (0.226)					0.683** (0.310)	
SS	0.739*** (0.215)			0.312 (0.241)	0.216 (0.233)			0.709** (0.308)	
MS	0.475** (0.226)					-0.425 (0.270)	0.177 (0.231)	0.714** (0.295)	
IM	-0.285 (0.274)	0.422** (0.163)		0.486*** (0.167)		0.355** (0.162)		-0.371 (0.303)	
PM	-0.788*** (0.273)		-0.480*** (0.166)		-0.537*** (0.168)		-0.345** (0.163)	-0.681** (0.310)	
NS*IM									-0.371 (0.303)
NS*PM									-0.681** (0.310)
WS*IM		0.057 (0.337)						0.152 (0.426)	0.464* (0.280)
WS*PM			0.013 (0.339)						0.001 (0.288)
SS*IM				-0.150 (0.346)				0.042 (0.432)	0.381 (0.281)
SS*PM					0.195 (0.345)				0.028 (0.287)
MS*IM						0.544 (0.353)			0.343 (0.280)
MS*PM							-0.546 (0.356)	-0.581 (0.443)	-0.548* (0.310)
Male	0.331** (0.156)	0.323** (0.159)	0.297* (0.159)	0.379** (0.160)	0.369** (0.160)	0.329** (0.161)	0.329** (0.162)	0.320** (0.159)	0.320** (0.159)
Income	-0.011 (0.070)	0.018 (0.071)	0.005 (0.071)	0.012 (0.071)	-0.001 (0.070)	0.017 (0.072)	0.001 (0.071)	-0.001 (0.071)	-0.001 (0.071)
Constant	0.365 (0.399)	0.050 (0.354)	0.506 (0.354)	-0.047 (0.376)	0.436 (0.347)	0.165 (0.361)	0.504 (0.352)	0.358 (0.406)	0.358 (0.406)
Pseudo R2	0.034	0.019	0.020	0.018	0.020	0.019	0.018	0.036	0.036
Log likelihood	-437.996	-444.777	-444.001	-445.078	-444.334	-444.784	-444.957	-436.837	-436.837
Lrchi2	30.83	17.27	18.82	16.67	18.16	17.26	16.91	33.15	33.15
(p-value)	(0.000)	(0.004)	(0.002)	(0.005)	(0.002)	(0.004)	(0.004)	(0.000)	(0.000)
Alpha	0.589	0.671	0.662	0.682	0.675	0.677	0.681	0.574	0.574
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

^a: Some variables have been omitted due to multicollinearity problems.

^b: Model 9 corresponds to the most informative model, reported in Table 4.

(*), (**) and (***) indicate parameter significance at the 10, 5 and 1 per cent level, respectively.