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Crime, Punishment or…*Reward*? Testing the Crowding-In Effect in the Case of Tax Compliance

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Abstract

Using experimental evidence this paper examines the impact of deterrence factors and rewards for honest taxpayers to increase compliance (Frey 1997). We found that rewards for honest taxpayers are more effective than penalty rates to change the level of tax compliance. The evidence provided here requires one to think differently about tax compliance. Creating well-advertised rewards for honest taxpayers can change the taxpayers' attitudes towards compliance. If the government recognizes honest responses through rewards, this policy can create a "critical mass" of people who comply. This attitude will encourage honesty, which can be expanded to other laws in society as well. These results are particular relevant in countries where there is little respect for the tax law since rewards can contribute to crowd in the intrinsic motivation to comply.

Key words*- tax compliance, experiments, crowding effect, rewards.*
JEL- classification*: H26, C91.*
JEL Summary:

This paper examines the impact of deterrence factors and rewards for honest taxpayers to increase compliance (Frey 1997). Rewards are more effective than penalty rates to change the level of tax compliance. The evidence provided here requires one to think differently about tax compliance. Creating well-advertised rewards for honest taxpayers can create a "critical mass" of people who comply. These results are particular relevant in countries where there is little respect for the tax law since rewards can contribute to crowd in the intrinsic motivation to comply with other laws in society as well.

Resumen

Este documento examina el impacto de los factores disuasivos y de los premios en la conducta de los contribuyentes honestos para incrementar el cumplimiento en el pago de impuestos (Frey 1997). Los premios son más efectivos que las multas para cambiar el cumplimiento del pago de impuestos. Así, la creación de premios para los contribuyentes honestos puede formar una "masa crítica" de personas que cumplan. Los resultados presentados son particularmente relevantes en países donde hay poco respeto hacia las leyes fiscales, por lo tanto los premios pueden contribuir a la motivación intrínseca para cumplir con otras leyes dentro de la sociedad.

I. Introduction

The traditional model of tax compliance by Allingham and Sandmo (1972) emphasizes that the threat of penalty and of audit make people pay their taxes. Yet, the model predicts that people should be evading more than they apparently do. Compliance has been recently reexamined in light of the psychological theory [Frey (1997)]. Tighter monitoring and higher penalties for noncompliance can negatively affect the taxpayer's morale, since they imply that authorities do not trust taxpayers. Therefore, deterrence factors can *crowd out* the intrinsic motivation of the individual to comply. On the other hand, rewarding compliance, instead of punishing non compliance, may be perceived very differently. The rewards can *crowd in* intrinsic motivation and effectively enhance compliance.

The ultimate management goal for tax authorities who face heterogeneous individuals is to develop incentives that discipline the dishonest taxpayers without discouraging the intrinsically motivated ones. There is a clear benefit if government compensates those who are prone to comply in order to further increase compliance. If rewards increase honest responses, this policy can create a "critical mass" of people who comply.[1] Thus, acknowledging the intrinsic motivation to comply through the presence of rewards can be more effective to increase compliance than simply punishing the non-compliant individuals. This attitude will encourage honesty, which can be expanded to other laws in society as well. Therefore, if this public policy can enhance tax compliance, then compliance in other areas of society could possibly be changed as well. More empirical research must be conducted to provide evidence whether rewards honest reinforce tax compliance.[2]

This paper presents evidence that confirms the existence of a positive relationship between positive rewards and tax compliance. Specifically, the experimental results indicate that *i*)the change in compliance is positive whenever there is a change in the probability of audit *ii*)penalties do not increase the level of compliance *iii*)rewards for honest taxpayers are better interventions to increase compliance than deterrence factors, such as the penalty rate *iv*)the combination of rewards and the probability of audit significantly increase the compliance rate and; thus, can contribute to spread the norm of tax compliance.

The structure of the present work is the following: The theoretical framework is presented in Section II. The experimental design is in Section III. Section IV describes the experimental results. Section V presents the conclusions.

[1] Bikhchandani, Hirshleifer and Ivo (1992).
[2] Kleppler and Naggin (1989). Hasseldine and Zhuhong (1999) and, Torgler (2002).

II. Theories of Tax Compliance

In the traditional economic models of tax compliance, the taxpayer decides how much income to report by solving an expected-utility maximization problem. Hence, the choice of whether and how much income to declare is akin to a choice of whether or not to gamble.

The taxpayer faces a trade-off between the tax savings from underreporting true income against the risk of audit and the penalties for detected noncompliance. The threat of detection and punishment are responsible for the individual's compliance. This theory stems from the economics of crime and was first applied to the problem of tax compliance by Allingham and Sandmo (1972).[3]

However, Frey (1997) argues that the taxpayer's motivation to comply depends on the agent's intrinsic motivation. Tighter monitoring and higher penalties can negatively affect the taxpayer's morale, since they signal that authorities do not trust individuals. Rewards, on other hand, can reinforce the motivation to comply since individuals perceive them as supportive. Consequently, the following propositions can be tested:

1. Monitoring and higher penalties crowd out intrinsic motivation. Thus, compliance must decrease when the probability of an audit is higher and, also when there are higher penalties.

2. Rewards must crowd in intrinsic motivation, thus increasing compliance.

More research is needed to analyze how this intrinsic motivation to comply arises or how it might be maintained. The idea is not to neglect the role of audits and penalties, but to draw attention to other aspects of compliance.

III. Experimental Design

The experiment is made up of 11 sessions, each consisting of three parts. Table 1 shows the features of each session in the experiment.

[3] The basic Allingham-Sandmo model has been extended in a variety of dimensions. For a comprehensive survey of this literature see Cowell (1990) and Slemrod and Yitzhaky (1999). Nevertheless, all these modifications do not take psychological aspects into consideration in their analysis

T A B L E 1

EXPERIMENTAL DESIGN

SESSION	AUDIT RATE	FINE RATE	TAX RATE	REWARD
1	5%,30%,50%	2	30%	NO
2	30%,50%,5%	2	30%	NO
3	50%,5%,30%	2	30%	NO
4	30%	2, 4, 6	30%	NO
5	30%	4, 6, 2	30%	NO
6	30%	6, 2, 4	30%	NO
7	30%	2	10%,30%,40%	NO
8	30%	2	30%,40%,10%	NO
9	30%	2	40%,10%,30%	NO
10	30%	2	30%	*FIXED REWARD*
11	30%	2	30%	*PERCENT REWARD*

During sessions 1 to 3, individuals face three different levels of probability of audit: 5, 30 and 50 percent. Then, sessions 4 to 6 leave the probability of audit constant, but change the fine rate on underreported taxes (2, 4 and finally to level 6). The response on the compliance rate to changes in the tax rate (10, 30 and 40 per cent) is captured in sessions 7 to 9.

The rewards sessions are 10 and 11. In session 10 those subjects who are audited and found compliant receive an immediate reward of 50 tokens. In session 11 the reward for taxpayers audited and complaint is a 10 percent reimbursement of the taxes paid. Under these schemes, individuals who declared honestly have an incentive to be audited.[4]

In each session, individuals are organized in groups of eight, and at the end of the experiment, each will be paid according to their performance. They are not allowed to communicate during the length of the experiment. A session typically lasts less than one hour.

At the beginning of a round, individuals randomly receive incomes varying between 25 and 200 tokens in 25 token increments. Only the individual knows his or her true income. In order to avoid end-of-treatment effects, this process will be repeated for a fixed number of rounds, but individuals will not know the total number of rounds. However, the actual number of rounds is predetermined at 30. At the end of each round, subjects are shown their balances, and a new round then begins.

The participants are told that all tokens accumulated during the experiment will be redeemed for cash at the end of the session at a fixed exchange rate of

[4] Note that it is implicitly assumed that during the experiment the tax agency does not face any budget constraint to implement this policy.

50 tokens per Mexican peso. Subject earnings range from seven to eleven dollars depending on the subject's performance in the experiment.

All sessions begin with the subjects reading their own copy of the instructions.[5] The subjects were recruited in class on a voluntary basis at the Centro de Investigacion y Docencia Economicas (CIDE) in Mexico City, Mexico. They were guaranteed at least five dollars, but they were told that they could earn more since they would be paid whatever they earned in the experiment. They had no prior experience with experimental settings, and were allowed to participate only once in the experiment. The experiments were conducted in the computer laboratory.

IV. Experimental Results

The analysis is based on the change in compliance in response to variations in the audit rate, the fine rate, the tax rate and each of the rewards.[6] Estimation results are reported in Table 2.

T A B L E 2

ESTIMATION RESULTS

INDEPENDENT VARIABLE	FIXED REWARD		PERCENTAGE REWARD	
	COEFFICIENT	ELASTICITY	COEFFICIENT	ELASTICITY
CONSTANT	-1.260	—	-1.386	—
	(-2.03)		(-2.17)	
INCOME	0.556	1.099	0.547	1.129
	27.02		25.81	
AUDIT RATE	6.329	0.360	6.285	0.373
	5.940		5.730	
FINE RATE	0.015	0.007	0.080	0.042
	0.170		0.930	
TAX RATE	-4.239	-0.237	-4.691	-0.273
	(-2.77)		(-2.98)	
FIXED REWARD	1.112	0.014		
	5.62			

[5] A sample set of instructions is in the Appendix.

[6] Since the dependent variable is censored at zero (amount of declared income) a Tobit estimation techniques was used.

INDEPENDENT VARIABLE	FIXED REWARD		PERCENTAGE REWARD	
	COEFFICIENT	ELASTICITY	COEFFICIENT	ELASTICITY
PERCENTAGE REWARD			20.421	0.009
			4.68	
N	2400		2400	
LOG-LIKELIHOOD	-6585.9593		-6543.0768	
LR STATISTIC	683.66		636.25	

The dependent variable is the declared income. Elasticities are calculated at the mean values of the variables. *t* values are in the parentheses.

According to the experimental results, the average compliance rate increases with greater enforcement efforts. These results are consistent with the Allingham-Sandmo model: the higher the probability of audit, the higher the predicted compliance level. They also support the evidence presented by Witte and Woodbury (1985), Dubin and Wilde (1988) and Dubin, Graetz and Wilde (1990).

However, the penalty rate elasticity shows that its effect is close to zero and non-significant, even when the probability of audit is large. This result cancels out the benefits of increasing the penalty rates, even though its low administrative cost. The response in compliance to a change in the fine rate is consistent with many studies about the effects of sentence severity on crime levels.[7]

The change in the average compliance rate is negative when there is a positive change in the tax rate. Higher tax rates lead to lower compliance since the payoff of a successful evasion increases when the tax rate increases. These results contradicts the Yitzhaki model (1974), but confirm the results from Clotfelter (1983), Slemrod (1985), Crane and Nourzad (1986), Baldry (1987), Poterba (1987) and Friedland, Maital, and Rutenberg (1978).

In both specifications, the estimation results are largely the same for the deterrence factors. Also, in both models, the coefficients for the rewards are highly significant. Recall that in the fixed reward session those individuals who are audited and found compliant receive an immediate reward of 50 tokens. The elasticities indicate that rewarding compliant individuals randomly with a fixed reward further increases the compliance rate than with a percentage reward (0.14 *vs* 0.009). Moreover, the fixed reward session is the session with the lower none compliance response within the experiment.

This results show that immediate and salient rewards have a significant impact upon compliance. Also, individual responses to rewards, on average, are

[7] Doob & Webster (2003). Roth *et al.* (1989); and, Grasmick and Bursik (1990).

greater than the responses to the penalty rate. In this way, tax authorities can start acknowledging taxpayers for being honest instead of increasing penalties, since they do not have a visible effect on compliance.

The positive elasticities of the rewards indicate that creating well-advertised rewards for honest taxpayers can change the taxpayers' attitudes toward compliance.[8] Different kinds of rewards can have an important impact on compliance —particularly if one thinks that they can be seen as a payment for the task of keeping records and filling out tax forms correctly.

V. Conclusions

Experimental evidence has two main advantages over the measures of compliance that can be obtained through surveys. The first is the fact that it allows to test the effects of changes in policy over individual behavior directly. Second, the experimental approach provides direct observation of behavior that may be penalized. Consequently, the influences of explanatory variables can be better analyzed in a laboratory setting. The present experiment confirms the importance of deterrence factors to increase compliance, but also the importance of rewards to recognize honest taxpayers, and to *crowd in* the intrinsic motivation to comply.

The policy recommendations stated here make us think differently about the problem of tax compliance. When deterrence factors increase, intrinsic motivation to comply tends to *crowd out*, unless honest taxpayers perceive the stricter policy to be directed against dishonest taxpayers. This is particularly relevant in countries where the common practice is to extend deadlines and offer discounts to people who do not pay on time. This policy has led to a loss of respect for those who comply, for the tax law, and also for the government itself. As a result, next time individuals have to fill their tax forms, they will think that if everybody was able to get an extension without paying a cost then, they should not care about paying their taxes accurately and on time.

This lack of respect for the rule of law spreads to all type of areas in society, thus affecting the legitimacy of the government. Rewards can contribute to the willingness of people to comply and to improve the relation between taxpayers and tax authorities in countries where the respect for tax law is low. If rewards acknowledge honest responses, this policy can create a "critical mass" of people who comply. This attitude can be expanded to other laws in society as well. A reward for "good behavior" can create a positive attitude towards the government and increase compliance in the long run.

The results of these experiments will contribute to the debate about the proper conceptual model to use in addressing tax compliance. The evidence from this study will be part of a growing body of tax compliance research.

[8] Frey (1997)

Furthermore, this analysis can also be applied to other contexts that require initial reporting like securities regulation, employment discrimination regulation, food and drug regulation and environmental regulation.

Appendix

Sample Instructions

Instructions

The following instructions were originally written in Spanish. The instructions were adapted accordingly to the different sessions. They are available upon request.

This is an experiment in the economics of decision making. The instructions are simple and, if you follow them carefully, you will have an opportunity to earn A CONSIDERABLE AMOUNT OF MONEY that will be paid to you in cash at the end of the session.

You have been organized in groups of eight people. Each group will consist of the same eight people for the duration of the session. The specific identities of the other people in your group will not be revealed to you. YOU MAY NOT COMMUNICATE WITH ANYONE ELSE IN THE ROOM DURING THE SESSION. If you do not follow the rules, we will have to exclude you from the experiment and you will not receive any payment.

The session will last for several rounds, each one is independent from the others. In each round, you will be required to make a decision and your total earnings will depend on these decisions. You will not know the total number of rounds. At the beginning of the session each individual will be given 2000 tokens. You will have the opportunity to add to these tokens in each round. At the end of the session, the tokens you have accumulated will be converted to cash at the rate of 50 tokens per pesos. For example, if at the conclusion of the experiment your balance on the computer is 5000 then you will receive 100 pesos. YOU SHOULD FEEL FREE TO TRY TO MAKE AS MUCH MONEY AS YOU CAN. The experiment is divided in two parts.

At the beginning of each round, on the top left corner, the session number, participant and round will appear on your computer. In each round, you will be given a new amount of tokens (actual tokens). The exact quantity you and the others in your group receive will be randomly drawn by the computer from the range of 25 to 200 tokens in increments of 25 tokens. All values are equally likely and only you will know the quantity you have received. You have the choice of keeping your tokens or disclosing them. Move the mouse to enter in the input-field "reported tokens". You may disclose any amount of tokens between zero and the amount of tokens that you actually receive.

You will pay 30 percent of the tokens you disclose. For example, if you receive 100 tokens and disclose 70 tokens, you will pay 21 tokens (0.3 times 70). You do not pay on money you do not disclose, and only you know the true amount of money that you receive at the start of each round. After you have decided the number of tokens that you want to disclose, please copy this number in the report sheet (yellow sheet), as well as the round number. In the above example, you will fill the report sheet with the following numbers:

Round	Reported Tokens
1	70

Now, WAIT FOR THE INSTRUCTION TO PRESS THE BUTTON "ACCEPT". Please check the number of tokens that you disclose, because once you click the "Accept" button, you will not be able to change your mind. After everyone has disclosed his or her tokens, some individuals may be selected for a check. In this check, the computer will compare the person's true quantities of

tokens for the current round with the actual levels disclosed. If you are checked, any tokens received but not disclosed will be discovered. You will pay the shortfall (30 percent of over the tokens received but not disclosed) plus a penalty. In this session, you pay the shortfall plus an amount equal to one time the shortfall—. In the above example, you would pay 18 additional tokens, that is, the shortfall (30 tokes times 0.3), plus fine of 9. The computer will calculate the shortfall payments and subtract it from your balance. Only you will know the result of your own check. If you are checked and reported the same amount of tokens that you received, as a reward you will receive 50 tokens.

The procedure for selecting the person for a check is as follows: each person has an ID number that appears on your computer screen, between 1 and 8. In the bingo cage that appears on the top right corner of your screen there are balls numbered 1 through 20. After everyone as disclosed his or her tokens, a ball will be drawn from the cage. If the number of the ball is from 1 to 8, the person with that ID will be checked. If the number is from 9 through 20, no one will be checked in that round. Once the ball has been drawn from the bingo cage, WAIT FOR INSTRUCTIONS TO CLICK ON THE BUTTON "ARE YOU READY TO CONTINUE?". Once you have clicked the button, you can continue to the next round.

We will begin with two practice rounds to familiarize you with the payment, disclosure, and check process. These practice rounds will not be counted to calculate your payment. At the end of the two practice rounds, your balance will be reset to 2000 tokens as the real rounds begin.

Are there any questions? Please, raise your hand, DO NOT ASK THE QUESTION OUT LOUD.
When you finish reading these instructions, please place them face down on your own desk.

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