ON THE NEED FOR FORWARD-LOOKING POLICYMAKING: AN ECUADORIAN CASE

Leopoldo Gómez Ramírez
  Department of Economics, Administration and Marketing,
  ITESO, Universidad Jesuita de Guadalajara (Mexico)
  Corresponding author: gomez.ramirez.l@iteso.mx
Gonzalo E. Sánchez
  Faculty of Social and Human Sciences,
  Escuela Superior Politécnica del Litoral (Ecuador)

ABSTRACT

While allowing the refiling of taxes in the case of legitimate mistakes is reasonable, there is empirical evidence showing that the unlimited ability to refile may incentivize evasion. However, theoretical models examining limiting unlimited refilings are nonexistent. Therefore, this paper develops a model to study the role of allowing an unlimited number of tax refilings on the behavior of taxpayers that received tax notifications because they under-reported taxes, as it was seen in the case of Ecuador between 2010 and 2012. Among other things, the key finding of the examination is that, if taxpayers are allowed to refile as many times as they want, the best decision for selfish taxpayers is to evade taxes. Contributing to the tax compliance literature but from a broader perspective as well, this paper demonstrates the importance of considering behavior through careful theoretical analysis before implementing new tax policies.
Keywords: Tax compliance, policy effects, Ecuador.
JEL Classification: C72, H25, H26, K42.

SOBRE LA NECESIDAD DE FORMULAR POLÍTICAS PREVISORAMENTE: UN CASO ECUATORIANO

RESUMEN

Si bien es razonable permitir declaraciones sustitutivas de impuestos en caso de errores legítimos, hay evidencia empírica que demuestra que la capacidad ilimitada de hacerlas puede incentivar la evasión. Sin embargo, no existen modelos teóricos que examinen la limitación de las declaraciones sustitutivas ilimitadas. Entonces, este artículo desarrolla un modelo para estudiar el papel de permitir declaraciones sustitutivas de impuestos ilimitadamente sobre el comportamiento de contribuyentes que recibieron notificaciones porque sub-declararon impuestos, como fue el caso en Ecuador entre 2010 y 2012. Entre otros, el hallazgo clave de la investigación es que, si se les permite realizar declaraciones sustitutivas tantas veces como quieran, la mejor decisión para las(os) contribuyentes egoístas es evadir impuestos. Contribuyendo a la literatura sobre el cumplimiento tributario, pero también desde una perspectiva más amplia, este artículo demuestra la importancia de considerar el comportamiento a través de un análisis teórico cuidadoso antes de implementar nuevas políticas tributarias.

Palabras clave: cumplimiento tributario, efectos políticas, Ecuador.
Clasificación JEL: C72, H25, H26, K42

1. INTRODUCTION

There is a rich literature that studies the effects of diverse interventions to reduce tax evasion. These interventions are usually complex and involve behavioral or punitive strategies, or a combination of both. This paper studies a rather simple alternative that has not been studied in detail in the literature: reducing the capacity of taxpayers to refile their taxes an unlimited number of times. Between the years of 2010 and 2012, the Ecuadorian tax authority allowed for unlimited tax refiles with an interesting, in hindsight mistaken for tax compliance, feature. A misreporting person could leave the list of "evaders" once she or he refiled their taxes correctly, but the option to refile yet again with a beneficially incorrect amount remained open. The study by Sánchez

(2022) found empirical evidence that notifications of incorrect reporting during the time of this policy led to increased levels of reported taxes, but had no effect on the total amount of tax dollars collected. While this empirical finding makes sense in hindsight, there has been no formal behavioral theoretical analysis that illuminates the conditions under which the ability to do unlimited refilings —*i.e.* as many times as desired without going through a formal process that verifies that the refile is legally necessary— can lead to adverse for tax compliance outcomes.

This paper, therefore, building upon Sánchez (2022), formally models the effect of allowing unlimited tax refiles on total taxes collected in the context of the tax control policies applied in Ecuador between 2010 and 2012 —it should be highlighted it limited refiling since 2013 by requiring that after the first refile, a formal petition must be submitted and reviewed by a tax authority. This analysis formally clarifies why, although tax notifications sent to taxpayers who have under-reported the income tax advance (ITA) in Ecuador increased reported taxes, the notifications did not affect the total amount of collected taxes. The model also supports the hypothesis that some taxpayers initially refiled their taxes to correct their "miscalculations" and then exit the list of tax evaders, but later refiled again to evade taxes. The support is stronger when evading the ITA implies reducing the tax liability.

More specifically, the investigation finds, first, that, if unlimited refilings are possible and taxpayers are exclusively selfish —*i.e.*, only care about their individual payoffs—, then their best decision —*i.e.*, that maximizes expected payoffs— is to under-report their ITA even if tax authorities never miss their under-reporting[1]. A key implication of this first finding of the paper (which explains its title) is a call for policymakers to carefully think, in advance of applying some policy, if it would actually change the incentives of selfish economic agents in the desired ways.

In order to explore possible solutions, the model is then extended, in two steps. First, remaining in the context of selfish taxpayers, the effects of banning unlimited refilings are examined, finding that such banning is necessary but not sufficient to achieve that selfish taxpayers report

---

[1] The classic tax evasion' analysis of Allingham and Sandmo (1972) implies that, if caught under-reporting, an agent may end up worse than if not.

the truth and that having a proficient tax authority which often catches under-reporters is key to successfully curb tax evasion in this scenario. Second, the effects of having taxpayers who to some degree exhibit social preferences —*i.e.*, to some extent care about the effects of paying taxes for society at large[2]— on tax compliance are examined, both in the case in which unlimited refilings are allowed and in the case in which they are banned, finding that, in the first scenario, social preferences help to reduce tax evasion but (unless they are unrealistically strong) don't omit the need for tax authorities to proficiently catch under-reporting, and that, in the second scenario, taxpayers will truthfully report even if the probability of being caught if they under-report is relatively low[3].

Broadly, the literature on the enforcement of tax compliance can be classified as the studies of punitive and behavioral strategies. An example of the former is the evaluation of the impact of audit rates and rules on compliance (for instance Dubin *et al.*, 1990; Alm *et al.*, 1993; Mittone, 2006; Dubin, 2007; Kleven *et al.*, 2011). The latter literature's branch is relatively recent and it has focused on the study of nudges. For instance, Moulton *et al.* (2022), use a field experiment to find that reminders about payment obligations cause a reduction in the probability of missing payments of property tax among older adults who took out a reverse mortgage. Other studies about the effect of nudges on tax compliance include Blumenthal *et al.* (2001); Hallsworth *et al.* (2017); Meiselman (2018); John and Blume (2018), and Fišar *et al.* (2022). Recent, global views on the extent of tax evasion are given by OECD (2023) and Alstadsaeter *et al.* (2024). Also, although in contexts not related to Ecuador, from a variety of perspectives, recent contributions have examined tax compliance issues in relationship to filings or sending messages (akin to this paper's notifications) [Carruthers *et al.*, 2022; Goldin *et al.*, 2022; Goodman *et al.*, 2023; Holz *et al.*, 2023; DeBacker *et al.* 2024; Cohen, 2024; Hauck and Wallossek, 2024].

---

[2] The textbook definition of social preferences is those that place a value on what happens to other people even if it results in individual lower payoffs (The CORE Team, 2017). It includes caring for others because of nice (like altruism) and not nice (like envy or spite) motives. We use the term only in the nice way.

[3] Within the tax literature, Cummings *et al.* (2009) examines the relationship between preferences in favor of paying taxes with the institutions of tax administration and citizen assessment of governance quality. Muller (2022) examines the role of growth and distribution on tax capacity.

More generally, tax compliance is shaped by a range of economic, social, psychological, and institutional factors, as highlighted in the literature reviews by Alm (2019) and Slemrod (2019). Political stability and effective governance positively influence compliance by enhancing enforcement and ensuring the availability of third-party information. Social norms contribute positively when tax compliance is accepted as a societal standard but can have a negative impact in contexts where tax evasion is normalized. Individual participation in government decision-making further encourages compliance, as taxpayers are more likely to comply when they feel involved in the allocation of public resources. Additionally, technological advancements, such as the digitalization of tax systems, play a significant role in improving compliance by increasing transparency, and reducing opportunities for evasion.

This paper contributes to the literature in several ways. First, it is, to the best of our knowledge, the first study that theoretically analyzes the role of unlimited refilings on tax compliance. Second, it shows that, unless a person's care for the welfare of society as a whole is unrealistically strong, the better decision for taxpayers is to evade taxes if their ability to unlimitedly refill is not curtailed. Third, the paper highlights the importance that policymakers, before enacting policies, carefully consider if policies will correctly incentivize the desired behavior. This is a consideration that has been brought to the forefront in tax collection literature's several recent papers (Yang, 2008; Alm, 2010; Paula and Scheinkman, 2010; Gillitzer and Skov, 2013; Carrillo *et al.*, 2017; Slemrod *et al.*, 2017; Almunia and Lopez-Rodriguez, 2018) and —importantly for us to highlight— in several other areas of economics research, including crime economics, ecological economics, labor economics, public sector economics, business economics, and economics of innovation (Becker, 1968; Frey and Oberholzer-Gee, 1997; Gneezy and Rustichini, 2000; Fehr and List, 2004; Gneezy and List, 2006; Mulder *et al.* 2006; Bowles, 2008; Bowles and Hwang, 2008; Ellingsen and Johannesson, 2008; Georgellis *et al.* 2011; Gneezy *et al.*, 2011; Bowles and Polania-Reyes, 2012; Kerr *et al.* 2012; Madrian, 2014, Weaver, 2015; Dai and Wang, 2024). Finally, it presents a simple policy recommendation to prevent tax evasion that consists of limiting unlimited refilings. Now, while the Ecuadorian tax authority did so since 2013, the earlier situation is a useful phenomenon to study for the very reason that, just as we study history to not repeat

our mistakes, a careful theoretical investigation of it could be essential to prevent similar policies from being implemented in the future.

The rest of the paper is organized as follows. Section 2 presents the institutional background around the ITA in Ecuador and the associated empirical findings which motivate our theoretical inquiry. Section 3 presents the formal analysis when unlimited refilings are allowed. Section 4 presents, first, the formal analysis when unlimited refilings are blocked; and, second, the formal analysis in the presence of taxpayers with social preferences. Section 5 concludes.

2. THE INCOME TAX ADVANCE

First, the Ecuadorian tax legislation valid for the fiscal year 2010 and that is relevant for this research is described[4]. The income tax (IT) in Ecuador is similar to the one in the USA. For individuals it is determined using a progressive tax schedule with marginal rates that go from 5 to 35%. For corporations the IT is calculated as a flat rate of the tax base that was 25% in 2010.

In addition to the IT, Ecuadorian taxpayers have to file the ITA. When taxpayers file their IT_{t-1} (in March or April of year t), they also determine the ITA_t. We study corporations and individuals who are required to keep accounting records. For them the ITA_t is calculated as a function of tax records corresponding to the year $t-1$. Specifically, it is equal to sum of 0.4% of the total assets, 0.4% of the total taxable income, 0.2% of the net worth, and 0.2% of deductible expenses.

It is important to note that the ITA is a minimum income tax. When taxpayers file their IT_t (in the year $t+1$), the IT_t and the ITA_t are compared, and the greater of the two becomes the relevant income tax (RIT_t). Moreover, there is an anticipated portion of the ITA_t that is paid in two equal parts in July and September of year t (before the IT_t is determined). This amount is equal to the ITA_t minus taxes withheld (by third parties) in year $t-1$.

---

[4] The institutional background relevant to this paper was in effect in the fiscal years 2010 and 2011. Many changes have occurred since then, but they are not relevant for this research. Those changes also imply that updating the information used in this paper to study the same research questions is not feasible.

Clearly, there are incentives to evade the ITA. First, a lower ITA_t means a lower anticipated payment and hence more liquidity for the taxpayer in year t. More importantly, a lower ITA_t could potentially imply less paid taxes if the ITA_t ends up being greater than the IT_t. Sánchez (2022) shows evidence that these incentives are strong, because it documents that in the fiscal year 2010 around 7% of total number of corporations and individually-owned businesses obligated to keep accounting records under-reported the ITA. More details about the ITA in Ecuador are presented in that paper.

2.1. Tax enforcement

As a response to the under-reporting of the ITA, the Ecuadorian tax authority implemented a program to control evasion which included delivering tax notifications. In 2010 these notifications were delivered by tax officials, instead of the postal service (currently, most tax notifications are delivered electronically). However, because of human resource constraints, not all the taxpayers who, in 2010, under-reported the ITA received a notification. Only those with the greatest under-reported amounts were selected to receive it. That is, due to these restrictions a selection threshold was defined. However, the selection process was not perfect in the sense that some taxpayers not selected to receive the notification were notified and some originally selected were not notified. Note, however, that all the notified taxpayers did evade taxes.

Sánchez (2022) estimates the causal effect of those tax notifications using a fuzzy regression discontinuity design (FRDD) that exploits the exogenous and discrete change in the probability of receiving the notification. FRDD is the ideal option to estimate the effect of the notification, since it exploits exogeneous variation created by the assignment rule. Then, the endogeneity problems that usually happen in the application of time series and structural equations methods, are resolved by using FRDD. Moreover, that paper shows various identification tests that justify the use of FRDD. Given the nature of the FRDD estimate, the results are interpreted as the effect of the marginal notification on the expected value of the dependent variable. The results indicate that the notification increased the reported ITA in around $900. However, there is no evidence of an effect on the RIT. In other words, the notification increased reported taxes but did not affect taxes collected.

These seemingly contradictory results are explained by strategic behavior. When the ITA is greater than the IT, and therefore the ITA is the RIT, the notification has no effect on the ITA. In contrast, when the ITA is not the RIT because the IT is greater than the ITA, the notification has a positive and significant effect of around $1,000. These results are summarized in Table 1[5].

Sánchez (2022) argues that the previous results are explained, at least partially, by the fact that unlimited refilings were possible because it allowed the following behavior. When taxpayers were notified, they could refile initially to correct the values and, just for doing so, leave the list of evaders. However, they later could refile again and change the

Table 1. RDD estimates of the causal effect of the tax notification (LATE) in US$

Variables	(1) Reported ITA	(2) Collected taxes (RIT)	(3) Reported ITA ITA is RIT	(4) Reported ITA IT is RIT
Conventional	922.2***	−181.3	116.9	981.2***
	(299.9)	(677.5)	(540.3)	(304.0)
Bias corrected	945.7***	−274.9	94.94	967.6***
	(299.9)	(677.5)	(540.3)	(304.0)
Robust	945.7***	−274.9	94.94	967.6***
	(343.1)	(769.5)	(616.1)	(363.4)
Effective number of observations	6,451	6,666	1,978	5,714
Bandwith	0.983	1.035	1.001	1.045

Note: standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

---

[5] The estimates in both Table 1 and 2 are adapted from Sánchez (2022). All estimations use triangular kernels and linear polynomials. The results are robust to the use of different kernels and polynomials. The conventional estimates correspond to a non-parametric estimation that selects the bandwidth that minimize the mean squared error. The bias corrected estimates take into consideration the bias produced by the conventionally chosen bandwidth. The robust estimates adjust the standard errors to consider the additional variability produced by the bias correction. See Calonico *et al.* (2014) for details.

reported ITA in order to evade taxes. To back up this hypothesis, that paper shows evidence that the notification causes a significant increase in the probability of refiling more than one time. Furthermore, the effect of the notification on this probability is significantly stronger when the ITA is the RIT, and therefore there are more incentives to under-report it. These results are summarized in Table 2. Detailed results of the effect of the tax notifications and the identification tests of the FRDD can be seen in that paper. It is important to highlight that, in 2013, the Ecuadorian tax authority stopped allowing the unlimited refiling of taxes. That is, any taxpayer wishing to refile their taxes more than once must first file a formal petition to the tax authority (and thus eliminates the ability to evade taxes through this channel).

The empirical findings that the notification policy increased reported taxes but did not affect taxes collected and that it could be explained by the ability to carry out unlimited refilings (as many times as desired without going through a formal process that verifies that the refile is legally necessary) motivate, therefore, the next theoretical inquiry.

Table 2. RDD **estimates of the causal effect of the tax notification** (LATE) **on the probability to refile more than once**

Variables	(1) Refiling	(2) Refiling ITA is RIT	(3) Refiling IT is RIT
Conventional	0.128***	0.157***	0.117***
	(0.0258)	(0.0323)	(0.0292)
Bias-corrected	0.119***	0.145***	0.102***
	(0.0258)	(0.0323)	(0.0292)
Robust	0.119***	0.145***	0.102***
	(0.0304)	(0.387)	(0.350)
Kernel type	Triangular	Triangular	Triangular
Effective number of observations	6,739	3,789	6,040
Bandwith	0.900	0.931	1.314

Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

3. UNDERSTANDING THE ISSUE

Consider the situation, thus, in which (*a*) if the taxpayers under-reports their[6] ITA, then they don't necessarily get a notification; with $p \in [0,1]$ being the probability that tax authorities send them such notification and $1 - p$ the probability they don't; and (*b*) they are able to freely refile more than once. The latter allows the following two-step (or more) behavior: In a first refiling they could report the true ITA and, just for that, leave the list of evaders, and in a second refiling they could under-report again without any further problem. As shortly shown, in this scenario, to under-report their ITA (assuming it is greater than their IT) is the expected payoff maximizing decision for exclusively selfish taxpayers —*i.e.*, who only care about their individual and monetary payoffs and not about the consequences of evading taxes for society as a whole— even if tax authorities always send them a notification. However, before proceeding, it is important to point out four things. First, because in this scenario taxpayers have greater incentives to under-report the ITA, only the case in which the ITA is greater than the IT is examined. However, under reasonable assumptions, the result that under-reporting is the payoff maximizing decision for selfish taxpayers also holds when the ITA is smaller than the IT; see footnote 8. Second, to carry out a general analysis, it is posited that, when truthfully reporting, they still face a probability $q \in [0,1]$ that tax authorities wrongly send them a notification (and a probability $1 - q$ they don't). However, it did not happen in Ecuador's tax control program for the ITA in the period 2010-2012, *i.e.*, in that case $q = 0$. Third, because it is assumed that the utility that every outcome yields is the same as its payoff and that all payoffs are linear, the models assume taxpayers are risk-neutral. However, see footnote 9. Fourth, it should be warned —and this type of warning applies to any modeling effort— that the inquiry has simplifying assumptions that must not be generalized. Among them, we could mention that, selfish or otherwise, taxpayers maximize expected payoffs and that the tax authority may make mistakes but it is not corrupt.

Logically, under any institutional framework that will be examined, the taxpayer could end up in any of four possible situations: *i*) report their true ITA and the tax authority sends them a notification, *ii*) report

---

[6] We use the gender neutral "they" term.

their true ITA and the tax authority does not send them a notification, *iii)* under-report their ITA and the tax authority sends them a notification, and *iv)* under-report their ITA and the tax authority does not send them a notification. Now, in the institutional framework in which (*a*) and (*b*) above explained are the case, the payoffs of the selfish taxpayer for each of such situations are as follows. In the first situation, they'll have to pay their true ITA (denoted by $0 < T$) plus the refiling costs of addressing the notification (denoted by $0 < c$), thus having a payoff of $-(T + c)$. In the second situation, they'll only have to pay their true ITA, thus having a payoff of $-T$. In the third situation, their payoff will be $-(T + 2c - u(1 + r))$ because of the following. To begin with, they reported $0 < T - u$ (with $0 < u$ denoting the amount under-reported). Furthermore, if invested somewhere else, u yields a return of ur (with $0 < r$ denoting the rate of return). So, if instead of paying u as taxes they could keep it, they would only pay $T - u(1 + r)$. But the fact that unlimited refilings are possible allows them to indeed not pay $u(1 + r)$ in taxes. The only added costs for not paying it would be they have to pay the refiling costs twice (or more times, of course, if they refiled more than twice, but no need to assume so) which are $2c$. So, their payoff would be $-(T - u(1 + r) + 2c)$. In the fourth situation, in addition of being able to not pay $u(1 + r)$ in taxes, they'll not have to pay refiling costs, thus having a payoff of $-(T - u(1 + r))$. We assume that $2c < u(1 + r)$, which is a fairly reasonable assumption given that the under-reporting taxpayer chooses u (with the only restriction, given they can't report a negative ITA, that $u < T$).

Therefore, the expected payoffs for reporting the true ITA and for under-reporting it (hereafter, π^{tr} and π^{un}, respectively) are:

$$\pi^{tr} = -q(T + c) - (1 - q)T = -qcT \qquad [1]$$

$$\pi^{un} = -p(T - u(1+r) + 2c) - (1-p)(T - u(1+r)) = -2pc - T + u(1+r) \quad [2]$$

From equations [1] and [2] it follows that:

$$\pi^{tr} < \pi^{un} \leftrightarrow p < \frac{q}{2} + \frac{u(1+r)}{2c}$$

$$\pi^{un} \leq \pi^{tr} \leftrightarrow \frac{q}{2} + \frac{u(1+r)}{2c} \leq p \qquad [3]$$

However, given that $2c < u(1 + r)$, then $\pi^{tr} < \pi^{un}$ no matter how proficiently (or incompetently) tax authorities carry out their job, that is, for any $p \in [0,1]$ and $q \in [0,1]$. Figure 1 left panel graphically shows this result. It has the positively sloped line $p(q) = \frac{q}{2} + \frac{u(1+r)}{2c}$ at which $\pi^{tr} = \pi^{un}$, which we label p^{unl} (for "unlimited refiling"). Above p^{unl} it is the case that $\pi^{un} < \pi^{tr}$, so that reporting the true ITA is the expected payoff maximizing decision. Below p^{unl} it is the case that $\pi^{tr} < \pi^{un}$, so that under-reporting the ITA is the expected payoff maximizing decision. It could be seen that, within the $p \in [0,1]$ and $q \in [0,1]$ unit square area, it never occurs that $\pi^{un} < \pi^{tr}$.[7]

The intuition of this worrisome result is, actually, straightforward. If accompanied by allowing taxpayers to refile unlimited times, the sending notifications policy does not take away from taxpayers the power to obtain benefits if they under-report; with those benefits being $u(1 + r)$. Under-reporters will only have to pay the costs of refiling twice, $2c$. Thus, if the former are greater than the latter, the expected payoff maximizing decision would be to under-report. However, it is reasonable to assume that $2c < u(1 + r)$, for the very reason that the taxpayer chooses u.[8]

The bottom line of this analysis is that, for selfish taxpayers, allowing unlimited refilings makes the notification policy plainly ineffective.[9]

---

[7] Some literature has rightfully highlighted the role of asymmetric information on tax evasion (Crocker and Slemrod, 2005; Chen and Lin, 2017; Guo and Hung, 2020; Han, 2020; Boadway *et al.,* 2022). Now, because it holds even if the tax authority always knew taxpayers' true ITA (thus, always notified under-reporters) this finding does not hinge upon asymmetric information issues.

[8] Consider the case in which the IT is greater than the ITA. Thus, $I = T + D$, with I denoting the IT and $0 < D = I - T$. Then, the payoffs for the four situations in which the taxpayer could be, above described, are $-(T + D + c)$, $-(T + D)$, $-(T + D - ur + 2c)$, and $-(T + D - ur)$, respectively. Therefore, $\pi^{tr} = -qc - (T + D)$, and $\pi^{un} = -2pc - (T + D) + ur$. It follows that:

$$\pi^{tr} < \pi^{un} \leftrightarrow p < \frac{q}{2} + \frac{ur}{2c}$$

Therefore, if $2c < ur$, then $\pi^{tr} < \pi^{un}$ for any $p \in [0,1]$ and $q \in [0,1]$. However, given that the taxpayer chooses u (with the only restriction that $u < T$), that $2c < ur$ seems a reasonable assumption.

[9] That taxpayers are risk-averse but in the same degree for truth-reporting than for under-reporting can be modeled with the following utility function for each outcome j related to either case: $U_j = (A_j)^{1/a}$, with A denoting the payoffs of the paper's and $1 < a$ being integer

4. ADDRESSING THE ISSUE

4.1. Blocking unlimited refilings

To promote that truth-reporting becomes the expected payoff maximizing decision, a necessary first policy seems to be blocking unlimited refilings. Importantly, this is what actually happened in Ecuador since 2013. Thus, assume now that only one free refiling is possible, by which the following is meant. If taxpayers under-report their ITA and receive a notification, then they will have only one chance to refile without a formal review. Any additional refiling is not automatic, but has to be formally and deeply reviewed by a tax official, who would easily find out any attempt to evade taxes, which will cause a fine.

Given this new institutional setup, the selfish taxpayer's payoffs in the situation in which they under-report and the tax authority sends them a notification is modified. It is now given by $-(T + c)$ [while when unlimited refilings were allowed it was given by $-(T - u(1 + r) + 2c)$]. The reasons explaining this key modification are the following. In the new institutional framework, the under-reporting taxpayer who does receive a notification has to choose between two options. First, they can under-report again in the refiling, in which case they will be caught and eventually fined and, therefore, will have to pay $T + c + f$ (with $0 < f$ denoting the fine's amount). Second, she can refile stating her true ITA, in which case she will avoid further issues and, thus, pay $T + c$. But $-(T + c + f) < -(T + c)$ for any $0 < f$. Therefore, it is fair to assume they will choose the second option and, thus, have a $-(T + c)$ payoff.

(and odd). Then, their expected utility for truth-telling is $U^{tr} = q(-T - c)^{1/a} + (1 - q)(-T)^{1/a}$ while their expected utility for under-reporting is $U^{un} = p(-T + u(1 + r) - 2c)^{1/a} + (1 - p)(-T + u(1 + r))^{1/a}$. It follows that:

$$U^{un} + U^{tr} \leftrightarrow q\frac{D}{E} + \frac{F}{E} < p$$

in which $0 < D = (T)^{1/a} - (-T - C)^{1/a}$, $0 < F = (-T + u(1 + r))^{1/a} - (-T)^{1/a}$, and $0 < E = (-T + u(1 + r))^{1/a} - (-T + u(1 + r) + 2c)^{1/a}$. Naming p^{cr} the function $p = q\frac{D}{E} + \frac{F}{E}$ (above which $U^{un} < U^{tr}$) it is the case that $0 < \frac{D}{E} = \frac{\partial p^{cr}}{\partial q}$. Therefore, if $1 \leq F/E = p^{cr}(0)$, then $U^{un} < U^{tr}$ for any $p \in [0,1]$ and $q \in [0,1]$. But it can be verified that, under the assumption that $2c < u(1 + r)$, actually $1 \leq F/E$.

Therefore, the expected payoff for under-reporting the ITA is:

$$\pi^{un} = -p(T+c)-(1-p)(T-u(1+r)) = -pc-T+(1-p)u(1+r) \quad [4]$$

while the expected payoff for reporting the true ITA remains given by equation [1]. From equations [1] and [4] it follows that:

$$\pi^{tr} < \pi^{un} \leftrightarrow p < \frac{cq}{c+u(1+r)} + \frac{u(1+r)}{c+u(1+r)}$$

$$\pi^{un} \leq \pi^{tr} \leftrightarrow \frac{cq}{c+u(1+r)} + \frac{u(1+r)}{c+u(1+r)} \leq p$$

[5]

Equation [5] implies $\pi^{un} < \pi^{tr}$ when $p \to 1$, *i.e.*, tax authorities are proficient in sending notifications to under-reporters. This could be better grasped by noticing that, in the extreme case in which they always send notifications to under-reporters ($p = 1$), then reporting the true ITA is the expected payoff maximizing decision even if they also almost always wrongly send notifications to truth-reporters ($q \to 1$). Formally, if $p = 1$ then $\pi^{un} < \pi^{tr}$ for any $q \in [0,1)$ (while, if $q = 1$, then $\pi^{un} = \pi^{tr}$).

Figure 1 right panel graphically shows this result. It has the positively sloped line $p(q) = \frac{cq}{c+u(1+r)} + \frac{u(1+r)}{c+u(1+r)}$ at which $\pi^{tr} = \pi^{un}$, which we label p^{one} (for "one refiling"), above/below which $\pi^{un} < \pi^{tr} / \pi^{tr} < \pi^{un}$ and, thus, truth-reporting/under-reporting the ITA is the expected payoff maximizing decision. It could be seen that, within the $p \in [0,1]$ and $q \in [0,1]$ unit square area, there is a subset in which actually $\pi^{un} < \pi^{tr}$, labeled A. That to be within A it is key that tax authorities often send notifications to under-reporters can be seen by noting it includes all the points in which $p = 1$ and $q \in [0,1)$, the same as the points in which $p \to 1$ even though $q \to 1$.

The intuition of this somewhat hopeful result is straightforward. Blocking unlimited refilings blocks the possibility that under-reporters could easily keep $u(1 + r)$ instead of paying it as taxes. Now, they would pocket it only if they are lucky enough not to receive a notification. If, in addition, the likelihood that they actually are notified is large enough, then reporting the true ITA could become their payoff-maximizing decision.

However, it should be highlighted that, in the presence of selfish taxpayers, blocking unlimited refilings is a necessary but not a sufficient

Figure 1. The scenarios under selfish preferences

(*a*) Unlimited refilings
$\pi^{tr} < \pi^{un}$ always

(*b*) One refilling
$\pi^{un} < \pi^{tr}$ within area A
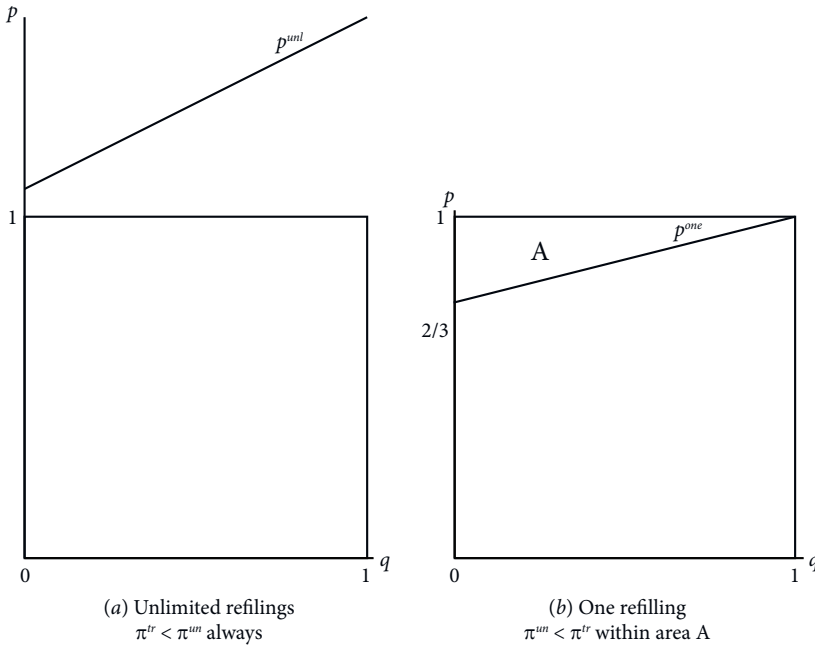
measure to achieve that truth-reporting is the expected payoff maximizing decision; for the latter, it is also needed that tax authorities do not often miss sending notifications to under-reporters. One way to grasp this issue is noting that, even if tax authorities never wrongly notify truth-reporters ($q = 0$), for the notification policy to have any chance to achieve the desired outcome, the probability that under-reporters are notified must be greater than 2/3. This result is also shown in Figure 1 right panel (in which $2/3 \leq p^{one}(0)$).

4.2. Social preferences

There is however, a supplementary approach to foster that reporting the true ITA is the expected payoff maximizing decision. It is the presence of taxpayers who, instead of being exclusively selfish, exhibit social preferences. By this, it is meant taxpayers who not only care about their strictly individual and monetary payoffs but they also positively care about the tax revenues raised by society as a whole (see footnote 2).

A parsimonious way to model them is assuming that, when reporting their true ITA, in addition of obtaining some monetary payoffs, they also obtain a subjective gain for reporting the truth (so they actually contribute more if IT is smaller than ITA). And, before proceeding, let us mention that, although it is beyond the scope of this paper to discuss how these preferences spread among society members, nevertheless, and as Fehr and Schmidt (2006, p. 617) say, the idea that "people often care about the well-being of others and that this may have important economic consequences" has been pointed out by an array of influential economists, including Smith (1759), Becker (1974), Arrow (1981), Samuelson (1993) and Sen (1995).

To assess the potential role of social preferences on taxpayers' compliance, it is important to examine their presence both in the institutional framework in which unlimited refilings are possible and in the institutional framework in which it has been blocked. Beginning with the former, consider the case such that, if under-reporting their ITA, the taxpayer payoffs are the same as with selfish preferences (recall: $-(T - u(1 + r) + 2c)$ if receiving the notification and $-(T - u(1 + r))$ if not); thus, the expected payoff for under-reporting the ITA remains given by equation [2]. However, very differently, given this institutional and preferences framework when the taxpayer reports their true ITA (and regardless of receiving a notification or not) obtains a gain $0 < s$. It is the parameter that captures their degree (strength) of social preferences. It is assumed that, on the one hand, $u(1 + r) - 2c < s$, i.e., social preferences are strong in this degree; but, on the other hand, $s < u(1 + r) - c$, i.e., social preferences are week in this degree. Therefore, when the taxpayer reports their true ITA and receives a notification, their payoff is $-(T + c - s)$; which is the case because, if they report their true ITA and receive a notification, in addition of having to pay $T + c$, they would obtain the gain s. If they report their true ITA and don't receive a notification, their payoff is $-(T - s)$; which is the case because, in addition of having to pay T, they would obtain the gain s.

Therefore, the expected payoff for reporting the true ITA is given by:

$$\pi^{tr} = -q(T + c - s) - (1 - q)(T - s) = -qc - T + s \qquad [6]$$

From equations [2] and [6] it follows that:

$$\pi^{tr} < \pi^{un} \leftrightarrow p < \frac{q}{2} + \frac{u(1+r)-s}{2c}$$

$$\pi^{un} \leq \pi^{tr} \leftrightarrow \frac{q}{2} + \frac{u(1+r)-s}{2c} \leq p$$

[7]

Given that $u(1 + r) - 2c < s < u(1 + r) - c$, equation [7] implies the following mixed results. On the one hand, social preferences are strong enough so as to achieve that, if tax authorities often send notifications to under-reporters ($p \to 1$) and seldom send notifications to truth-reporters ($q \to 0$), then $\pi^{un} < \pi^{tr}$. But, on the other hand, social preferences are not strong enough so as to achieve that, if tax authorities always wrongly send notifications to truth-reporters ($q = 1$), then nevertheless $\pi^{un} < \pi^{tr}$ no matter how often they rightly send notifications to under-reporters (*i.e.*, the fact remains that, if $q = 1$, then $\pi^{tr} < \pi^{un}$ for any $p \in [0,1]$).

Figure 2 left panel graphically shows these results. It has the positively sloped line $p(q) = \frac{q}{2} + \frac{u(1+r)-s}{2c}$ at which $\pi^{tr} = \pi^{un}$, which we label $p^{soc,unl}$ (for "social preferences with unlimited refilings"), above/below which $\pi^{un} < \pi^{tr}$ / $\pi^{tr} < \pi^{un}$ and, thus, truth-reporting/under-reporting the ITA is the expected payoff maximizing decision. It could be seen that, within the $p \in [0,1]$ and $q \in [0,1]$ unit square area, there is a subset in which actually $\pi^{un} < \pi^{tr}$, labeled *B*. The result that social preferences help to achieve that truth-reporting is expected payoff maximizing but it also requires that the tax authority carries out its job proficiently, could be seen by noting that area *B* includes the points in which $p \to 1$ and $q \to 0$. The result that $\pi^{un} < \pi^{tr}$ cannot occur if $q = 1$ (no matter how close to 1 or even equal to 1 p is) could be seen by noting that area *B* does not include any point on the vertical line $q = 1$. Furthermore, Figure 2 left panel shows that the vertical intercept of $p^{soc,unl}$ is greater than ½, *i.e.*, even if $q = 0$, to be within *B* it has to happen that ½ < p.

The intuition of these mixed results is straightforward. Related to the hopeful for tax compliance result, it is the following. If the taxpayers who report their true ITA obtains a gain s that is greater than $u(1 + r) - 2c$, regardless of whether they wrongly get a notification or not, then it is possible that reporting the true ITA is their expected payoff maximizing decision even if they can still do unlimited refilings. However, for that to be the case, and precisely because unlimited refilings are allowed, it is also needed that tax authorities often send notifications to under-reporters

and seldom send notifications to truth-reporters. The intuition of the sobering result is the following. If the gain s the truth-reporter obtains is smaller than $u(1 + r) – c$, they nevertheless for sure get a notification, and they could also do unlimited refilings, then under-reporting will be their expected payoff maximizing decision.

Moving to the institutional and preferences framework in which, in addition of having taxpayers with social preferences, unlimited refilings have been blocked, in it the expected payoffs for reporting the true ITA and for under-reporting it are given by equations [6] and [4], respectively. From the latter equations it follows that:

$$\pi^{tr} < \pi^{un} \leftrightarrow p < \frac{cq}{c + u(1+r)} + \frac{u(1+r) - s}{c + u(1+r)}$$

$$\pi^{un} \leq \pi^{tr} \leftrightarrow \frac{cq}{c + u(1+r)} + \frac{u(1+r) - s}{c + u(1+r)} \leq p$$

[8]

Equation [8] implies the following results. First, for any positive degree of social preferences, $\pi^{un} < \pi^{tr}$ occurs if tax authorities carry out their job fairly well. That is, provided such competent tax authority exists, it is no longer needed that social preferences are strong enough so that $u(1 + r) – 2c < s$ but any $0 < s$ suffices for truth-reporting to become the expected payoff maximizing decision. Second, and perhaps most importantly, the subset of the tax authority's performances which achieve that $\pi^{un} < \pi^{tr}$ is the greatest of the four institutional and preferences scenarios we have examined.

Figure 2 right panel graphically shows the latter result. It has the positively sloped line $p(q) = \frac{cq}{c + u(1+r)} + \frac{u(1+r) - s}{c + u(1+r)}$ at which $\pi^{tr} = \pi^{un}$, which we label $p^{soc,one}$ (for "social preferences and one refiling"), above/below which $\pi^{un} < \pi^{tr}$ / $\pi^{tr} < \pi^{un}$ and, thus, truth-reporting/under-reporting the ITA is the expected payoff maximizing decision. It could be seen that, within the $p \in [0,1]$ and $q \in [0,1]$ unit square area, there is a subset in which actually $\pi^{un} < \pi^{tr}$, labeled C. Comparing it with area B of Figure 2 left panel, it could be seen (and formally shown) that C is greater. Furthermore, comparing C with area A of Figure 1 right panel, it could be seen (and formally shown) that the former is greater as well. These comparisons show that, among the four institutional and preferences scenarios that have been examined, that one in which there are social preferences and

Figure 2. The scenarios with social preferences

(*a*) Unlimited refilings
$\pi^{un} < \pi^{tr}$ within area B

(*b*) One refiling
$\pi^{un} < \pi^{tr}$ within area C
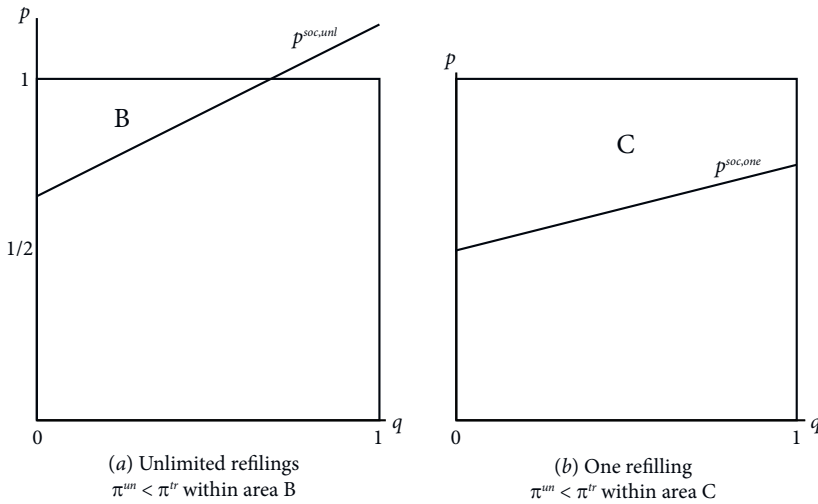
unlimited refilings are blocked gives rise to the greatest variety of a tax authority's performances which make that truth-reporting is expected payoff maximizing. Relatedly, Figure 2 also shows that the (right-panel's) vertical intercept of $p^{soc,one}$ is smaller than the (left-panel's) vertical intercept of $p^{soc,unl}$.[10]

The intuition of this hopeful for tax compliance result is straightforward. To begin with, blocking unlimited refilings reduces the expected payoff of under-reporting. In addition, social preferences increase the expected payoff of truth-reporting. Under the combined impact of both effects, reporting the true ITA could become the expected payoff maximizing decision even if the tax authority does not carry out its job that proficiently.

5. CONCLUSIONS

This paper theoretically analyzes the role of unlimited refilings on tax compliance; by which it is meant the ability to refile taxes as many

---

[10] Figure 2 right panel draws the specific case in which $p^{soc,one} \approx \frac{1}{2}$; in turn the case if $s \approx (\frac{1}{2})$ $(u(1 + r) - c)$.

times as desired without going through a formal process that verifies that the refile is legally necessary. It is done in the context of the use of tax notifications to control the evasion of the income tax advance in Ecuador, and the use of unlimited refilings to evade taxes in that country is documented. Building upon this background, a model to study the behavior of taxpayers under different institutional and preferences scenarios is developed.

First, it is assumed that taxpayers exhibit exclusively selfish preferences and unlimited refilings are allowed. The key (and worrisome) finding in this scenario is that, independently of the efficiency of the tax authority to correctly notify the evaders and not to notify compliers, the expected payoff maximizing decision is to evade taxes. Second, it is assumed that unlimited refilings are blocked but taxpayers are still exclusively selfish. The key finding in this scenario is that complying to pay taxes is the payoff maximizing decision as long as the tax authority is strongly efficient notifying evaders. That is, blocking unlimited refilings is a necessary but not sufficient condition to achieve compliance. Third, the scenario in which taxpayers exhibit social preferences and unlimited refilings are allowed is examined. The key finding under this scenario is that there will be compliance, because social preferences foster such a decision, but only if the tax authority delivers the tax notifications efficiently (does not miss under-reporters that often and does not notify truth-reporters). The fourth, last scenario assumes that taxpayers exhibit social preferences and that unlimited refilings are blocked. The key finding in this scenario is that there will be compliance for a broader range of parameters. The need of having an efficient tax authority (*i.e.*, consistently notifies evaders and does not notify compliers) remains but is less stringent the stronger the social preferences are.

Overall, the results imply that blocking unlimited refilings reduces the expected payoff of evasion and therefore reduces the probability of evasion. Furthermore, it is found that social preferences help reducing tax evasion and therefore that the proliferation of society-regarding preferences should be promoted. The findings imply a simple policy recommendation that consist on limiting the option of unlimited refilings in the context of tax evasion control. While the Ecuadorian tax authority blocked it in 2013, its earlier existence (2010-2012) is a useful phenomenon to study for the very reason that empirical and theoretical

study of history to avoid repeating mistakes is (or must be) an important research objective.

More generally, the results of this study call for carefully design evasion control policies that are compatible with the incentives of taxpayers. In fact, the call for policymakers to carefully consider, before enacting policies, if the latter will correctly incentivize the desired behavior, is found not only in the tax compliance literature but in several areas of economics research (see the literature referred to in the Introduction section). ◄

REFERENCES

Allingham, M., and Sandmo, A. (1972). Income tax evasion: A theoretical analysis. *Journal of Public Economics*, 1(3-4), 323-338. https://doi.org/10.1016/0047-2727(72)90010-2

Alm, J. (2019). What motivates tax compliance? *Journal of Economic Surveys*, 33(2), 353-388. https://doi.org/10.1111/joes.12272

Alm, J., Cronshaw, M., and McKee, M. (1993). Tax compliance with endogenous audit selection rules. *Kyklos*, 46(1), 27-45. https://doi.org/10.1111/j.1467-6435.1993.tb02405.x

Almunia, M., and Lopez-Rodriguez, D. (2018). Under the radar: The effects of monitoring firms on tax compliance. *American Economic Journal: Economic Policy*, 10(1), 1-38. https://doi.org/10.1257/pol.20160229

Alstadsaeter, A., Godar, S., Nicolaides, P., and Zucman, G. (2024). *Global Tax Evasion Report 2024*. EUTax Observatory.

Arrow, K. (1981). Optimal and voluntary income redistribution. In: S. Rosenfield (ed.), *Economic Welfare and the Economics of Soviet Socialism: Essays in Honor of Abram Bergson* (pp. 267-288). Cambridge University Press.

Becker, G. (1974). A theory of social interactions. *Journal of Political Economy*, 82(6), 1063-1093. https://doi.org/10.1086/260265

Blumenthal, M., Christian, C., and Slemrod, J. (2001). Do normative appeals affect tax compliance? Evidence from a controlled experiment in Minnesota. *National Tax Journal*, 54(1), 125-138. https://doi.org/10.17310/ntj.2001.1.06

Boadway, R., Sato, M., and Tremblay, J-F. (2022). Cash-flow business taxation revisited: Bankruptcy and asymmetric information. *International Tax and Public Finance,* 29(4), 922-952. https://doi.org/10.1007/s10797-021-09696-9

Bowles, S. (2008). Policies designed for self-interested citizens may undermine "the moral sentiments": Evidence from economic experiments. *Science*, 320(5883), 1605-1609. https://doi.org/10.1126/science.1152110

Bowles, S., and Polania-Reyes, S. (2012). Economic incentives and social preferences: Substitutes or complements? *Journal of Economic Literature*, 50(2), 368-425. https://doi.org/10.1257/jel.50.2.368

Calonico, S., Cattaneo, M., and Titiunik, R. (2014). Robust nonparametric confidence intervals for regression-discontinuity designs. *Econometrica*, 82(6), 2295-2326. https://doi.org/10.3982/ECTA11757

Carrillo, P., Pomeranz, D., and Singhal, M. (2017). Dodging the taxman: Firm misreporting and limits to tax enforcement. *American Economic Journal: Applied Economics*, 9(2), 144-164. https://doi.org/10.1257/app.20140495

Carruthers, C., Fox, W., Kessler, L., and Murray, M. (2022). Tax compliance in the Amazon. *National Tax Journal*, 75(2), 297-311. https://doi.org/10.1086/719199

Chen, T., and Lin, C. (2017). Does information asymmetry affect corporate tax aggressiveness? *Journal of Financial and Quantitative Analysis*, 52(5), 2053-2081. https://doi.org/10.1017/S0022109017000576

Cohen, I. (2024). Technology and the state: Building capacity to tax via text. *Journal of Public Economics*, 236, 105154. https://doi.org/10.1016/j.jpubeco.2024.105154

Crocker, K., and Slemrod, J. (2005). Corporate tax evasion with agency costs. *Journal of Public Economics*, 89(9-10), 1593-1610. https://doi.org/10.1016/j.jpubeco.2004.08.003

Cummings, R., Martinez-Vazquez, J., McKee, M., and Torgler, B. (2009). Tax morale affects tax compliance: Evidence from surveys and an artefactual field experiment. *Journal of Economic Behavior & Organization*, 70(3), 447-457. https://doi.org/10.1016/j.jebo.2008.02.010

Dai, X., and Wang, M. (2024). Unintended effects of tax incentives on firms' strategic patenting. *Journal of Economic Behavior & Organization*, 219, 1-24. https://doi.org/10.1016/j.jebo.2024.01.009

DeBacker, J., Heim, B., Tran, A., and Yuskavage, A. (2024). Seeking professional help: How paid preparers decrease tax compliance. *National Tax Journal*, 77(2), 229-261. https://doi.org/10.1086/728928

De Paula, A., and Scheinkman, J. (2010). Value-added taxes, chain effects, and informality. *American Economic Journal: Macroeconomics*, 2(4), 195-221. https://doi.org/10.1257/mac.2.4.195

Dubin, J. (2007). Criminal investigation enforcement activities and taxpayer noncompliance. *Public Finance Review*, 35(4), 500-529. https://doi.org/10.1177/1091142106295757

Dubin, J., Graetz, M., and Wilde, L. (1990). The effect of audit rates on the federal individual income tax, 1977-1986. *National Tax Journal*, 43(4), 395-409. https://doi.org/10.1086/NTJ41788861

Ellingsen, T., and Johannesson, M. (2008). Pride and prejudice: The human side of incentive theory. *American Economic Review*, 98(3), 990-1008. https://doi.org/10.1257/aer.98.3.990

Fehr, E., and Schmidt, K. (2006). The economics of fairness, reciprocity and altruism- experimental evidence and new theories. *Handbook of the Economics of Giving, Altruism and Reciprocity*, 1, 615-691. https://doi.org/10.1016/S1574-0714(06)01008-6

Fišar, M., Reggiani, T., Sabatini, F., and Špalek, J. (2022). Media negativity bias and tax compliance: Experimental evidence. *International Tax and Public Finance*, 29, 1160-1212. https://doi.org/10.1007/s10797-021-09706-w

Frey, B., and Oberholzer-Gee, F. (1997). The cost of price incentives: An empirical analysis of motivation crowding-out. *The American Economic Review*, 87(4), 746-755.

Georgellis, Y., Iossa, E., and Tabvuma, V. (2011). Crowding out intrinsic motivation in the public sector. *Journal of Public Administration Research and Theory*, 21(3), 473-493. https://doi.org/10.1093/jopart/muq073

Gillitzer, C., and Skov, P. (2018). The use of third-party information reporting for tax deductions: Evidence and implications from charitable deductions in Denmark. *Oxford Economic Papers*, 70(3), 892-916. https://doi.org/10.1093/oep/gpx055

Gneezy, U., and List, J. (2006). Putting behavioral economics to work: Testing for gift exchange in labor markets using field experiments. *Econometrica*, 74(5), 1365-1384. https://doi.org/10.1111/j.1468-0262.2006.00707.x

Gneezy, U., and Rustichini, A. (2000). A fine is a price. *The Journal of Legal Studies,* 29(1), 1-17. https://doi.org/10.1086/468061

Gneezy, U., Meier, S., and Rey-Biel, P. (2011). When and why incentives (don't) work to modify behavior. *Journal of Economic Perspectives*, 25(4), 191-210. https://doi.org/10.1257/jep.25.4.191

Goldin, J., Homonoff, T., Javaid, R., and Schafer, B. (2022). Tax filing and take-up: Experimental evidence on tax preparation outreach and benefit

claiming. *Journal of Public Economics*, 206, 104550. https://doi.org/10.1016/j. jpubeco.2021.104550

Goodman, L., Lim, K., Sacerdote, B., and Whitten, A. (2023). Automated tax filing: Simulating a prepopulated form 1040. *National Tax Journal*, 76(4), 805-838. https://doi.org/10.1086/726592

Guo, J., and Hung, F. (2020). Tax evasion and financial development under asymmetric information in credit markets. *Journal of Development Economics*, 145, 102463. https://doi.org/10.1016/j.jdeveco.2020.102463

Hauck, T., and Wallossek, L. (2024). Optional (non-) filing and effective taxation. *Journal of Public Economics*, 238, 105187. https://doi.org/10.1016/j. jpubeco.2024.105187

Hallsworth, M., List, J., Metcalfe, R., and Vlaev, I. (2017). The behavioralist as tax collector: Using natural field experiments to enhance tax compliance. *Journal of Public Economics*, 148, 14-31. https://doi.org/10.1016/j.jpubeco.2017.02.003

Han, W. (2018). The analysis on Chinese e-commerce tax losses based on the perspective of information asymmetry. *Electronic Commerce Research,* 20, 651-677. https://doi.org/10.1007/s10660-018-9318-7

Holz, J., List, J., Zentner, A., Cardoza, M., and Zentner, J. (2023). The $100 million nudge: Increasing tax compliance of firms using a natural field experiment. *Journal of Public Economics*, 218, 104779. https://doi.org/10.1016/j. jpubeco.2022.104779

John, P., and Blume, T. (2018). How best to nudge taxpayers? The impact of message simplification and descriptive social norms on payment rates in a central London local authority. *Journal of Behavioral Public Administration*, 1(1), 1-11. https://doi.org/10.30636/jbpa.11.10

Kerr, J., Vardhan, M., and Jindal, R. (2012). Prosocial behavior and incentives: Evidence from field experiments in rural Mexico and Tanzania. *Ecological Economics*, 73, 220-227. https://doi.org/10.1016/j.ecolecon.2011.10.031

Kleven, H., Knudsen, M.B., Kreiner, C., Pedersen, S., and Saez, E. (2011). Unwilling or unable to cheat? Evidence from a tax audit experiment in Denmark. *Econometrica*, 79(3), 651-692. https://doi.org/10.3982/ECTA9113

Madrian, B. (2014). Applying insights from behavioral economics to policy design. *Annual Review of Economics*, 6(1), 663-688. https://doi.org/10.1146/annurev-economics-080213-041033

Meiselman, B. (2018). Ghostbusting in Detroit: Evidence on nonfilers from a controlled field experiment. *Journal of Public Economics*, 158, 180-193. https://doi.org/10.1016/j.jpubeco.2018.01.005

Mittone, L. (2006). Dynamic behaviour in tax evasion: An experimental approach. *The Journal of Socio-Economics*, 35(5), 813-835. https://doi.org/10.1016/j.socec.2005.11.065

Moulton, S., Collins, J., Loibl, C., Haurin, D., and Brown, J. (2022). Property tax compliance and reverse mortgages: Using nudges to improve the market. *National Tax Journal*, 75(1), 33-59. https://doi.org/10.1086/717160

Mulder, L., Van Dijk, E., De Cremer, D., and Wilke, H. (2006). Undermining trust and cooperation: The paradox of sanctioning systems in social dilemmas. *Journal of Experimental Social Psychology*, 42(2), 147-162. https://doi.org/10.1016/j.jesp.2005.03.002

Muller, N. (2022). La composición de la capacidad tributaria: evidencia para un panel de países. *Investigación Económica*, 81(319), 63-89. https://doi.org/10.22201/fe.01851667p.2022.319.80790

OECD (2023). *Harmful Tax Practices – 2022 Peer Review Reports on the Exchange of Information on Tax Rulings: Inclusive Framework on BEPS: Action 5*. OECD Publishing. https://doi.org/10.1787/22bbeacc-en

Samuelson, P. (1993). Altruism as a problem involving group versus individual selection in economics and biology. *The American Economic Review*, 83(2), 143-148.

Sánchez, G.E. (2022). Non-compliance notifications and taxpayer strategic behaviour: Evidence from Ecuador. *International Tax Public Finance,* 29, 627-666. https://doi.org/10.1007/s10797-021-09677-y

Sen, A. (1995). Moral codes and economic success. In: S. Brittan and A. Hamlin (eds.), *Market Capitalism and Moral Values* (pp. 29-34). Edward Elgar.

Slemrod, J. (2019). Tax compliance and enforcement. *Journal of Economic Literature*, 57(4), 904-954. https://doi.org/10.1257/jel.20181437

Slemrod, J., Collins, B., Hoopes, J., Reck, D., and Sebastiani, M. (2017). Does credit-card information reporting improve small-business tax compliance? *Journal of Public Economics*, 149, 1-19. https://doi.org/10.1016/j.jpubeco.2017.02.010

Smith, A. (2010). *The Theory of Moral Sentiments*. (1759) Edition reprinted. Penguin. The CORE Team (2017). *The Economy*.

Weaver, R. (2015). Getting people to behave: Research lessons for policy makers. *Public Administration Review*, 75(6), 806-816. https://doi.org/10.1111/puar.12412

Yang, D. (2008). Can enforcement backfire? Crime displacement in the context of customs reform in the Philippines. *The Review of Economics and Statistics*, 90(1), 1-14. https://doi.org/10.1162/rest.90.1.1