

# Tax Lotteries: the Crowding-out of Tax Morale and Long-run Welfare Effects<sup>1</sup>

## Abstract

This paper examines tax lottery policies as a method to reward consumers to request business receipts for goods and services they have paid for. We argue that the evaluation of the welfare effects of tax lotteries based solely on short-run tax revenue variations so far proposed overlooks important long-term sources of inefficiency. Our claim is that tax lotteries, by crowding-out the willingness to engage in voluntary third-party tax enforcement of highly educated individuals with leading roles in shaping societal norms, may negatively affect the generational transmission of the “tax morale”, thus possibly determining long-term welfare losses. We seek empirical support for our argument by taking advantage of a recent tax lottery introduction in Portugal and by administering a survey to a sample of the Portuguese population. Findings confirm that tax morale is a key determinant of voluntary third-party tax enforcement and that there is a positive association between respondents’ level of education and crowding-out of intrinsic motivation to engage in voluntary third-party tax enforcement.

## 1) INTRODUCTION

For tax authorities, efficiently monitoring and sanctioning VAT evasion is a challenging task. The 2015 VAT Gap report estimated that in 2013, EUR 168 billion in VAT revenues were lost in the European Union due to non-compliance or non-collection. The so called VAT Gap, the difference between the expected VAT revenue and the VAT actually collected, equated to 15.2%

---

<sup>1</sup> **Acknowledgments:** The authors wish to thank Luis Pacheco for his help in conceiving the questionnaire and collecting the data.

of total expected VAT revenue of the 26 Member States at that time. The VAT GAP varied between 4% in the Netherlands, Sweden and Finland, and 41% in Romania.<sup>2</sup>

A common strategy for business owners engaging in VAT evasion is not to issue the invoice registering a business transaction and to pocket the equivalent amount of VAT. To combat this type of tax evasion, in recent years tax authorities of several governments around the world have devised a new behavioral approach to engage customers in fighting indirect tax evasion. This system incentivizes people to request invoices for goods and services they have paid for by linking the possession of the business receipt to the participation in a lottery. While isolating the causal effects of tax lotteries on VAT revenue is a challenging empirical task, evaluations based on the first few years after the policy introduction that attempted answering this question suggest a significant positive increase in net tax revenue (Naritomi, 2013; Wan, 2010).

In this paper we argue that a proper assessment of the welfare effects of tax lottery policies that is based solely on short-term variation of VAT revenue may potentially overestimate tax lotteries welfare effects by overlooking important long-term inefficiencies. Our analysis moves from the current undisputed evidence that, once implemented, material incentives crowd out non-financial motives such as moral values and civic virtues, while simultaneously determine unpredicted effects on behavior (Bowles, 2008). This has been referred to as the “crowding-out effect” (Frey and Jegen, 2001).<sup>3</sup> In the case of consumers’ voluntary enforcement of VAT payment, implementing a tax lottery policy may be counterproductive due to the crowding-out of the intrinsic motivation to engage in voluntary third-party tax enforcement. Given the diminished frequency of a voluntary third-party tax enforcement determined by crowding-out, a key question to assess the effectiveness of tax lotteries is if VAT losses caused by the crowding-out effect are larger than the increase in tax revenue generated by the tax lottery (taking into account the expense of the lottery prize). However, an evaluation considering only the short-term effects

---

<sup>2</sup> CASE- Center for Social and Economic Research, Study to quantify and analyse the VAT Gap in the EU Member States, 2015 Report. TAXUD/2013/DE/321, [http://ec.europa.eu/taxation\\_customs/resources/documents/common/publications/studies/vat\\_gap2013.pdf](http://ec.europa.eu/taxation_customs/resources/documents/common/publications/studies/vat_gap2013.pdf) (accessed 16 September 2015).

<sup>3</sup> There are other reasons besides the crowding-out effect to explain why economic incentives might not work. First, strong monetary incentives could “overmotivate” an agent, leading to a more-than-optimal arousal during the performance (Ariely et al., 2009). Second, incentives could alter individuals’ beliefs about the behavior chosen by others (Galbiati and Vertova, 2008). In this paper, we do not focus on these two possible alternative reasons for incentives failure.

of tax lotteries would not take into account possible long-term indirect effects of crowding-out. Indeed, while the introduction of the tax lottery may determine a temporary raise of net tax revenue, the crowding-out effect may increase over time by spilling over to future generations. Moreover, it may impact on the intergenerational transmission of norms regarding tax morale, defined here as the intrinsic motivation to comply with tax duties or the moral imperative to be honest regarding taxes (Feld and Frey, 2002; Lewis, 1982). The above phenomenon is especially likely to happen if the crowding-out effect is concentrated on groups of people who play a pivotal role in shaping future generations' social norms and values, such as highly educated members of the population. Hence, irrespective of short-term positive impact evaluations, the choice to implement tax lotteries may still create long-term inefficiencies and even a permanent welfare loss.

We complement our argument by providing preliminary empirical evidence on the effects of a tax lottery policy recently introduced in Portugal. Findings of the survey we administered suggest that the tax lottery has mixed effects on people's propensity to engage in third-party tax enforcement. Indeed, while many respondents state that the material incentive offered by the tax lottery is effective in inducing them to enforce the emission of invoices, simultaneously it crowds-out the willingness to engage in voluntary third-party tax enforcement in a sizeable fraction of the population. Moreover, these crowding-out effects are concentrated on highly educated people, who are more likely to have leading roles in transferring tax morale to future generations. Hence, while evidence shows that the Portuguese tax lottery boosted tax revenues in the months immediately after the policy implementation and the government labelled it as a "success", we caution policymakers that this short-run evaluation might result incomplete and it does not necessarily coincide with the long-run welfare effects of the tax lottery policy.

Tax lotteries have been used in some countries, but they have received limited research attention. In particular, no contribution discusses the possibility of crowding-out effects arising in the long as well as in the short time horizon. Therefore, the purpose of this study is to fill this gap. The article proceeds as follows. It begins with a literature review of the rationale behind the use of tax lotteries and a brief overview of work on tax evasion. The main focus is on recent articles that analyze tax lottery policies as an instrument to enhance tax compliance. The following section elaborates the claim that the crowding-out effect caused by tax lotteries, if concentrated on people with higher level of education, may generate a long-term reduction in VAT collection

by hampering the intergenerational transmission of tax morale. Section 4 describes the institutional details of the Portuguese tax lottery and the results of our survey are discussed in section 5. In the last section, a conclusion is drawn and possible avenues for future research are suggested.

## 2) LOTTERIES AGAINSTS TAX EVASION

Neoclassical economic models consider agents' decision to engage in tax evasion as the result of cost and benefit calculations (Allingham and Sandmo, 1972; Becker, 1968; Yitzhaki, 1974). However, there is compelling evidence that shows that, if this were the case, to achieve compliance would be prohibitively expensive (Blumenthal and Slemrod, 1992). Tax evasion remains a widespread problem (Feige, 2007), and the high costs and the low effectiveness of tax enforcement methods based exclusively on a deterrence approach explain the growing interest of scholars and policymakers for policies based on reward that complement traditional enforcement tools (Feld and Frey, 2007).

A key proposition advanced by prominent scholars is that the presence of third-party private tax enforcers supplementing the centralized tax enforcement system constitutes a key ingredient in preventing tax evasion (Kleven et al., 2006). However, in the context of VAT evasion, customers have no material incentives to enforce the emission of invoices. The VAT involved in the transaction will be redistributed to the entire state population, but the individual customer benefits only from a negligible fraction of the tax paid by the business owner. On the other hand, the customer bears material costs in requesting for a receipt. First, she/he forgoes the possibility to engage in a collusive agreement with the business owner and to receive a possible price discount equal to a fraction of the VAT evaded. Second, if the social norm is positive towards tax evasion, the customer acting as a third-party tax enforcer faces moral and ethical costs in enforcing invoices emission (McGee, 2011). Therefore, customers enforcing VAT payment bear an individual cost and produce a positive externality that they do not internalize. This situation is well captured by the incentives scheme characterizing a public good dilemma. As for a public good, voluntary contribution in the form of third-party tax enforcement would be optimal and would enhance the social good, but the dominant strategy for an individual payoff maximizer is to free-ride on contribution. Given this incentives scheme, customers will engage in a

suboptimal level of invoices emission enforcement (Fabbri and Hemels, 2013).

To encourage third-party enforcement of invoices emission, some European countries, like for instance Belgium and Italy, attempted to oblige customers to request a receipt by imposing sanctions. However, this solution was difficult to implement and ultimately ineffective.<sup>4</sup> Conversely, a tax lottery system is based on rewards instead of sanctions and thus is thought to induce customers to act as third-party tax enforcers. The rationale behind the tax lottery incentives scheme is based on the belief that consumers want to participate in a lottery to win a prize, and accordingly are willing to request business receipts, which is the only means to participate in the lottery. If the increase in VAT revenue generated by the lottery is larger than the prize awarded, net tax revenue increases. Although tax lottery policies have been common in some parts of the world since many decades,<sup>5</sup> they have been rare in Europe. So far, and only in recent years, Malta, Portugal and Slovakia are the only three EU countries that implemented a tax lottery to increase VAT compliance. Nonetheless, it should be noted that the interest of European governments for the use of lotteries in order to reinforce desirable behaviours has increased (Fookien et al., 2015). The interest of governments and policymakers in tax lotteries is due to the belief they are a cost-effective and easy to implement policy tool. In recent years, scholarly work on the topic has flourished. For example, Martin and Dolan (2010) propose an incentive in form of lottery participation for incentivizing timely submission of income tax declaration. Marchese (2009) in a theoretical contribution shows that the provision of in-kind incentives to consumers can reduce tax evasion. In the same vein, Fabbri (2015) advances a theoretical model based on the Prospect Theory that establishes boundary conditions for an implementation of a welfare-improving lottery.

Empirical results from laboratory experiments provide evidence that tax lottery can effectively reduce the level of tax evasion. Alm et.al (1992) investigated the use of tax lotteries in a laboratory setting, showing that lottery participation linked to compliance is more effective in

---

<sup>4</sup> A fundamental problem of sanctions against customers is that they are difficult to enforce. Moreover, public opinion perceived the measures as being unfair and protested vigorously against them (cit. needed). As a consequence, Belgium and Italy revoked the sanctions soon after they have been introduced. An alternative to sanctions used by some countries was to provide incentives to customers for requesting receipts. Some countries like Argentina and Bolivia tried to give customers a monetary refund equal to a percentage of the total VAT registered in each business receipt. However, this incentives scheme was difficult and costly to manage, and soon governments abandoned it (see Fabbri and Hemels, 2013 for deeper discussion of this points).

<sup>5</sup> The first tax lottery was introduced in Taiwan in 1951. For a historical overview about the use of tax lotteries, see Fabbri (2015).

lowering tax evasion than fixed rewards and audit reduction. Another study suggests a possible gender difference. In the experiment conducted by Brockmann et al. (2015), while female participants complied more when offered a conditional reward in the form of lottery tickets, male participants reacted to the incentives by increasing tax evasion.

Moreover, contributions based on field data confirm that implementing tax lotteries may reduce VAT evasion. For instance, Wan (2010) explored the different time of implementation of the tax lottery policy in Chinese provinces in order to estimate its effect on tax revenue over five years. He found that for each dollar paid out as a prize the Chinese government raised additional thirty to forty US dollars of VAT revenue. In the same line, Naritomi (2015) estimated the effect of the tax lottery implementation in the State of Sao Paulo, Brazil. She explored a discontinuity in the way the level of the lottery prizes were assigned in order to draw causal inferences about the lottery effects in the first few years after the introduction. Results confirmed that the tax lottery lowered VAT evasion and that the increase in tax revenue more than compensated the cost of the lottery prizes, hence generating a net VAT revenue increase.

Given the above, theoretical predictions and empirical evidence seem to suggest that tax lotteries are a valuable tool against tax evasion. However, a point worth noting is that all these studies focus on a period of few years after the lottery introduction. As we will argue in the next section, the crowding-out of voluntary third-party tax enforcement due to the tax lottery policy may generate, in a long-run time framework, a permanent reduction of VAT revenue.

### 3. TAX MORALE, FINANCIAL INCENTIVES AND THE CROWDING-OUT EFFECT OF VOLUNTARY THIRD-PARTY TAX ENFORCEMENT

A wide strand of research in economics, economic psychology and other social sciences suggests that incentives<sup>6</sup> often fail to achieve the intended results, and in some cases can even backfire. As explained before, this phenomenon is known in the literature as “crowding out effect”. The crowding out of the intrinsic motivation has been thoroughly studied and empirical evidence abounds. For instance, studies show that subsidies for high school matriculation have only a small effect on girls and no effect on boys (Angrist and Lavy, 2009), and incentives based on

---

<sup>6</sup> The term “incentives” used here refers to any intervention aiming at influencing the behavior by modifying costs and benefits of a certain action, thus appealing exclusively to self-regarding preferences.

academic achievement proved to have limited effects on performance (Fryer 2010); fines imposed to reduce hospital stay in Norway had the effect to increase hospitalization (Holmas et al., 2010); monetary incentives to foster blood donations do not affect men's blood quantity collected and even lowered women's contribution (Mellstrom & Johannesson, 2008); a (small) monetary reward to volunteers fundraising for non-profit organizations lowers the amount of funds gathered (Gneezy and Rustichini, 2000).<sup>7</sup> The above findings are in line with the idea that to attach a financial value to something that is considered socially important degrades one's "moral standing" (Dubas et al., 2014). Or, as Morgan (2000, p.777) claims, "the linkage between private gain from lotteries and public goods provision may actually reduce a taste for altruism or 'warm glow' that individuals obtain through giving behaviour".

Given the above, to assess the effects of tax lottery policies it is important to verify if offering a reward for enforcing the emission of a receipt generates the crowding-out effect. Indeed, tax lottery crowding-out can reduce the number of third-party tax enforcers. Customers do not derive material benefit from enforcing VAT payments. Therefore, third-party enforcement is likely to be driven by non-material reasons, like the willingness to contribute to the community well-being (services are financed by taxes) or the ethical concerns for justice (tax evaders are unlawfully enriching themselves at the expenses of "good citizens", who pay their taxes).

Empirical evidence shows that lottery incentives can be detrimental for customers' willingness to engage in third-party tax enforcement and for business owners' reaction to the customers' enforcement action. In a laboratory experiment, Fuster and Meier (2012) show that incentives might have a detrimental effect on both peers' willingness to punish free riders. The authors run a public good game where participants (*i*) choose a level of contribution to the public good and (*ii*) could punish peers whose contribution was below the average. In a second treatment, subjects receive an additional monetary incentive in form of lottery tickets proportional to their contribution to the public good. Results show that, in the condition "with incentives", peers punish less harshly contributions below the average. Therefore, because of these two different responses, the introduction of the incentive did not increase the net level of public good collected. The reason put forward by the author is that punishers are "over motivated" by the incentive (i.e. by not contributing, the free rider had already decided to forgo the incentive) and

---

<sup>7</sup> A complete review of studies reporting empirical evidence of motivation crowding-out effect lies outside the scope of the present article. For detailed surveys on the topic see Bowles & Polania-Reyes, 2012.

that free riders had not felt the shame or guilt for not having contributed (i.e. they had already “paid the price” of not collecting the incentive).

The crowding-out effect discussed so far would be generated immediately by the lottery introduction. Therefore, even a short-term estimation of tax lotteries effects on VAT revenue is sufficient to establish whether this form of crowding-out determines a net tax revenue loss or if it is more than compensated by the lottery incentive to request invoices. However, another form of crowding-out effects cannot be captured by a short-term empirical analysis. Indeed, it is possible that the crowding-out effect spillover across generations. The process of transmission of social norms and values from one generation to the following one operates through the influence of both formal and informal institutions (Tabellini, 2010). In accomplishing this norms transmission process, that include perpetrating the willingness to engage in voluntary third-party tax enforcement, some members of the society such as educators and other individuals sharing a public profile play an especially important role. We call these individuals “public leaders”. Given this special role of public leaders, should their internal motivation be negatively affected for whatever reason, the consequences would be borne both directly (e.g. the immediate change in behavior of the public leader) and indirectly, in future years (e.g. the public leader will transmit to future generations a bundle of values and norms that has been depleted) by the society as a whole. In the context of third-party tax enforcement, if public leaders’ internal motivation is crowded-out by the introduction of tax lotteries, the welfare effects will involve both an immediate reduction in the share of voluntary third-party tax enforcers (the direct, short-term effect) and additionally a hampered transmission of the ethical commitment to engage in third-party tax enforcement for the future generation (the indirect, long-term effect). Moreover, this indirect effect of crowding-out, rather than be constant overtime, would likely continue to spread out across generations, since for each public leader that fails to transmit values and ethical norms crowded-out by the tax lottery introduction, many common citizens *and* future public leaders are negatively affected. This process, by multiplying overtime the fraction of the population not educated to societal norms and values, will determine a progressive reduction of voluntary tax enforcement. Eventually, after a certain time, the decline in net tax revenue may possibly generate a permanent welfare loss. Thus, in spite of the benefits of the initial periods immediately after the introduction of the tax lottery, in the long-run the policy effect might result in a permanent tax revenue loss.



Considering the key role of public leaders in shaping a country tax morale, it is important asking the question how crowding-out generated by tax lotteries affects their willingness to act as voluntary tax enforcers. Public leaders in a country are on average more educated than the average member of the population. Consistently, previous research also shows that education has a positive effect on tax morale and with propensity to act as third-party tax enforcers. (Lewis, 1982; Ross and McGee, 2012). In the next section we report some preliminary evidence that the crowding-out effect caused by the lottery is concentrated on highly educated individuals. Hence, it follows that public leaders are especially affected by the crowding-out effects triggered by the tax lottery introduction. This fact supports our concerns regarding the problem of transmitting social norms and values to future generations. Before presenting the results of our survey study, we shall provide an overview of the Portuguese tax lottery.

#### 4. THE PORTUGUESE TAX LOTTERY

In Portugal lost revenue to the shadow economy is estimated to be 26.81 per cent of national output. VAT revenues represent around 60 per cent of the total indirect taxes and 25 per cent of total tax revenues. It is estimated that more than 20% of VAT remains uncollected.<sup>8</sup> As it is common in many countries, business owners benefit from not issuing the invoices in all business transactions and by doing so they evade taxes. Traditional attempts to foster tax compliance based on deterrence models have been ineffective, and tax evasion has remained a widespread problem in the country. In an attempt to contrast the problem of indirect tax evasion, in 2014 the tax lottery program '*Fatura da sorte*' (literally 'lucky invoice') was launched to engage consumers in cracking down on tax evaders and the shadow economy.

The lottery aims to motivate consumers to request receipts for goods and services they have paid for. The bills can be for any amount and of any kind. The receipts are converted into lottery tickets according to the value of each transaction. From April 2014 onwards weekly lotteries have been held and up market cars offered as prizes. According to governmental sources, the cost of the cars is outweighed by the increase in tax revenues, and the number of sales

---

<sup>8</sup> For official OECD statistics, see <http://www.oecd.org/portugal/Portugal-Deepening-structural-reform-to-support-growth-and-competitiveness.pdf>

transactions communicated to the tax authorities leapt by 45.4 per cent in comparison to the previous year.<sup>9</sup>

## 5. THE SURVEY STUDY

An empirical study was conducted in order to investigate the motivation underlying intentions behind requesting sales receipts and the effect of the tax lottery on consumers' willingness to act as third-party tax enforcers. More specifically, the aim of the study was to address two key questions. First, to understand the reasons beyond respondents' decision to engage in third-party tax enforcement. Specially, whether, and to what extent, respondents considered that civic duties and ethical norms were important to voluntarily enforce the emission of invoices. Second, to verify whether the crowding-out effect of third-party tax enforcement was confined to a specific category of the population. Explicitly, to know if the crowding-out effect was related to the level of education of the respondents.

### 5.1. Methodology

A questionnaire was constructed for the purpose of this study:

- Information on demographics, including education level, and habits of participation in lottery games was collected.
- Respondents were asked how often they are used asked for a receipt (1 =*always*; 7 =*never*) and whether the lottery had motivated them to ask more for receipts (1=*much more*; 7= *much less*). Additionally, respondents were asked whether they watched the lottery draw on television (1=*always*; 5=*never*).
- Two items assessed how often the respondents bought any form of lottery tickets (1=*every week*; 5=*never*) and how much they were accustomed to spend.
- On the basis of results of Study 1 described above and following prior researches on tax compliance, nine items were developed to deal with the reasons for acting as a third-party tax enforcer. The items were rated on a seven-point scale anchored at each end with *total agreement* and *total disagreement*.

---

<sup>9</sup> See <http://www.oecd.org/ctp/consumption/presentation-session-5-filipe-abreu-portugal-second-global-forum-on-vat.pdf>.

- Tax fraud acceptability was measured by a single question: ‘Generally speaking, is cheating on tax never justified, always justified or something in between? (1 = *never justified*; 7 = *always justified*). This item has been widely used in other studies (Kirchler and Wahl, 2010).
- Six items targeted beliefs related to the reasons for tax compliance. These items were drawn from Kirchler and Wahl (2010) and used in a former study in Portugal (Wilks and Pacheco, 2014); were rated on a seven-point scale, anchored at each end by *total agreement* and *total disagreement*.<sup>10</sup>
- To explore the possibility that potential personal gains from VAT non-compliance might influence the likelihood of asking for a receipt, two hypothetical situations were included. In one of them, respondents were asked if they would request a receipt after paying €10 in a coffee shop or a restaurant, without specifying the possibility to receive personal gains in case one does not act as third-party tax enforcer. In the second situation, respondents were asked about the likelihood of requesting a receipt if a car mechanic offered a discount resulting from not charging VAT on a €500 value service. Both used a response scale in which 1=*always* and 7=*never*.

In order to minimise social desirability bias and response acquiescence, items were randomly ordered and some items repeated. A convenience sample was obtained through a snowball technique, whereby respondents were asked to pass the questionnaire to friends, colleagues and acquaintances. Data were collected in Portugal and the research was conducted in a manner that followed standard ethical guidelines. Completed data were obtained from 539 respondents. The mean age of the respondents was 45 (min.=18; max.=86). Forty six per cent were female. About 10 per cent of respondents were retired, 7.4 per cent were unemployed, 4 per cent were students, 79 per cent had full-time jobs, and 65.5 per cent worked either for private or public organizations. About 13 per cent were self-employed. As for education, about 14 per cent had received basic education, 17 per cent had received secondary education, 38 per cent had attended higher education, and 31 per cent had postgraduate qualifications.

## 5.2. Results

---

<sup>10</sup> For data analysis purposes, these results were reverse-coded.

About twenty-two per cent of the respondents participated in lottery games every week and spent on average seven euros per month. Thirteen per cent of them always asked for sales receipts. While 26.7 per cent never provided their fiscal number for sales receipt, 27.8 always did that. Findings indicate that the lottery changed habits in terms of making receipt requests ( $M=3.98$ ;  $SD=1.87$ ). Whereas 15.4 per cent asked for a receipt much less often, 14.5 per cent asked much more frequently. However, when asked if they requested a receipt in order to participate in the lottery, 53.2 per cent of them responded in the negative (*totally disagreed*) and 5.6 four per cent said they did so (*totally agreed*) ( $M=2.42$ ;  $SD=1.86$ ). The majority (55.5 per cent) did not watch the lottery draw on the television.

Requesting sales receipts was the dependent variable in the following three conditions:

- a) asking for an invoice in general, whenever they made a purchase
- b) asking for an invoice after paying a €10 bill
- c) asking for an invoice in a situation in which there were potential personal gains from VAT noncompliance (Euro 500 in form of price discount).

Variables related to the respondents' socio-demographics, degree of participation in lottery games, reasons for acting as a third-party tax enforcer, attitudes towards taxes, moral beliefs regarding taxes (tax morale/civic duty)/, tax evasion acceptability and reasons for tax compliance were treated as independent.

An exploratory Factor Analysis followed by Varimax rotation was conducted on the nine items regarding the reasons for requesting a receipt. Two factors were extracted explaining 56 per cent of the total variance. Considering the pattern of loadings, the first factor was labeled tax morale according to the content of the items, and explained 36.3 per cent of the variance; the second factor was identified as being related to an interest in participating in the tax lottery, and explained 19.7 per cent of the variance.

A Factor Analysis of the five items regarding the reasons for paying taxes yielded a two-factor solution explaining 65.2 per cent of the variance. The first factor explained 44.7 of the variance and was associated with a sense of public spirit in tax compliance. The Cronbach alpha was .73. The second factor was fear of tax audits and explained 20.5 per cent of the variance. Table 2 shows the means, standard deviations, Cronbach's alphas and intercorrelations among the variables. Composites were formed on the basis of the extracted components and used in subsequent analyses as predictors in multiple regressions with the other aforementioned

independent variables. All the predictors were entered simultaneously into the model. The model obtained explained 24.7 per cent of the variable “asking for a receipt in general” and was statistically significant,  $F(13, 539) = 13.25, p < .001$ .

*Table 1* Means, standard deviations, Cronbach’s alphas and intercorrelations among variables (N=539)

Variables	<i>M</i>	<i>SD</i>	$\alpha$	1	2	3
1. Moral beliefs regarding taxes	4.92	1.32	.73	-		
2. Tax morale	5.42	1.20	.80	.46**	-	
3. To participate in the lottery	2.86	1.54	.70	.03	.20**	-

\* $p < .05$  level; \*\* $p < .01$  (2-tailed).

*Question 1) Which are the key determinants of third-party tax enforcement?*

*Condition a) Results for requesting a receipt in general*

As shown in Table 3, there were significant effects for age and education. Consistent with previous studies (McGee et al., 2012), older respondents and those with more years of education asked for a receipt more frequently than younger respondents and those with fewer years of education. Compared to the proportion of full-time employees, the share of unemployed respondents who asked for a receipt was lower. There was no significant relationship between asking for a receipt and reasons for tax compliance and fear of audits. Tax morale was the largest contribution to the model.

*Condition b) Results for requesting a receipt for a 10 Euro bill*

The multiple linear regression with all the predictors and requesting a receipt after paying €10 as the dependent variable explained 25.7 per cent of the variance and was statistically significant,  $F(13, 539) = 13.95, p < .001$ . There were significant effects for education and the variable is positive associated with requesting the receipt. This result signals that, consistent with our reasoning in the previous section, more educated people tend to engage in a higher level of voluntary third-party tax enforcement. Respondents who were unemployed requested a receipt

less often than those who were retired and employed. The more respondents that feared tax audits, the higher was their tax morale. Respondent attracted by lottery participation were also more willing to request a receipt.

Table 2 Multiple regressions

<i>Predictors</i>	<i>Regression I</i>		<i>Regression II</i>		<i>Regression III</i>	
	<i>Beta</i>	<i>Sig.</i>	<i>Beta</i>	<i>Sig.</i>	<i>Beta</i>	<i>Sig.</i>
(Constant)		.000***		.000***		.001**
Sex	-.171	.250	-.069	.704	.123	.497
Age	.017	.021*	-.005	.552	.020	.030*
Working for an organization	.476	.048*	.842	.004**	.661	.025*
Self-employed	.543	.070	1.142	.002**	.966	.008**
Retired	-.370	.357	.831	.089	.447	.364
Education	.401	.000***	.302	.001**	.112	.227
How often do you participate in lottery games?	.033	.501	.013	.821	.021	.725
How much do you spend?	.005	.360	.010	.132	.009	.198
Tax evasion acceptability	-.131	.013*	-.008	.905	-.197	.002**
Moral beliefs regarding taxes	-.049	.530	.211	.028*	.350	.000***
Fear of audits	-.042	.289	-.179	.000***	-.036	.458
Tax morale	.562	.000***	.684	.000***	.476	.000***
To participate in the lottery	.361	.000***	.648	.000***	-.043	.633
R <sup>2</sup>	.247		.257		.191	
F	13.25***		13.95***		9.56***	

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

*Condition c) Result for requesting a receipt when there is a possibility of personal gains*

The multiple linear regression with all the independent variables as predictors and the hypothetical situation in which there were personal gains from VAT non-compliance explained 19.1 per cent of this variable and was statistically significant,  $F(13, 539) = 9.56, p < .001$ . Age differences were statistically significant, indicating that older people are more willing to request a receipt in this condition. Respondents who were unemployed requested a receipt less often than those who were either retired or employed. The respondents who found tax evasion less justifiable and had higher levels of tax morale were more likely to ask for a receipt. As can be seen in Table 3, tax morale provides the largest contribution for the model.

*Question 2) Is the crowding-out effect influenced by education?*

To answer this question, we explored whether the introduction of the tax lottery crowds out the willingness to engage in voluntary third-party tax enforcement from public leaders more than from participants with lower education levels. Respondents stating that they never or almost never requested invoices were excluded from the analysis, and the remaining respondents were divided into two categories according to their level of education (“high” and “low” educated), including in the first category the respondents with a degree or post-graduate education. We consider as a measure of crowding-out a self-reported statement that, because of the lottery introduction, the respondent asked “less” or “much less” often for an invoice than they used to before the lottery.

Findings indicate that the percentage of respondents that show a crowding-out effect in the group of high-educated people is almost the double than that in the low-educated ones (15% vs. 8% respectively). We then considered the crowding-in effect of the lottery, that is, the ability of the material incentive offered by the lottery to induce consumers who never requested the invoices to act as a third-party tax enforcers. Contrary to the case of crowding-out, respondents were induced by the tax lottery to request invoices emission evenly across different levels of education (31% for both the high- and low-educated respondents). This preliminary evidence suggests that a sizeable fraction of customers that would not request for invoices could be induced by the tax lottery to engage in third-party tax enforcement. However, the tax lottery generates also crowding-out effect and some respondents who were willing to act as voluntary third-party tax enforcers reported that, because of the lottery introduction, they would refuse to continue doing

so. Most important, the finding that the crowding-out effect is positively associated with the education level of the population members supports our concerns regarding the possibility that crowding-out effects might spill over across generations. Should that be the case, an evaluation of tax lotteries effects on welfare would not be fully captured by empirical analysis focusing solely on the few years after the policy has been implemented.

## 6. CONCLUSION

This paper discuss the welfare effects of tax lotteries against VAT evasion. We argue that evaluations of tax lotteries based exclusively on a short time span following the policy introduction may result in an overestimation of the policy benefits. Indeed, such an evaluation fails to take into account possible long-term reduction of VAT collection due to the crowding-out of people's willingness to act as third-party tax enforcement. Our claim is that crowding-out indirect effects triggered by the lottery introduction, if concentrated on highly educated "public leaders" that are responsible to the transmission of social norms and values, will spill over to future generation at an increasing rate. The consequent progressive erosion of people's tax morale might determine, after some time, a permanent decline in net tax revenue. We produce preliminary evidence this concern is well grounded. Taking advantage of a recent tax lottery introduction in Portugal, we administered a survey to a stratified sample of the Portuguese population to verify the effects of the lottery introduction on tax morale and tax enforcement propensity. Results confirm that tax lotteries trigger both an increase in the number of people requesting invoices among those individuals not used to do so and at the same time crowd-out the willingness to engage in third-party tax enforcement among those individuals that were accustomed to voluntarily engage in this activity. Our data support the prior that tax morale is indeed an important determinants of third-party tax enforcement and that the crowding-out effects caused by the tax lottery are concentrated on highly educated members of the population. Considering that public leaders in charge of transferring norms of tax morale to future generations are in general characterized by high level of education, these results trigger concerns about the possibility of long-term negative welfare effects connected to crowding-out.

Whether the long-run increase in tax revenue triggered by the introduction of tax lotteries is larger than the sum of direct and indirect crowding-out effects is ultimately an empirical question



that lies outside the scope of the present paper. Our goal is instead to caution policymakers that evaluating the success of tax lottery policies considering solely short-term variation in tax revenue may be inappropriate, since a short-term estimated increase in net VAT revenue collected can be consistent with a long-term welfare loss. Further researches on the welfare effects of tax lotteries are needed in order to produce a comprehensive estimation of their welfare effects.

## REFERENCES

- Allingham, Michael G., and Agnar Sandmo. "Income tax evasion: a theoretical analysis." *Journal of Public Economics* 1.3-4 (1972): 323-338.
- Alm, James, Gary H. McClelland, and William D. Schulze. "Why do people pay taxes?." *Journal of public Economics* 48.1 (1992): 21-38.
- Angrist, Joshua, and Victor Lavy. "The effects of high stakes high school achievement awards: Evidence from a randomized trial." *The American Economic Review* (2009): 1384-1414.
- Ariely, Dan, Anat Bracha, and Stephan Meier. "Doing good or doing well? Image motivation and monetary incentives in behaving prosocially." *The American economic review* 99.1 (2009): 544-555.
- Becker, Gary S. "Crime and Punishment: An Economic Approach, 76 *J. Pol. Econ.* 169 (1968)." *J. Pol. Econ* (1968).
- Blumenthal, Marsha, and Joel Slemrod. "The compliance cost of the US individual income tax system: A second look after tax reform." *National Tax Journal* 45.2 (1992): 185-202.
- Bowles, Samuel. "Policies designed for self-interested citizens may undermine" the moral sentiments": Evidence from economic experiments." *science* 320.5883 (2008): 1605-1609.
- Bowles, Samuel, and Sandra Polania-Reyes. "Economic incentives and social preferences: substitutes or complements?." *Journal of Economic Literature* (2012): 368-425.
- Brockmann, Hilke, Philipp Genschel, and Laura Seelkopf. "Happy taxation: increasing tax compliance through positive rewards?." *Journal of Public Policy*: 1-26.
- Dubas, Khalid M., Saeed M. Dubas, and Rajiv Mehta. "Theories of Justice and Moral Behavior." *Journal of Legal, Ethical and Regulatory Issues* 17.2 (2014): 17.
- Fabbri, Marco, and Sigrid Hemels. "'Do You Want a Receipt?' Combating VAT and RST Evasion with Lottery Tickets." *Intertax* 41.8 (2013): 430-443.
- Feige, Edgar L. *The underground economies: Tax evasion and information distortion*. Cambridge University Press, 2007.
- Feld, Lars P., and Bruno S. Frey. "Tax compliance as the result of a psychological tax contract: The role of incentives and responsive regulation." *Law & Policy* 29.1 (2007): 102-120.
- Fookien, Jonas, Hemmelgarn, Thomas and Herrmann, Benedikt, (2015), Improving VAT compliance – random awards for tax compliance, No 51, Taxation Papers, Directorate General Taxation and Customs Union, European Commission, <http://EconPapers.repec.org/RePEc:tax:taxpap:0051>.
- Frey, Bruno S., and Lars P. Feld. "Deterrence and morale in taxation: An empirical analysis.", *CESifo Working Paper Series No. 760*, (2002).
- Frey, Bruno S., and Reto Jegen. "Motivation crowding theory." *Journal of economic surveys* 15.5 (2001): 589-611.

- Fryer Jr, Roland G. *Financial incentives and student achievement: Evidence from randomized trials*. No. w15898. National Bureau of Economic Research, 2010.
- Fuster, Andreas, and Stephan Meier. "Another hidden cost of incentives: The detrimental effect on norm enforcement." *Management Science* 56.1 (2010): 57-70.
- Galbiati, Roberto, and Pietro Vertova. "Obligations and cooperative behaviour in public good games." *Games and Economic Behavior* 64.1 (2008): 146-170.
- Gneezy, Uri, and Aldo Rustichini. "Pay enough or don't pay at all." *Quarterly journal of economics* (2000): 791-810.
- Holmås, T. H., Kjerstad, E., Lurås, H., & Straume, O. R. (2010). Does monetary punishment crowd out pro-social motivation? A natural experiment on hospital length of stay. *Journal of Economic Behavior & Organization*, 75(2), 261-267.
- Kirchler, Erich, et al. "Why pay taxes? A review of tax compliance decisions." *Developing alternative frameworks for explaining tax compliance*(2010): 15-31.
- Kleven, Henrik Jacobsen, Claus Thustrup Kreiner, and Emmanuel Saez. *Why can modern governments tax so much? An agency model of firms as fiscal intermediaries*. No. w15218. National Bureau of Economic Research, 2009.
- Lewis, Alan. *The psychology of taxation*. Blackwell, 1982.
- Marchese, Carla. "Rewarding the consumer for curbing the evasion of commodity taxes?." *FinanzArchiv: Public Finance Analysis* 65.4 (2009): 383-402.
- Martin, S. and Dolan, P. (2010) *Dear Taxpayer, Congratulations! You've Won Your Money Back*, 2010, Harvard Business Review, available at <https://hbr.org/2010/12/dear-mr-taxpayer-congratulation>
- McGee, Robert W., ed. *The ethics of tax evasion: Perspectives in theory and practice*. Springer Science & Business Media, 2011.
- McGee, R. W., Nickerson, I., Pleshko, L., & Broihahn, M. (2012). The ethics of tax evasion: An investigation into demographic differences. *Journal of Legal, Ethical and Regulatory Issues*, 15(1), 105.
- Mellström, Carl, and Magnus Johannesson. "Crowding out in blood donation: was Titmuss right?." *Journal of the European Economic Association* 6.4 (2008): 845-863.
- Morgan, John. "Financing public goods by means of lotteries." *The Review of Economic Studies* 67.4 (2000): 761-784.
- Naritomi, Joana. "Consumers as tax auditors." *Unpub. paper, Harvard University* (2013).
- Ross, Adriana M., and Robert W. McGee. "Education Level and Ethical Attitude toward Tax Evasion: A Six-Country Study." *Journal of Legal, Ethical and Regulatory Issues* 15.2 (2012): 93.
- Tabellini, Guido. "Culture and institutions: economic development in the regions of Europe." *Journal of the European Economic Association* 8.4 (2010): 677-716.
- Yitzhaki, Shlomo. "Income tax evasion: A theoretical analysis." *Journal of public economics* 3.2 (1974): 201-202.
- Wan, Junmin. "The incentive to declare taxes and tax revenue: the lottery receipt experiment in China." *Review of Development Economics* 14.3 (2010): 611-624.
- Wilks, Daniela and Luis Pacheco, "Tax Compliance, Corruption and Deterrence: an Application of the Slippery Slope Model", *Interdisciplinary Insights on Fraud* (2014): 87

