TITLE: Exercising social control in PAYT (Pay-As-You-Throw) violations: the role of subjective evaluations and social capital

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ABSTRACT

In this paper we examine the relative importance of an individual's subjective evaluations and social capital on his/her decision to exercise social control (i.e. confront the offender) on the hypothetical instance of witnessing a PAYT (Pay-As-You-Throw) scheme violation. Our data (N=299) originates from an online questionnaire filled in by residents of Greece in early summer 2016. Through logistic regression modeling, we find that the subjective evaluation of the offence and social capital components have independent and complementary effects on the decision to exercise social control, over and above the demographic characteristics of the respondent.

1. INTRODUCTION

The European Community's Thematic Strategy on the Prevention and Recycling of Waste aspires to "move the EU decisively onto the path of becoming an economically and environmentally efficient recycling society" (Commission of the European Communities, 2005, p. 6) while, according to the European Commission (2011), by 2020 waste should be treated as a resource. In order to reach these goals, EU member-states had been encouraged to adopt a series of measures and economic instruments (EIs) that promote waste prevention and enhance re-use, recycling and waste recovery (Commission of the European Communities, 2005). Numerous EIs, with different impacts on waste management outcomes, are currently being implemented by member states, including landfill and incineration taxes and fees as well as "Pay-as-you-throw" and "Producer responsibility" schemes (European Commission, 2012)."Pay-as-you-throw" (PAYT) waste management schemes are implemented in various forms and combinations (Dahlén and Lagerkvist, 2010; Skumatz, 2008) and, in their various formats, have been gaining pace across the EU. By 2012, 17 EU member-states had introduced some version of unit-pricing programs into the management of their municipal waste (European Commission, 2012), while a recent paper (Seyring et al., 2016) reports that 10 out of the 28 EU countries' capitals implement PAYT schemes. PAYT's increased popularity is related to its perceived ability to address a number of waste management policy challenges and objectives. According to an extensive review of the existing literature, PAYT schemes reported strengths include 'fair allocation of costs to the users', 'reducing waste in bins and bags (15–90%reduction reported)', 'ensuring transparency of waste management costs', 'increasing sorting of recyclables', 'encouraging home composting' as well as the fact that they 'are generally well accepted by the householders' (European

Commission, 2003 cited in Dahlén and Lagerkvist, 2010, p. 24). Yet PAYT is not without its drawbacks and/or challenges, including 'increased costs (both investment and operational ones)','increased amounts of contaminants in recyclables', 'encouraging waste tourism (i.e. waste moved to neighboring communities)' as well as 'encouraging illegal waste dumping' (ibid.).

While the exact magnitude of the illegal dumping's increase following the adoption of a PAYT scheme is still debated in the literature, its occurrence is a fact which necessitates the waste management authorities' attention. Besides 'formal 'measures (i.e. more inspections, closer monitoring, higher fines), (local) authorities may attempt to dissuade people to free-ride (by illegally dumping their waste) on a PAYT scheme through ordinary citizens' involvement.

Accordingly, in this paper we are interested in examining who is likely to exercise 'social control' (i.e. confront the offender) while witnessing an individual inappropriately using ("free-riding" on) a PAYT scheme. In particular, we are going to examine and compare the explanatory potential of two different theorizations suggested in the relevant literature: one stressing the relevance of the individual's subjective appraisal of the 'inappropriate' behavior; the other highlighting the importance of the individual's social characteristics, and in particular of his/her social capital. To the best of our knowledge, no existing research has tried to compare these two explanatory approaches when it comes to exercising social control in the case of illegal dumping- or, for that matter, in the case of any other anti-social/illegal behavior.

2. LITERATURE REVIEW

2.1. PAYT and illegal dumping

The question on whether, and to what extent, adopting a PAYT system for waste management actually increases illegal dumping in an area is not settled in the existing literature. Economic modelling had shown that the introduction of a PAYT charge operates not only as a stimulus for waste reduction (through reuse, recycling, composting etc.) but also as an incentive for illegal dumping (Choe and Fraser, 1999; Fullerton and Kinnaman, 1995). Yet the available empirical evidence is mixed. Based on *secondary* material (such as official statistics, interviews with officials and/or self-reports), a number of studies concluded that the introduction of variable-rate waste-pricing was not followed by a (not always statistically) significant increase of illegal waste disposal (e.g. Kuo and Perrings, 2010; Miranda et al, 1994; Reschovsky and Stone, 1994). Yet, Hong (1999), for Korea, and Heller and Vatn (2017), for a Norwegian municipality, provide reports of substantial increases in illegal dumping – which, in the Norwegian case, was the main reason for the local authorities' decision to terminate the PAYT system only two years after its introduction (Heller and Vatn, 2017).

On the contrary, research based on *primary* data indicates that the introduction of variable waste tariffs leads to substantial increases in illegal dumping. In an early study concerning the impacts of introducing a PAYT scheme in Charlottesville, Virginia, USA, Fullerton and Kinnaman (1996) concluded that 24 to 43% of the observed household-waste reduction could had been due to illegal dumping (pp. 978-980). Later research corroborated this alarming finding. Thus Kim et al. (2008) found that 'a 1% increase in the unit price of a trash bag led to a 3% increase in the number of reports of illegal dumping' in Korea over the period 2001-2003 (p.167),

while, for the case of Italy, D'Amato et al. (2018) conclude that 'the hypothesis that stricter environmental policy tends to favor the emergence of illegal disposal cannot be rejected'. Similarly, Allers and Hoeben (2010), in their study of 'unit-based garbage pricing' (UBP) across Dutch municipalities over a ten-year period, found 'that only about 18% of the reduction in unsorted waste quantities is due to better recycling'(p.424). While the authors acknowledge that part of the remainder 'missing waste 'percentage may be attributed to illegal dumping, they nevertheless note that 'if this was a serious problem, one would expect many municipalities to abolish user fees. This has not happened. Thus, there is no evidence of municipalities becoming disappointed about the effects of UBP programs' (ibid.).

2.2. Illegal dumping and citizens' social control

Although its actual magnitude cannot be precisely determined, the rise of illegal dumping following the introduction of a PAYT scheme is an adverse reality which local authorities will have to address. In the face of budget constraints and personnel limitations, authorities have an incentive to promote individual citizens' action in confronting/reporting trespassers. Available research has shown that public environmental monitoring may enhance regulatory efficiency, under certain conditions (cf. Goeschl and Jürgens, 2012). Particularly to waste dumping, Matsumoto and Takeuchi (2011) found that local residents' 'community support' (i.e. the existence of a system through which citizens assist the authorities' monitoring and patrol programs) (p.187) is related to fewer (and to a lesser growth of) illegal dumping incidents of electric appliances.

When citizens witness uncivil/unlawful behaviors by others their reactions could vary over a spectrum, ranging from doing nothing -at the one end- to reporting

the perpetrator to the relevant authorities -to the other end-, with any other of the intermediate reactions being a form of 'social control'. By the term 'social control' is meant 'any behavior whereby an individual communicates his or hers disapproval to someone who holds a counternormative attitude or engages in counternormative behavior' (Brauer and Chekroun, 2005a, p. 1519). This willingness to engage in social-norm enforcement (also referred to by some as 'altruistic punishment') is rather surprising since it 'is individually costly, e.g. because it requires time and effort to enact, and the punisher bears the risk of retaliation when confronting a non-cooperator' (Balafoutas et al., 2014, p. 15924). Nevertheless, it is quite common in a variety of social norms' violations, including littering. Thus, Brauer and Chekroun (2005a) found that 68% of respondents *would* exercise some kind of 'social control' (e.g giving an angry look to personally insulting n someone littering in a French park (p.1530)), while 40% actually *did* so in a parallel, natural (i.e. real-life) experimental design (p.1529). Similar substantial percentages of social control (averaging around 32% yet ranging substantially across cities) are reported by Berger and Hevenstone (2016) for the case of littering just outside a public trash-bin in natural experiments conducted in Bern and Zurich, Switzerland, and New York, USA (pp.307-308) -in stark contrast to Athens, Greece, where littering in the corridors leading to the platforms one of the city's train subway station was sanctioned by bystanders in only 4% of the cases (Balafoutas and Nikiforakis, 2012, p. 1775).

2.3. The determinants of social control

Why are some individuals 'willing to punish defectors [of social norms] at a cost to themselves, even though it would be advantageous [to themselves] to simply ignore them' (Guala, 2012, p. 1)? Available research on the predictors of social control has developed along two distinct pathways. Thus, on the one hand, it has been argued that social control follows from an individual's subjective appraisal of the behavior -the latter being contingent to a number of factors: the offender's physical characteristics-such as his/hers gender or posture (Balafoutas and Nikiforakis, 2012; Balafoutas et al.,2014; Przepiorka and Berger, 2016); the number of other bystanders witnessing the transgression (Chekroun, 2008; Przepiorka and Berger, 2016); the particularities of the area where the offence occurred (Berger and Hevenstone, 2016); the feelings the particular anti-social behavior elicits in the observer and whether the offender is considered as "one of us" or s/he is closely related to the observer ((Berger and Hevenstone, 2016; Chekroun, 2008; Moisuc and Brauer, 2019; Nugier et al., 2009); the level of ambiguity surrounding the behavior and the extent to which the observer feels it is legitimate to exercise 'social control' over the particular behavior (Chaurand and Brauer, 2008a). Amidst the plethora of these explanatory variables, two have constituted the baseline for this particular analytical tradition, and they have been shown to be positively correlated with social control: 'the degree of personal implication' (i.e.to which extent the individual feels that the observed behavior has implications to himself/herself) and the 'degree of deviance' of the behavior/action (i.e. the extent to which it runs counter to societal "norms" of acceptable/desirable behavior in a social unit) (Brauer and Chekroun, 2005a; Chaurand and Brauer, 2008a), although the latter was not found to be statistically significant in a natural (i.e.

real-life) experiment's setting (e.g. Balafoutas and Nikiforakis, 2012; Brauer and Chekroun, 2005b).

The alternative perspective focuses instead on the individual's social characteristics and in particular to his/her social capital. 'Social capital' (SC) is a composite concept, comprised of the social norms one adheres to, the social trust one has to other members of the society and the social networks one partakes in (Coleman,1988), and has been widely employed as an explanatory factor in many areas of environmental policies and behaviors (Dietz et al., 2007; Jones and Clark, 2014; Pretty,2003) including waste management (Jones et al., 2011; Pargal et al., 2002; Tsai, 2008).In the words of Coleman (1988, p. S98) 'Social capital is defined by its function. It is not a single entity but a variety of different entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors-whether persons or corporate actors-within the structure. [..It..] is productive, making possible the achievement of certain ends that in its absence would not be possible'. Ostrom (1998) has highlighted that communities with higher levels of social capital –dense horizontal networks and higher levels of trust- tend to act in a collective way facilitating the management of natural resources (Pretty, 2003). Through the number and type of networks (pro-environmental or not) that an individual is involved, the level of trust towards other citizens and institutions and the type of social norms according to which an individual acts, social capital can influence the level of public acceptability for waste management policies and the existence (or not) of social control (Jones et al., 2011).

As it follows from a long-standing and substantial body of research on the predictors of crime-levels at the neighborhood level (Bursik, 1988; Bursik, 1999;Sampson and Groves, 1989; Rose and Clear, 1998), social capital (especially its

188 'social networks' and 'social trust' components) play an important role in actual crime
189 prevention and control because it is positively correlated to 'informal social control',
190 i.e. 'the informal mechanisms by which residents themselves achieve public order
191 […such as…] monitoring of spontaneous play groups among children, a willingness
192 to intervene to prevent acts such as truancy and street-corner "hanging" by teenage
193 peer groups, and the confrontation of persons who are exploiting or disturbing public
194 space'(Sampson et al., 1997, p. 918). In the words of Sampson et al. (1997), 'At the
195 neighborhood level [..] the willingness of local residents to intervene for the common
196 good depends in large part on conditions of mutual trust and solidarity among
197 neighbors. Indeed, one is unlikely to intervene in a neighborhood context in which the
198 rules are unclear and people mistrust or fear one another' (p. 919)- and this positive
199 correlation between SC and informal social control has been empirically validated in a
200 number of studies (Sampson et al., 1999; Sampson et al., 1997).

201 Accordingly, in this paper we are interested in testing and addressing the
202 following research hypotheses and questions respectively:

203 **Hypothesis 1a (H1a)**: The degree of personal implication (i.e. to which extent the
204 individual feels that an observed behavior has implications to himself/herself) will
205 impact positively on the willingness to exercise social control when witnessing illegal
206 waste dumping.

207 **H1b:** The 'degree of deviance of the counter-normative behavior' (i.e. the extent to
208 which the observed behavior runs counter to societal "norms" of acceptable/desirable
209 behavior in a social unit) will impact positively on the willingness to exercise social
210 control when witnessing waste dumping

211 **H2:** An individual's social capital will impact positively on the willingness to
212 exercise social control when witnessing waste dumping.

213

214 **Research Question 1 (RQ1)**: Do an individual's subjective evaluation of waste
215 dumping and his/her social capital have independent effects on his/her willingness to
216 exercise social control?

217 **RQ2:** Do the various social capital components have a similar impact on one's
218 willingness to exercise social control in cases of waste dumping?

219

220 ## 3. DATA & METHODS

221 ### 3.1. Context and Sampling

222 In early summer 2016 we conducted research concerning the Greek public's
223 views on PAYT schemes. The research was based on an online questionnaire asking
224 participants to express, under conditions of anonymity, their views about
225 the introduction of a PAYT scheme in their area of living. On the first page of
226 the questionnaire, the readers were given information regarding the current situation
227 of waste management and charges in Greece and were asked to suppose that a PAY
228 scheme would be implemented in their area of living by their municipality. It was
229 mentioned that the new system relied on the "Polluter Pays Principle", and thus waste
230 charges would be proportionate to the amount of waste produced. Furthermore, the
231 participants were informed that the unit-pricing program would be applied
232 simultaneously to residue waste and recyclables (the latter already collected through
233 the 'Blue Bin' system, where individuals may drop their recyclable waste of glass,
234 paper, plastic, aluminum and tinplate without the need to separate them and without
235 being offered any explicit and immediate reward). Users of the PAYT scheme would
236 be charged 0,05€/kg of residue/recyclable waste (i.e. an amount reflecting the
237 prescribed municipal waste management costs per kilogram at the time, under Article

238 43 of Law4042/12 (FEK 24/A/13-2-2012)). It was further mentioned that any
239 inappropriately placed/disposed waste would not be collected by the cleaning
240 workers. One of the sections of this broader questionnaire included items relating to
241 the respondent's likely reaction if witnessing a case of waste dumping (i.e.
242 purposefully bypassing the PAYT scheme).

243 The questionnaire was communicated electronically through the University of
244 the Aegean, Greece, academic email database and official Facebook page as well as to
245 the acquaintances' network of the authors, while the recipients/readers were
246 encouraged to forward the questionnaire to their own network of contacts. The survey
247 remained online between May 30th and June 29th 2016, and a total of 299 responses
248 were collected.

249

250 **3.2. Variables used**

251 Dependent variable

252 'Exercising social control': Measured through the following question: '*Assume*
253 *that your municipality is implementing a Pay-As-You-Throw (PAYT) scheme for*
254 *household waste and you witness another citizen bypassing it (e.g. leaving the*
255 *garbage outside the 'smart bin' or outside the communal bin of his/hers block of flats*
256 *or not using the pre-paid waste bags). Will you do any of the following?* [Answer:] *I*
257 *will reprimand him/heron the spot for his/her behavior*'. The original responses were
258 measured on a 4-pointLikert-scale (ranging from '1: Surely No' to '4: Surely Yes',
259 plus the '666: I don't know' option). For our analysis, the responses 'don't know'
260 were treated as missing while the remaining 273 responses (91.3% of the original)
261 were recoded into a dichotomous dummy variable, '1: Surely/Rather NO' and '2:
262 Surely/Rather YES'.

263

264 Predictor variables

265 'Degree of Personal Implication' (IMPLICATION): We measure this through
266 the personal endorsement of any out of three PAYT schemes, which previous research
267 identified as most suitable for implementing under existing conditions in Greek
268 communities: (a) the volume-based bag program (Ecological Recycling Society,
269 2011;Karagiannidis et al., 2008; Malamakis et al., 2009); (b) the punch card weight-
270 based system (Ecological Recycling Society, 2011; Jones et al., 2010; Karkanias et
271 al., 2015);and, (c) weight-based bin per residence scheme (Ecological Recycling
272 Society, 2011;Karagiannidis et al., 2008; Malamakis et al., 2009). In particular,
273 respondents were asked to indicate their level of endorsement through the 5-point
274 Likert-scale question reading '*Would you be against or in favor of introducing any of*
275 *these three PAYT schemes in your area of residence?*' ('1: Against' to '5: In favor').

276 In previous research the degree of personal implication has been measured
277 through a question reading '*To what extent would you suffer, personally, the*
278 *consequences of the action of this person?*' (E.g. Brauer and Chekroun, 2005b;
279 Chaurand and Brauer, 2008b), yet this exact question was not part of the
280 questionnaire we used during that data gathering. As a plausible proxy, we assume
281 that the *stronger* the endorsement of a PAYT system the more *negative* the
282 consequences felt by an individual would be s/he witnesses this system being free-
283 ridden: since an individual endorsing a PAYT system is, *ceteris paribus*, in effect
284 agreeing to pay his/her monetary 'fair share' for waste disposal management, s/he is
285 quite likely to consider the free-riding of the system as a, direct and personal, negative
286 (economic to say the least) consequence. Furthermore, our analyses (available upon
287 request) show that the endorsement of any of the proposed PAYT schemes by our

respondents is strongly and negatively correlated with the 'personal costs' one perceives in the system ('*It will be more time consuming for me; …will be more difficult to use for me; and, …will be more costly to operate*'). In other words, the endorsement of a PAYT scheme is strongly related to individual *self-interest*, the same concept that 'personal implication' is also supposed to measure (see Brauer and Chekroun, 2005b, p. 1523). Thus, while acknowledging the variable we use is sub-optimal, we nevertheless consider the degree of personal endorsement to be an appropriate proxy for measuring an individual's 'degree of personal implication'.

'Degree of deviance of the behavior' (DEVIANCE): A three-item scale (Cronbach's α =0.806) based on the following three questions: 'To which extent do you agree with each of the following statements as a way of dealing with citizens by-passing/non-complying with your Municipality's Pay-As-You-Throw scheme (e.g. leaving their garbage outside the PAYT bin; or, disposing household garbage in public trash-bins; or, burning their garbage, etc.): *the local authorities should make public the names of those bypassing the PAYT scheme; the local authorities should impose heavy monetary fines on those bypassing the PAYT scheme; and, citizens should report to the relevant authorities (e.g. the local authorities or the police) those bypassing the PAYT scheme*' (each question measured on a 5-point Likert scale, ('1: Strongly Disagree', '5: Strongly Agree').Again, our approach differs from previous research which has tapped on the degree of deviance in a straightforward way (e.g. asking individuals to indicate '*To what extent do you consider the [particular] behavior to be counter the norms of our society?*' (Brauer and Chekroun, 2005b) or '*To what extent is the* [particular] *behavior of this person counternormative?*' (Chaurand and Brauer, 2008b). Obviously, ours is an even stronger indicator of the behavior's perceived deviance, since the individual is asked to indicate whether s/he

feels that the particular transgression is important enough to be reported to-and/or punished by- the appropriate authorities.

Social Capital (SC) is a multi-dimensional concept and was measured in our study by combining different indicators proposed in the literature (e.g. Grootaert and Bastelaer, 2002; Putnam, 2000). The most important indicator of social capital, trust, was divided in two different categories, 'social (or interpersonal) trust' (Villalonga-Olives and Kawachi, 2015) and 'institutional trust' (Harring, 2018).

Institutional Trust (INSTIT TRUST) was measured through a three-item scale (Cronbach's $\alpha = 0.729$) based on the following questions: 'How much do you trust the following institutions: *the national government; the Ministry for the Environment; and, your local government*' (each question measured on a 5-point Likert scale, '1 = Not at all' to '5 = Fully'). Social Trust (SOCIAL TRUST) was measured through a three-item scale (Cronbach's $\alpha = 0.658$) based on the following questions: 'Concerning the following groups of people, do you think you should rather be cautious or you could trust them? *neighbors; family*; and, *friends*' (each question measured on a 5-point Likert scale, '1 = Cautious' to '5 = Trustful').

Informal Social Networks (INFORMAL NETS) were captured through a two-item scale (Cronbach's a = 0.258) based on the following questions: 'How often do you do any of the following: *meeting with relatives*; and, *meeting with friends*' (each question measured on a 5-point Likert scale, '1: Never' to '5: Daily').

Formal Social Networks (FORMAL NETS) were assessed through a two-item scale (Cronbach's $\alpha = 0.695$) based on the following questions: 'Over the past 12 months have you been a member or have you volunteered to any club or society (e.g. sports/cultural/professional/environmental/political etc.)? ('1 = Yes', '2 = No', for either being a member or volunteering').

In order to capture the level of Public Participation (PARTICIPATION) a four-item scale was applied (Cronbach's $\alpha = 0.619$) based on the following questions: 'Over the past 12 months have you done any of the following? *worked for a political party or any other group/society; signed a petition; participated in a demonstration*; and, *boycotted or bought certain products for political, ethical and/or environmental reasons*' ('1 =Yes', '2 = No').

Finally Social Norms (NORMS) were measured via a two-items scale (Cronbach's $\alpha = 0.797$) based on the following questions: 'How justifiable do you consider the following actions: *disposing waste outside the assigned bin;* and, *disposing non-recyclable waste inside the recyclables' bin*' (each question measured on a 5-point Likert scale, '1: Totally justifiable to '5: Totally unjustifiable').

The correlations between the different predictor variables are presented in Table X1 in the Appendix.

Control variables

We also include a number of demographic variables as controls, such as the respondent's gender (dichotomous variable), age (continuous variable), educational attainment (categorical variable with 3 levels: "low- elementary schooling", "middle -high school", "higher- (post)graduate degrees") and income (categorical variable with 3levels: "low, <800 euros", "middle, 801-1600 euros", and "higher, >1600 euros") (The reader is referred to Table X2 in the Appendix for the descriptive statistics of the demographic variables). Available research on exercising social control has not given particular emphasis on the possible effects of demographic variables, while the few existing results have been mixed. With respect to gender, Berger and Hevenstone (2016)and Przepiorka and Berger (2016) found no

363 statistically significant differences, *contra* Balafoutas and Nikiforakis (2012) who
364 found that males are more likely to engage in social control. Regarding age, we are
365 aware of a single study which found that older individuals are more likely to engage
366 in social control (Berger and Hevenstone, 2016) while we have not been able to
367 identify any studies examining the possible effect of an individual's income and/or
368 educational attainment.
369
370 **3.3. Methods**
371 We test the predictor variables' effect on an individual's willingness to
372 exercise social control through binary logistic regression modeling approach (Agresti,
373 2002). We fit the logistic models in three consecutive steps. In order to assess the
374 model fit, we employ a model-comparison approach starting by fitting a generic null
375 model (control model A) and then proceed by adding new sets of predictor variables
376 for each subsequent model (Models B, C) in order to perform the models'
377 comparisons. Model comparison is performed via the X^2 statistic, which is a measure
378 of how well the independent variables affect the outcome of the dependent variable
379 (Hosmer et al., 2013). To obtain the results, the IBM SPSS programme 21 (Released
380 IBM Corp., 2012) has been utilized. More analytically, in Model A, which serves as
381 the control model, we examine solely the explanatory power of the demographic
382 variables. In the subsequent Model B, we further incorporate the predictors pertaining
383 to the individual's subjective evaluation of the (counter-normative) behavior, the
384 'degree of personal implication' and the 'degree of perceived deviance'. As a final
385 step, we examine the role of an individual's social capital, through its constituent
386 parts of networks, trust, participation and norms (Model C).
387

4. RESULTS

An impressive 89.3% of our respondents answered that they would 'Surely/Rather' reprimand on the spot someone bypassing the PAYT scheme. As it follows from Model A (Table 1), an individual's demographic characteristics do not influence his/hers likelihood to exercise social control, with the exception of the Income variable: middle income individuals are over five times more likely (Odds ratio (i.e. exp(B)) = 5.129, p = 0.023 <0.05) than high-income individuals (the reference category) to exercise social control. On the contrary, there exist no statistically significant differences between low income individuals and middle or high-income ones, respectively.

The inclusion of the predictors pertaining to the perceived personal implication and deviance of the PAYT bypassing (Model B), leads to an improvement of the model fit (Nagelkerke R^2 increasing from 0.070 to 0.112 between Models A & B), which is also statistically significant according to the X^2 test (X^2 = 10.166; p-value = 0.017<0.05). Again, we find that (only) middle income individuals are five times more likely to exercise social control (Odds ratio (i.e exp(B)) = 5.039, p = 0.026 <0.05). While the perceived personal implication effect turned out to be statistically non-significant, those who perceive bypassing the PAYT scheme as "deviant" are over 1.6 more likely to reprimand someone bypassing the PAYT scheme (Odds ratio = exp(B)=1.656, p=0.049< 0.05).

Coming to the final Model C, which incorporates the Social Capital (SC) component predictors, we find a further (and statistically significant) improvement of the model fit (Nagelkerke R^2 = 0.194; X^2 = 17.927; p-value = 0.001<0.05). Again, we observe the positive effects of middle-income (Odds ratio (i.e. exp(B)) = 5.443, p=0.025<0.05) and of the perceived deviance of the behavior (Odds ratio (i.e. exp(B))

413 = 1.811,p = 0.035 <0.05) on social control. Of the added SC predictors, the only one
414 which turned out to be statistically relevant was the 'Participation' one: an individual
415 who has been socially active in the past year, is more likely to confront a PAYT
416 offender (Odds ratio (i.e. exp(B)) = 0.447, p = 0.011 < 0.05).
417

Table 1: Predictors' effects on an individual's likelihood to exercise social control when witnessing PAYT bypassing (binary logistic regression results)

	B (s.e.)	**Wald**	**Exp(B)**
		Model A	
EDUCATION	n.s.		
AGE	n.s.		
GENDER	n.s.		
INCOME (**Ref: High,3)**			
Income (Low, 1)	n.s.		
Income (Middle, 2)	1.635** (0.720)	5.161	5.129
Constant	1.447*** (0.556)	6.779	4.250
-2 Log likelihood		110.247	
X^2 statistic		6.256	
Nagelkerke R^2		0.070	
		Model B	
EDUCATION	n.s.		
AGE	n.s.		
GENDER	n.s.		
INCOME (**Ref: High,3)**			
Income (Low, 1)	n.s.		

Income (Middle, 2)	1.617** (0.729)	4.925	5.039
DEVIANCE	0.504** (0.257)	3.846	1.656
IMPLICATION	n.s.		
Constant	1.476*** (0.566)	6.795	4.376
-2 Log likelihood		106.337	
X^2 statistic		10.166	
Nagelkerke R^2		0.112	
		Model C	
EDUCATION	n.s.		
AGE	n.s		
GENDER	n.s.		
INCOME (**Ref: High,3)**			
Income (Low, 1)	n.s.		
Income (Middle, 2)	1.694** (0.758)	4.993	5.443
DEVIANCE	0.594** (0.281)	4.458	1.811
IMPLICATION	n.s.		
NORMS	n.s.		
INFORMAL NETS	n.s.		
FORMAL NETS	n.s		
INSTIT. TRUST	n.s.		
SOCIAL TRUST	n.s.		
PARTICIPATION	-0.804** (0.315)	6.505	0.447
Constant	1.640*** (0.602)	7.430	5.154
-2 Log likelihood		98.576	
X^2 statistic		17.927	

Nagelkerke R^2	0.194

n.s.: Not statistically significant, p >0.1; *: statistically significant at the 0.1 level; **: … at the 0.05 level; ***: … at the 0.01 level

5. CONCLUSIONS & DISCUSSION

In this paper we set to compare two different theorizations concerning who is likely to exercise social control in the case of illegal dumping in the context of a (hypothetical) Pay-As-You-Throw (PAYT) waste management scheme. One line of argument has suggested that this would be influenced by the observer's subjective evaluation of the behavior, and in particular the extent that s/he feels personally affected by the behavior ('degree of personal implication') and the extent s/he considers that behavior as inappropriate ('degree of deviance'). The other line focuses instead on the observer's social characteristics, in particular his/her social capital. Although both approaches have been used in previous research, we are unaware of any study which tried to juxtapose these two approaches, thus this research attempted to address a lacuna in our theoretical understanding of the determinants of social control.

Our results show that both sets of predictors impact the likelihood to exercise social control, independently of one another and over the individual's demographic characteristics. In particular, we found that, as anticipated by previous research, the perceived degree of deviance of the observed behavior is positively related to exercising social control. Individuals who think that transgressing the PAYT scheme is an offence serious enough to be reported to -and/or punished by- the appropriate authorities are 1.8 times more likely to engage in social control than those who do not think of it as an offence worth reporting/punishing. On the contrary, we did not find a

statistically significant relation between the 'degree of personal implication' and social control. This result, which runs counter to past research, should rather be attributed to our operationalization of the relevant concept. As we mentioned earlier, past research measured the 'degree of implication' by asking respondents to indicate to what extent they would suffer, personally, the consequences of the particular action/behavior. In this research, and since we lacked such an explicitly formatted question, we attempted to tap into 'personal implication' by using one's endorsement of the PAYT scheme, arguing that, the *stronger* the endorsement of a PAYT system the more *negative* the consequences felt by an individual would be if this system is free-ridden.

Our finding that that general endorsement of a PAYT scheme does not directly influence the willingness to confront an offender, should inform future research to the importance of measuring explicitly the extent to which one feels personally *affected* by the offence. Arguably, using the endorsement of *any* PAYT scheme as a proxy, is a broad brush approach which does not take into account the individual's preferences for a *particular* scheme -or even for the PAYT framework itself-, which are likely to influence his/her degree of implication. Thus, further research is needed for establishing the actual strength (or the very existence) of the relation between the concepts of 'endorsement' and 'implication' which –as our results suggest- are not highly correlated.

Coming to the possible effects of Social Capital (SC) on social control, we find that it also plays a role, over and independently of an individual's subjective evaluation of the observed behavior. This is corroborated on one hand by the fact that the final Model C (i.e. the one in which we have included SC predictors) fits better to, and explains more of, the data; on the other hand, by the fact that the addition of the

SC predictors does not alter either the sign or the statistical significance of the effect of any of the other predictors (the subjective evaluative ones included). Yet not all SC components were found to be relevant. Only public 'Participation' proved statistically significant, with more 'active' individuals being over two times more likely to engage in social control than less 'active' ones. On the contrary, social trust and informal networks, which were found to be particularly prominent in other studies on social control (e.g. Sampson, et al., 1999; Sampson et al., 1997), turned out to be non-significant in our study. We claim that this discrepancy is due to the fact that this prior research had largely focused on a radically different kind of delinquent behavior, namely (violent/petty) crime. Since, as Coleman (1988, p.S98) notes 'Social capital…is not a single entity but a variety of different entities […thus it…] is not completely fungible but may be specific to certain activities. A given form of social capital that is valuable in facilitating certain actions may be useless or even harmful for others', the fact that certain SC components which were found to be relevant in the social control of crime turned out to be non-relevant for the case of the social control on illegal dumping should not come as a surprise. Furthermore, it should not make us lose sight of the really important theoretical finding of our research: (aspects of) social capital are a *complementary* predictor of social control in the case of waste dumping, independent of the subjective evaluation of the deviant behavior.

Turning to the limitations of our study, the fact that our sample was self-selected, may have introduced a selection bias, with persons more concerned about PAYT choosing to participate and thus being over-represented in the research. Furthermore, our average respondent (female, under 40 years old, highly educated) is not representative of the general population. These characteristics would have restricted the variability of the responses and thus resulted to weakened correlations.

Nevertheless, our analyses returned overall statistically significant relationships between the variables as well as congruent with both the available literature and previous, random-sample research. Thus, while acknowledging that the limitations posed by our sample's characteristics should serve as a note of caution when interpreting our findings, it is not very likely that the sample's composition substantially affected the results obtained. Future research, using random sampling, would allow us to settle this point.

A second point of concern relates to what extent our results, based on someone's professed willingness to exercise social control over PAYT violations, would hold 'in the real world'. Past research has established that those actually exercising social control are far fewer than those stating they would (e.g. Brauer and Chekroun (2005a). This is hardly surprising if one considers the multitude of factors affecting such a real-life decision (see the relevant discussion in the preceding section titled 'The determinants of social control'). Nevertheless, previous research has also established that *both* professed and actual behaviors are affected by the same predictors overall. Thus, although we expect that far fewer Greeks would actually exercise social control than the 89% who claimed they *would* do so, we also anticipate that the predictors we identified in this research would be relevant in cases of *actual* social control as well.

As a final note, we would like to comment on the policy implications of our findings. As mentioned in the Literature review, citizens' exercising social control in cases of PAYT bypassing may offer the waste authorities/managers a complementary (and low-cost) way of dealing with offenders. Should local officials wish to promote such a role for their citizens, our results suggest a promising way of intervening: since no external interferences may alter one's (personal) social capital, waste managers

517 should instead focus on highlighting the perceived deviance of PAYT bypassing.
518 Promoting, through informational and advertising campaigns, the particular
519 behavior's perception as an offence which should be reported to -and fined by- the
520 authorities and whose perpetrators merit a public reprimand, is likely to enhance the
521 citizen's willingness to confront the offenders. And if the latter is indeed materialized,
522 then both the costs of formal monitoring and the incidents of free-riding the local
523 PAYT scheme would be reduced in the longer-term.

524 **APPENDIX**
525

Table X2: Descriptive statistics of demographic variables used in the analyses

	Mean (std. dev.)	Minimum/Maximum	N
Gender	1.44 (0.50)	1/2	295
1: Female			
2: Male			
Age	39.93 (10.03)	21/71	286
Educational attainment	2.30 (0.74)	1/3	296
1: Elementary			
2: Gymnasium/High school			
3: (Post) Graduate			
Personal Income	1.79 (0.63)	1/3	251
1: <800€			
2: 801-1600€			
3: > 1600€			

526

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