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# TAX AVOIDANCE, ENDOGENOUS SOCIAL NORMS, AND THE COMPARISON INCOME EFFECT

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# TAX AVOIDANCE, ENDOGENOUS SOCIAL NORMS, AND THE COMPARISON INCOME EFFECT

## Abstract

We present a model of income tax avoidance with heterogeneous agents, assuming the presence of a comparison income effect and of a psychic cost (disutility) of tax dodging. We analyse the policy preferences of the agents, and identify a median-voter political equilibrium. Paralleling previous results in the optimal taxation literature, we show that the comparison income effect calls for a high degree of progressivity of the income tax; additionally, we find that this tendency is strengthened by the psychic cost of avoidance. We then model the endogenous formation of the stigma attached to the act of avoidance as a "conformism game". We argue that such stigma is motivated by the desire to make redistribution more effective, and that it is enhanced by the income comparison effect.

JEL Code: D72, H26, H31.

Keywords: tax avoidance, social norms, conformism, comparison income, median voter.

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# I Introduction

A problem that economists have traditionally encountered when studying imperfect tax compliance is that, while the phenomenon is quantitatively relevant in all countries (no matter whether they have developed, transition or developing economies), is not nearly as large as it should be. If *homo oeconomicus* were an accurate portrait of the real-world economic agent, then nobody should ever fully comply with the tax rules, as there are immediate and obvious gains to be reaped against a small probability of being caught. In reality, while it is presumably true that, given the chance, almost everybody will commit the occasional act of tax dodging, only a minority takes this up as a systematic activity.<sup>1</sup>

There have been various attempts at solving this conundrum. An interesting insight is offered by works like those by Friedman et al. (2000) and Johnson et al. (1997, 1998), arguing that tax dodging is closely related to tax implementation, regulation and corruption, and thus that changes along these dimensions explain most of the variation in non-compliance. We will follow however another branch of the literature, focusing on the existence of social norms against tax dodging; see e.g. Gordon (1989), Myles and Naylor (1996) and Orviska and Hudson (2002). If an individual believes that cheating the government is an intrinsically bad act, that is if she has interiorised a social norm against such behaviour, she will abstain from it even if it is clearly lucrative. Possibly, this line of enquiry goes, in some sense, *deeper* than the preceding one. It is in fact likely that the presence in the society of a negative attitude towards tax dodging will affect both the way the tax system is administered and the way individual citizens relate themselves to it. Where avoiding or evading taxes carries a social stigma there is less scope for corruption among tax officers *and* the tax-payers are more prone to comply with the rules.

One thing which is usually overlooked in the literature on social customs and tax avoidance is the question of how the norm is established. Why should rational, utility-maximising agents create a norm which goes seemingly against their own interest? There is thus a missing link in the analysis; one studies how the norm affect individual behaviour, but does not ask how individual behaviour contributes to establish the norm. This missing link will be addressed in the present paper.<sup>2</sup> In order to do this, we can rely on two important lines of research,

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<sup>1</sup>According to Schneider and Enste (2002) the average size of the shadow economy in the 90's was in the range of 12%, 23% and 39% of GDP for, respectively, developed, transition and developing economies.

<sup>2</sup>For related attempts, see Feld and Frey (2005), where tax compliance is interpreted as the outcome of a psychological contract; and Cullis and Lewis (1997), who propose a view of tax compliance as adherence to a

since both economists and social psychologists have investigated the spontaneous formation of social norms. In economics, we have the pioneering work of Akerlof (1980) and more recent examples, like Lindbeck et al. (1999), in which social norms, whose importance reflects (among other things) the number of agents that comply with them, are assumed to arise endogenously. In social psychology, there are fundamental works showing that indeed groups tend to create internal rules for behaviour using informal procedures (e.g. Sherif 1936; Hogg and Hardie 1992), and that conformity to the views of the majority is a powerful factor in determining adherence to the norm (e.g. Asch 1955; Baron et al. 1996).

The perspective we take here is that social norms do not exist in a vacuum, they must perform some useful social task in order to first arise and then survive. This is for example the basis of the well-know argument by Coleman (1990) that the presence of externalities creates a demand for a social norm such that the externalities are regulated; social interactions in dense networks make then the actual establishment of the norm feasible (see Festinger 2004 and Dufwenberg and Lundholm 2001 for economic approaches to the problem of norm formation). Specifically, we argue that a social norm against tax dodging serves two purposes. The first is straightforward: when the norm is active, compliance rises, hence there will be less distortion associated with redistributive taxation. In other words, the custom makes redistribution less costly and more effective. The second purpose is somewhat less self-evident: we suggest that another role of the norm is to facilitate social competition. Where people feel a strong urge of bettering themselves, social mobility is high, and the search for status compelling, norms are extremely important in that they prevent competition from degenerating into a rat race; "not playing by the rules", for example achieving status by cheating the government, cannot thus be condoned. If the above is true, then we should find that the norm is stronger, the more competitive the society is; and the same should hold for all customs condemning anti-social behaviour. There is in fact evidence (Triandis, 1989; Smith and Bond, 1993) that people from competitive societies like that of the US conform to customs dictating behaviour in matters of relevance for the society at large, whereas people from more cohesive societies like that of Japan tend to comply mostly with norms prevailing in their own narrowly defined reference group (be that their family or the firm in which they work).

Since both redistribution and social mobility are important especially for the low-income group, they will be the main supporters of a social norm against an anti-social attitude like social convention.

tax dodging. Much of the strength of the norm will thus depend on whether public opinion is entirely dominated by the high-income classes or whether the middle-to-low-income people carry some weight in shaping the view of the society. This will in turn depend on the solidity of the democratic institutions in the country, e.g. the balance of power between the executive, legislative and judiciary branches of the administration, the independence of the press and other media, etc. In long-established and well-working democracies like the US, the UK or the Scandinavian countries there seem indeed to be more stigma associated with tax dodging than in institutionally more fragile nations like, say, Greece or Italy – not to mention transition or developing countries.

The model we employ to investigate the questions posed above is a simple one. Our agents have fixed incomes and must only decide whether to dodge the income tax and if so, to what extent. In fact, adding a variable labour supply would not be difficult in principle, although it would make the analysis more involved. The only relevant, but by no means dissonant, modification would be that of extending the scope of the custom, which should include a work ethic, thus stigmatising in general anti-social attitudes like cheating on one's taxes or being absent from work (for a recent take on this latter issue, see Lindbeck and Persson 2006). To analyse the role of social competition, we assume that preferences incorporate the so-called "relative utility" or "income comparison effect" (see e.g. Easterlin 2001 for a recent discussion), that is that agents not only care for their own consumption but also for the "distance" between their consumption and that of a reference group. This is an immediate but effective way of capturing the presence of a status-seeking impulse behind the economic decisions of the agent.<sup>3</sup>

Given the agents' choices, we then study their policy preferences and the ensuing political equilibrium in a standard majority voting setting. The winning policy turns out to be the one preferred by the median voter; therefore, there will be a progressive income tax in place at the political equilibrium, and some tax dodging will occur. In line with similar results from the optimal taxation literature, we find that the comparison income effect calls for a high degree of progressivity of the income tax. Additionally, we detect a similar role for the social custom; the progressivity of the tax system is directly related to the strength of the social norm. This is plausible, and consistent with casual observation. For example, a recent reform of the income tax has involved a cut of marginal rates in Italy, beginning from 2005. The necessity of such

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<sup>3</sup>For a broader view of social preferences and their relationship with the social norms, see Fehr and Falk (2002).

a reform had been often announced in terms that clearly signal the lack of stigma for non-compliance: the then Prime Minister in fact endorsed avoidance as "good" behaviour, declaring that "[i]f reasonable taxes are demanded, no one thinks about avoiding paying them. But if you ask 50% or more ... *I consider myself morally justified to do everything I can to avoid paying them*"<sup>4</sup>.

Finally, we examine what the preferences of the agents concerning the force of the social norm are. It turns out that the strength of the norm against tax dodging can be directly related to the strength of the income comparison effect, which is consistent with the evidence cited above as it contributes to explain intercountry differences in the relevance of the social custom (the US is a much more competitive and mobile society than, say, Italy, and the norm should therefore be more binding).

Finally, note that the above succession of steps in the analysis corresponds to a standard backward solution procedure for a model whose timing is as follows: 1) agents establish social norms; 2) agents vote on policy; 3) agents make avoidance decisions.

## II A tax avoidance model

Consider an economy inhabited by agents differing for their gross incomes  $y$ . Gross income is fixed, and distributed continuously along an interval  $(y^-, y^+)$ ; the total number of agents is normalised to unity,  $\int y f(y) dy = 1$ . The government levies a linear income tax on the agents' incomes, with a marginal tax rate  $t \geq 0$  and a uniform grant  $T \geq 0$ . The agents have the option to hide a share of their income from the fisc by exploiting loopholes in the tax code; let  $a \in [0, 1)$  be the percentage of hidden income, such that  $r = (1 - a)y$  is the income actually reported, and  $h = ay$  is hidden income. In order to avoid taxes,<sup>5</sup> the agent incurs in some monetary costs (e.g. by paying a lawyer fee to learn how to circumvent the rules) and in some psychic

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<sup>4</sup>Reported by *Time*, March 1, 2004, p. 17, emphasis added.

<sup>5</sup>We model tax dodging as tax *avoidance*, i.e. a riskless but costly activity, as opposed to tax *evasion*, which is instead risky because of the possibility of pecuniary sanctions if discovered (see e.g. Cowell 1990b for a discussion). In fact, the two approaches can be connected using the concept of "cost of evasion", i.e. "the monetary amount that [a] person would just be prepared to pay in order to be guaranteed that he will get away with tax evasion" (Cowell 1990a p. 232), and reinterpreting the cost-of-avoidance function as a reduced form of the cost-of-evasion function. While this does not mean that the two approaches are completely equivalent, it does normally imply that the main insights survive as we shift across them (Balestrino and Galmarini, 2003, discuss the point at some length and provide an example).

costs associated with breaking the social norm condemning tax avoidance (provided such norm exists). The m-cost function is written  $K(h, y)$ , and the p-cost function is written  $\theta C(h, y)$ , where  $\theta \in [0, 1]$  measures the strength of the social norm (for  $\theta = 0$  the norm is in fact absent).<sup>6</sup> We assume that

$$K_h > 0, K_{hh} > 0, C_h > 0, C_{hh} > 0; \quad (1)$$

$$K(0, y) = K_h(0, Y) = C(0, y) = C_h(0, Y) = 0, \quad (2)$$

and that both  $K(\cdot)$  and  $C(\cdot)$  are homogeneous of degree one in  $h$  and  $y$ . Then, we can write per-unit-of-true-income cost functions as

$$k(a) \equiv K(ay, y)/y = K(a, 1); \quad c(a) \equiv C(ay, y)/y = C(a, 1), \quad (3)$$

and of course we will have that both  $k(\cdot)$  and  $c(\cdot)$  are strictly convex and that

$$k(0) = k'(0) = c(0) = c'(0) = 0. \quad (4)$$

The functions defined in (3) are independent of true income, which makes the model much simpler to analyse and interpret – similar assumptions are used e.g. in Boadway et al. (1994) and Balestrino and Galmarini (2003). Further, we assume that  $\theta$  depends on the opinions that the agents have on whether tax avoidance should be condemned or not, that is on how strongly they feel that the social custom should be in place; we take it that each type has a preferred level of the norm and that the social norm is some function, to be defined later, of these individually ideal norms.

From the above, we can write the agent's net income or consumption as

$$X = (1 - t + ta - k(a))y + T. \quad (5)$$

The agent's utility depends however not only on her own consumption, but also on her relative position in the society; she is happier whenever her consumption or net income increases, and less happy when the consumption or net income of the reference group increases. To capture this effect in a simple way, we assume that the arguments in the agent's utility function include her consumption as well as the difference between such consumption and the reference standard.

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<sup>6</sup>In the main text, we assume that there is no enforcement of the tax code, and therefore that the monetary cost of avoidance is unaffected by policy. In Appendix A we show that, even if we endogenise tax enforcement, our main findings do not change.



Hence, in general such utility function will be written

$$u = U(X, X - S, C), \quad (6)$$

where  $S$  is the reference standard, and where utility is increasing in the first two arguments and decreasing in the third. For reasons of tractability, we will however use a more specific utility function. Specifically, we postulate that the comparison income effect enters additively, and choose a quasi-linear utility function. More precisely, we let

$$x = (1 - \beta)X + \beta(X - S) = X - \beta S \quad (7)$$

where  $\beta$  is a dummy variable taking values

$$0 \text{ for } X \geq S; \quad \tilde{\beta} \in (0, 1) \text{ for } X < S. \quad (8)$$

This means that only agents with consumption below the standard perceive the comparison income effect; there is in fact some evidence (Ferrer-i-Carbonell 2005) that such effect is asymmetric and is experienced mostly by those who do not achieve the reference level, rather than those who are above it. To keep things simple, we make the extreme assumption that "downward" comparisons do not matter at all.<sup>7</sup>

Then, utility becomes

$$u = x(a) - y\theta c(a). \quad (9)$$

Substituting the budget into the utility function and rearranging gives:

$$u = (1 - t + ta - k(a) - \theta c(a))y + T - \beta S. \quad (10)$$

Maximising w.r.t.  $a$ . we get

$$t = k' + \theta c', \quad (11)$$

which is necessary and sufficient for a maximum thanks to the strict convexity of the cost functions. The first order condition (FOC) has the obvious interpretation that, at the optimum, the percentage of hidden income  $a$  equates the marginal benefit (avoided taxation) with the marginal cost (monetary plus psychic). Note that for  $t = 0$  the FOC is satisfied at  $a = 0$ , as it becomes  $0 = 0$  by (4).

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<sup>7</sup>Falk and Knell (2004) provide an economic analysis that includes both upward and downward comparisons and takes the important step of endogenising the reference standard (letting the agents "choose the Joneses").

We denote the solution as

$$a = a(t, \theta). \quad (12)$$

Given quasi-linearity, and first-degree homogeneity of the cost functions, neither gross income nor the reference standard affect the solution.<sup>8</sup> Straightforward comparative statics analysis yields:

$$a_t > 0; a_\theta < 0, \quad (13)$$

that is, the avoidance activity increases when the tax rate rises and decreases when its sanctionability increases.<sup>9</sup> We also make the following assumption on the behaviour of second derivatives:

**Assumption 1** a)  $a_{tt} \geq 0$ ; b)  $a_{t\theta} \leq 0$ .

This assumption is satisfied by e.g. a quadratic cost function for both monetary and psychic costs; in general it requires a restriction on the sign of the third derivatives of the cost functions. It has a plausible interpretation: part *a* says that the fraction of hidden income increases with the tax rate at a non-decreasing pace, whereas part *b* says that whenever the social norm becomes more stringent, the fraction of hidden income becomes less (or at least not more) reactive to increases in the tax rate.

As for reported income,  $r(\cdot) = y(1 - a(\cdot))$ , it is easy to see using (13) that  $r$  decreases as  $t$  increases, and increases with  $\theta$ , since  $r_z = -ya_z$ ,  $z = t, \theta$ . Moreover, we have  $r_y = (1 - a) > 0$ , that is, reported income rises with true income. However, hidden income  $h = ay$  also rises with income ( $h_y = a > 0$ ). This is consistent with the observation that tax avoidance is normally an activity at which high-income agents are more successful (see e.g. Slemrod 2001).<sup>10</sup>

Finally, consider net income or consumption. Define

$$\pi(t, \theta) \equiv 1 - t(1 - a(t, \theta)) - k(a(t, \theta)) > 0 \quad (14)$$

as the complement to unity of the *effective* tax rate, the percentage of income which is actually

<sup>8</sup>Quasi-linearity also implies that neither the poll-tax nor the parameter  $\beta$  have any impact on the avoidance decision.

<sup>9</sup>Details on the comparative statics are given in Appendix B.

<sup>10</sup>This is not necessarily true for all forms of imperfect compliance. Black markets activities appear to be mostly carried out by low-income agents; see e.g. Lemieux et al. (1994) and Anderberg et al. (2003).

lost due to taxation, including the benefits and costs of avoidance.<sup>11</sup> We can then write  $X(\cdot) = \pi(\cdot)y + T$ . First, note that

$$\pi_\theta = (t - k') a_\theta < 0; \quad (15)$$

$$\pi_t = -(1 - a) + (t - k') a_t, \quad (16)$$

where the sign of the first derivative follows from (11) and (13). The effect w.r.t.  $t$  is ambiguous since when the marginal tax rate is positive and rises, the effective tax rate rises too because taxation is more stringent but at the same time falls because the percentage of hidden income increases. Hence, we have

$$X_\theta = y\pi_\theta < 0; X_t = y\pi_t; X_T = 1; X_y = \pi > 0. \quad (17)$$

That is, consumption rises with income and is positively affected by an increase in the poll-subsidy, but falls when the norm becomes stronger; changes in the tax rate have an ambiguous effect.

An important consequence of  $a(\cdot)$  being independent from income is that the agent's positions on the true income distribution carry over to both the reported and net income distributions; most notably the agents with, respectively, mean and median true income also have mean and median reported and net income. We shall use frequently this fact in what follows, as it facilitates the interpretation of the policy results.

### III Preferences over policy and the political equilibrium

For simplicity, and in line with most of the literature, we shall assume that the reference standard is given by the mean consumption level,

$$S = \overline{X}(t, T; \theta) = \pi(t, \theta)\overline{y} + T, \quad (18)$$

where the upper bar denotes an average value and where the second equality sign follows because all agents have the same  $a(\cdot)$  and hence the same  $\pi(\cdot)$ . Note, from (17), that

$$\overline{X}_t = \pi_t\overline{y}; \overline{X}_T = 1; \overline{X}_\theta = \pi_\theta\overline{y} < 0. \quad (19)$$

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<sup>11</sup>It is possible to show that (11) implies  $1 > t(1 - a) + k + \theta c \geq t(1 - a) + k$ , so that  $\pi$  is indeed positive. To see this consider the  $-(k' + \theta c') \equiv -\gamma$  curve, which is decreasing in the  $[0,1]$  interval. The optimal  $a$  is given by the intersection between that curve and a straight line representing the value of  $t$ . Then  $t(1 - a) + k + \theta c \equiv \int_0^a tdz - \int_a^1 \gamma(z)dz < t \equiv \int_0^1 tdz$ , since  $-\gamma(z) < t$  for  $z \in (a, 1)$  by (11). Clearly, if  $t(1 - a) + k + \theta c < t$  then  $t(1 - a) + k + \theta c < 1$  for  $t \leq 1$ .

We are now ready to start with the policy analysis. We assume a simple Downsian model of political competition where the candidates are solely office-motivated and commit to policies before the election. The outcome of the elections is decided by majority voting.

To begin with, let us investigate the agents' policy preferences. Indirect utility will be written:

$$V(t, T; \beta, \theta, y) = (1 - t + ta - k(a) - \theta c(a))y + T - \beta \bar{X}(\cdot). \quad (20)$$

The marginal rate of substitution between policy tools is

$$-\frac{V_t}{V_T} = -\frac{(a-1)(y - \beta \bar{y}) - \beta \bar{y} a_t \theta c'}{1 - \beta}, \quad (21)$$

where we used (16) and the fact that  $t - k' = \theta c'$  by (11). The MRS is monotonic in type, since

$$\frac{\partial(-V_t/V_T)}{\partial y} = \frac{1-a}{1-\beta} > 0. \quad (22)$$

This observation is important because monotonicity of the MRS guarantees that the indifference curves in the policy space satisfy a so-called "single-crossing" condition, which in turn ensures that a median-voter equilibrium exists under majority voting (see Gans and Smart 1996 for details). In fact, the single-crossing condition implies that, for any two tax rates  $t'$  and  $t''$  such that  $t' > t''$  and any two agents  $y'$  and  $y''$  such that  $y'' > y'$ , if  $y'$  prefers  $t''$  to  $t'$ , then also  $y''$  prefers  $t''$  to  $t'$ ; in words, agents "on the same side" of the income distribution have consistent policy preferences.

The government's budget constraint, written in per capita terms, is simply

$$t\bar{r}(t, \theta) = T, \quad (23)$$

where we used the fact that the total size of the population is normalised to unity. Note that, since all agents hide the same fraction  $a$  of their income, we have that

$$\bar{r}(t, \theta) = (1 - a(t, \theta))\bar{y}. \quad (24)$$

We can interpret the budget equation as expressing  $T$  as a function of  $t$  (and  $\theta$ ) and check whether the revenue curve in the  $(t, T)$ -space (holding  $\theta$  fixed) is strictly concave, i.e. if  $T_t > 0$  and  $T_{tt} < 0$ .<sup>12</sup> We note that  $T_t = \bar{r} + t\bar{r}_t$ , where  $\bar{r}_t = -\bar{y}a_t < 0$  by (13); this is positive as long as

$$\left| \frac{t}{\bar{r}} \bar{r}_t \right| < 1 \quad (25)$$

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<sup>12</sup>Incidentally, notice that  $T_\theta = t r_\theta > 0$ , i.e. if the social norm becomes more stringent, revenue will go up.

i.e. if the elasticity of reported income w.r.t. the tax rate is less than unity (which is empirically plausible, see e.g. Kopczuk 2005). The second derivative is  $T_{tt} = 2\bar{r}_t + t\bar{r}_{tt}$ , and is negative since  $\bar{r}_{tt} = -\bar{y}a_{tt} \leq 0$  by Assumption 1. Strict concavity of the revenue curve is thus generally guaranteed.

Consider now the ideal tax rate. It can be identified by solving  $V_t = 0$  for  $t$  after substituting  $T$  with the revenue constraint  $T(t, \theta)$ :

$$V_t = (a - 1)(y - \beta\bar{y}) - \beta\bar{y}a_t\theta c' + (1 - a)\bar{y} - t\bar{y}a_t = 0. \quad (26)$$

Recalling that for agents with income above the mean we have  $\beta = 0$  (because those are also the ones with net income above the standard), while for the others we have  $\beta = \tilde{\beta} \in (0, 1)$ , we find that:

$$t(\theta, \beta, y) = \frac{(1 - a)}{a_t} \left( (1 + \tilde{\beta}) - \frac{y}{\bar{y}} \right) - \tilde{\beta}\theta c' \text{ for } y < \bar{y}; \quad (27)$$

$$t(\theta, \beta, y) = \frac{(1 - a)}{a_t} \left( 1 - \frac{y}{\bar{y}} \right), \text{ for } y \geq \bar{y}. \quad (28)$$

Since  $\bar{a}_t > 0$  by (13), it follows that agents with higher than average income would prefer income subsidisation, but since we ruled out this possibility they will settle for a corner solution,  $t = 0$ . The agent with exactly average income would prefer no policy. This is the most efficient solution, since it eliminates the social waste of resources associated with avoidance. However, if an agent desires to achieve some redistribution in her favour, she will willingly trade off some efficiency against the desired amount of redistribution; all agents with less than average income prefer a positive rate of income tax, no matter whether this generates tax dodging (an efficiency loss). Close inspection of (27) will readily reveal that the ideal tax rate is monotonically decreasing in income for  $y < \bar{y}$  (see Appendix B for details). This is actually a straightforward variant of a well-known result from the literature on the political economy of income taxation (see e.g. Meltzer and Richards 1981), although we replaced the usual distortion due to a variable labour supply with the waste of resources devoted to tax dodging.

Given our assumptions on the political competition, recalling that the median-voter theorem applies, *and* adding the usual assumption that the median income is below the mean income (which is true for virtually all real-world income distributions), we can conclude that at the political equilibrium there will be a positive tax rate, and that a certain amount of tax avoidance activity will thus be carried out. Letting  $y^m$  denote median income, and ignoring the term  $\tilde{\beta}\theta c'$

(which is approximately zero)<sup>13</sup>, we can in fact write the winning policy as

$$t(\theta, \beta, y^m) = \frac{(1-a)}{a_t} \left( (1 + \tilde{\beta}) - \frac{y^m}{\bar{y}} \right). \quad (29)$$

The budget-balancing value of the universal grant will be established via the relationship  $T(t(\theta, \beta, y^m), \theta)$ .

It is interesting to note that the ideal policy problem for agents with below-mean income (including in particular the median income agent) is well-behaved in the sense that  $V_{tt} < 0$ ; this allows us to perform a meaningful comparative statics analysis to check the impact of changes in  $\beta$  and  $\theta$  on the equilibrium tax rate.<sup>14</sup> We find that

$$t_\beta(\theta, \tilde{\beta}, y^m) > 0; t_\theta(\theta, \tilde{\beta}, y^m) > 0. \quad (30)$$

The first result parallels similar results obtained in the optimal taxation literature (see e.g. Boskin and Sheshinski 1978 and Ireland 2001), where it has been found that the comparison income effect calls for a high degree of progressivity of the income tax, and more generally, that it justifies, from a normative standpoint, the existence of a redistributive tax system. Here, we argue that also from a positive standpoint the comparison income effect has an important role to play; it helps to explain why redistributive tax systems are effectively in place in virtually all the developed countries. The reason is obvious: each voter whose income is below the mean, in particular here the decisive one, views a positive rate of income tax as a means to achieve some redistribution in her own favour *as well as* a means to reduce the net income of the reference individual; thus, income taxation works from both ends, by boosting one's consumption *and* by decreasing the reference consumption.

The second result is specific to our contribution, and offers a complementary explanation of the prevalence of redistributive tax systems; it says that the stronger is the social norm against tax avoidance, the higher will be the tax rate at the political equilibrium. The straightforward reason is that when tax dodging carries social stigma, redistribution can be pushed farther because it entails a lower efficiency loss (it generates less avoidance activity).

So far, we discussed the impact of the income comparison effect and of the social custom on the "statutory", as opposed to "effective", rate of income tax. However, an increase in the tax rate as determined by the law does not necessarily bring about an increase of the actual tax

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<sup>13</sup>Indeed,  $\tilde{\beta}$ ,  $\theta$  and  $c'$  are all less than unity.

<sup>14</sup>Details of the analysis are given in Appendix B.

rate faced by the agent. The latter, as we already know from (14), is

$$\tau(t, \theta) = t(1 - a(t, \theta)) + k(a(t, \theta)) \quad (31)$$

with  $\tau_z = -\pi_z$ ,  $z = t, \theta$ . It is then easy to see that, since  $\pi_t$  is ambiguous in sign by (16), so are

$$\frac{d\tau\left(t\left(\theta, \tilde{\beta}, y^m\right), \theta\right)}{d\beta} = -\pi_t t_\beta \quad \text{and} \quad \frac{d\tau\left(t\left(\theta, \tilde{\beta}, y^m\right), \theta\right)}{d\theta} = -\pi_t t_\theta - \pi_\theta. \quad (32)$$

We can however argue the following. If we evaluate the above derivatives at  $\theta = 0$ , we find that since  $\pi_t|_{\theta=0} = a - 1 < 0$  and  $\pi_\theta|_{\theta=0} = 0$ ,<sup>15</sup> then  $d\tau/d\beta > 0$  and  $d\tau/d\theta > 0$  by (30). When the norm against tax dodging begins to take shape, then a stronger comparison income effect and a stronger social custom both imply a larger statutory tax rate as well as a larger effective tax rate. However, this marginal result does not necessarily generalise to a global result.

## IV Endogenous formation of the social norm

In the analysis so far, we have treated  $\theta$  as exogenous: we now turn to the analysis of the origin of the social norm. The modelling strategy that we adopt follows closely the political economy approach we have used to identify the chosen policy rule – a social norm is informal rather than backed by the law, but it works pretty much in the same way as a formally established norm, including the enforcement procedures. Agents have preferences over policies, and then the policy preferences are aggregated through a formal mechanism yielding the policy choice, i.e. voting. In a similar way, agents have preferences over the customs and there is an informal mechanism aggregating these preferences into a society-wide norm. In our Introduction, we have described this mechanism as an adherence to the view of the majority, basically a form of conformism. In the social psychology literature, it has been argued (see Festinger 1950 and Lewin 1965) that if the members of a group perceive a clearly defined common aim, to be reached by coordinating each agent’s effort with that of the others, there is a strong tendency to conformism. Obeying to a social norm, whose importance for the stability and flourishing of the group can well be grasped by its members, is a type of behaviour that can be explained along these lines, consistently with the arguments by Coleman (1990) referred to earlier.

We begin by identifying the preferences over the strength of the social custom. Let us move a further step backward and consider how indirect utility is affected by changes in the parameter

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<sup>15</sup>This is because  $t = k'$  when  $\theta = 0$  by (11).

$\theta$  (expressing the force of the social norm) when the equilibrium policy is in place. Let us then write

$$W(y, \theta, \beta) = (1 - t^m + t^m a(t^m) - k(a(t^m)) - \theta c(a(t^m)))y + T(t^m, \theta) - \beta \bar{X}(t^m, \theta) \quad (33)$$

where  $t^m = t(y^m, \theta, \beta)$  and  $a$  is chosen optimally given  $t = t^m$ . We can now ask what the preferred  $\theta$  would be for each agent. If we maximise  $W(\cdot)$  w.r.t.  $\theta$ , under the constraint that  $\theta \geq 0$ ,<sup>16</sup> we have that

$$W_\theta = V_{t^m} t_\theta^m - \beta \bar{X}_\theta - yc \leq 0; \theta \geq 0; \theta V_\theta = 0. \quad (34)$$

where  $V_{t^m} = V_t|_{t=t^m}$  and  $V(\cdot)$  is defined by (20).

Consider first agents with income below the *mean*. For them, we have an interior solution,  $\theta(y, \beta) > 0$ , identified by:

$$V_{t^m} t_\theta^m - \beta \bar{X}_\theta = yc, \quad (35)$$

which can be interpreted as *net* marginal benefit ( $V_{t^m} t_\theta^m - \beta \bar{X}_\theta$ ) equating marginal cost ( $yc$ ).<sup>17</sup> The marginal cost of  $\theta$  is simply the disutility of violating the norm. The marginal benefit is instead more complicated, as it includes the impact on the equilibrium tax rate as well as that on the reference standard. We know that an increase in  $\theta$  produces a higher equilibrium tax rate, as  $t_\theta^m > 0$  by (30); hence, a marginally higher  $\theta$  will represent a gain for all agents with income below the *median*, who would prefer a higher tax rate than the equilibrium one (for them  $V_{t^m} > 0$ ), and a loss for all agents with income above the *median* ( $V_{t^m} < 0$ ), while agents with *median* income will be unaffected ( $V_{t^m} = 0$ ). As far as the reference standard is concerned, all agents below the *mean* income benefit from a marginal increase in  $\theta$ , since it will reduce average consumption,  $\bar{X}_\theta < 0$  by (19).

For agents with income equal or above the *mean*, we have instead a corner solution, since for them  $V_{t^m} < 0$  and  $\beta = 0$ , so that  $W_t = V_{t^m} t_\theta^m - yc < 0$ , and therefore  $\theta(y, \beta) = 0$ ; for the high-income agents the social norm does not generate any benefit, only costs.

Condition (35) takes thus different forms depending on the level of the agent's income; Table 1 summarizes. The comparative statics does not yield unambiguous results; however, considering the various conditions in turn, there is a presumption that, as income increases, the

<sup>16</sup>We assume that the constraint  $\theta \leq 1$  is always satisfied.

<sup>17</sup>The second order condition  $V_{t^m t^m} (t_\theta^m)^2 + V_{t^m} t_{\theta\theta}^m - \beta \bar{X}_{\theta\theta} - ya_\theta c' < 0$  is taken to be satisfied. This requires that  $(V_{t^m t^m} (t_\theta^m)^2 + V_{t^m} t_{\theta\theta}^m - \beta \bar{X}_{\theta\theta}) < 0$  and larger (in absolute value) than  $-ya_\theta c' > 0$ .



| level of $y$           | Marg. benefit                               |   | Marg. cost                | value of $\theta$      |
|------------------------|---|---|---------------------------|------------------------|
| $y < y^m$              | $V_{t^m} t_\theta^m - \beta \bar{X}_\theta$ | = | $yc$                      | $\theta(y, \beta) > 0$ |
| $y = y^m$              | $-\beta \bar{X}_\theta$                     | = | $yc$                      | $\theta(y, \beta) > 0$ |
| $y \in (y^m, \bar{y})$ | $-\beta \bar{X}_\theta$                     | = | $yc - V_{t^m} t_\theta^m$ | $\theta(y, \beta) > 0$ |
| $y \geq \bar{y}$       | 0   | > | $yc - V_{t^m} t_\theta^m$ | $\theta(y, \beta) = 0$ |

Table 1: The pattern of preferred strength of the social norm

individually preferred strength of the social norm should tendentially decrease; benefits appear to fall, and costs to rise, with income. Moreover, it is also to be expected that the individually optimal  $\theta$  will rise with  $\beta$ , as a larger  $\beta$  appears to entail a larger benefit from  $\theta$ ; as we mentioned above, a custom against a form of anti-social behaviour like dodging taxes is particularly felt when there is a strong social competition. We thus make the following assumption:

**Assumption 2** *The ideal level of the norm is: a) decreasing in income,  $\theta_y(y, \beta) < 0$ , and b) increasing in the comparison income effect,  $\theta_\beta(y, \beta) > 0$ .*

The picture that emerges so far confirms our claim that the social norm serves the purpose of enhancing redistribution; even if  $\theta$  were not monotonically decreasing in  $y$  as stated in part a) of the Assumption, it would still be true that only agents with income below the mean favour an active condemnation of tax dodging. Our second claim, that the social norm allows a smoother process of social competition is also well supported because part b) of the Assumption is extremely weak; intuitively, whenever  $\beta$  increases, the norm becomes more valuable, again for all agents with income below the mean, because it helps closing the gap with the reference standard (the presence of the norm forces down average consumption by increasing tax compliance).<sup>18</sup> Thus, it is generally true that those supporting the norm will be those in the lower half of the income distribution, i.e. those who have more to gain from redistribution and social competition.

We now model the aggregation mechanism, that is the informal procedure that establishes a society-wide level of the norm. We call it the "conformism game": it consists of several

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<sup>18</sup>Without entering the details of the comparative statics, it can be seen from Table 1 that a marginal increase in  $\beta$  has, first of all, a positive first-order effect on the marginal benefit ( $-X_\theta$ ), plus other second-order effects that can be safely taken as dominated.

subsequent rounds of simultaneous two-players, one-shot bargaining games, each of them pairing agents with differing views on what is the "correct" strength of the norm. At the end of a typical game, the players may agree on a norm, and follow it; or, if no agreement has been reached, they may continue to follow the same norm as before entering the game. Suppose that all the games end with the agents agreeing on a level of  $\theta$ , and that this level is the same across games; then this common outcome will constitute the social norm.

The outcome of the game depends crucially on the costs associated with the two possible courses of action at disposal of the agent – agree or disagree. After the debate, they may have converged on the same position, or they may have stayed where they were before. There certainly is an utility loss to face when adopting the other’s view, i.e. when agreeing; there is however also a cost for disagreeing, and whenever it exceeds the cost of switching sides, the agent will change idea, and will behave according to the newly adopted norm. Importantly, the costs for disagreeing are not symmetric; they are heavier for agents in the minority group. This is essentially the meaning of the tendency towards conformism: the cost of disagreeing depends on the difference between the size of the groups to which the agents belong, in the sense that, the larger an agent’s group size is, the more secure she is in her positions and the lower is for her the cost of disagreeing.

In order to give a formal account, we start by defining a weight-adjusted income distribution, where the weights are meant to reflect the social influence of each income group; there is little doubt that some categories have more say than others in determining the course of things, in the sense that what they do, the way they behave, constitutes more of a model for the rest of the society.<sup>19</sup> We have

$$\varphi(y) = m(y) f(y), \tag{36}$$

where  $m(y)$  are the weights, satisfying  $m(y) \in (0, 1)$  for all  $y$ , and  $\int m(y) = 1$ ; hence,  $\varphi(y)$  has all the properties of a distribution function, i.e. it is nonnegative and integrates to unity. If  $m'(y) = 0$ , all agents carry the same social weight, whereas if  $m'(y) > 0$  higher-income agents have more influence; we take the latter as our working hypothesis, as it seems more plausible, and also more consistent with our previous assumptions on the comparison income effect. The function representing the psychic cost of disagreeing for an agent with income  $y^i$  arguing with

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<sup>19</sup>Psychological studies highlight that non only the size, but also the authoritativeness, of the group supporting a given view, determines the success of that view; see Bond and Smith (1996) for a long list of references.

an agent with income  $y^j$  is then taken to be

$$g^i = g(\varphi(y^j) - \varphi(y^i)), \quad (37)$$

with  $g'(\cdot) > 0$ ,  $g^i = 0$  for  $\varphi(y^j) \leq \varphi(y^i)$  and  $g^i > 0$  for  $\varphi(y^j) > \varphi(y^i)$ .<sup>20</sup> Thus, supposing e.g. that  $\varphi(y^j) > \varphi(y^i)$ , a typical game will either end with the two agents having utility

$$W(\theta(y^i), y^i) - g^i; W(\theta(y^j), y^j) \quad (38)$$

if they disagree, or utility

$$W(\theta(y^j), y^i); W(\theta(y^j), y^j) \quad (39)$$

if the agent in  $i$ -income group accepts the view of the other agent. Whenever

$$W(\theta(y^i), y^i) - W(\theta(y^j), y^i) \leq g^i \quad (40)$$

the  $i$ -agent will take the view of  $j$ -agent as her own – she will conform to that view and act accordingly.

Each income group will exert some influence on the *neighbouring* groups concerning the "right" strength that should be given to the social norm; this captures roughly the notion that people tend mostly to communicate, and exchange ideas and opinions, with those who are on the social ladder in a position similar to their own.

The idea behind the conformism game is that the more influential group in these interactions will be the one with the largest adjusted size. Indeed, in the weight-adjusted distribution, there will be an income level  $y^d$  representing the mode; the ideal level of the norm for those with income  $y^d$  will be  $\theta^d = \theta(y^d)$ . We take this group, which constitutes the relative majority, as the first mover in the conformism game: it will exert its influence on the groups in the intervals  $[y^d - \eta^1, y^d)$  and  $(y^d, y^d + \eta^1]$ , where  $\eta^1 > 0$  is such that the total number of agents in the intervals is the same as the number of agents in the  $y^d$ -group.<sup>21</sup> The first round of games sees then each agent in the above-defined intervals playing against one agent in the  $y^d$ -group. Since all income groups in the intervals are smaller, the agents in them will experience a positive cost of disagreeing. If the condition in (40) is satisfied for all of these agents, there will be at the end of this first round a new relative majority, made of those whose income lies between  $y^d - \eta^1$

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<sup>20</sup>We take the extreme view that majority members face no cost for disagreeing; this simplifies the analysis, but it is not essential (what counts is that costs are asymmetric for agents in groups of different sizes).

<sup>21</sup>We take for simplicity the interval to be symmetric around  $y^d$ , but this is in fact inessential

and  $y^d + \eta^1$  (both included), all supporting the view that  $\theta = \theta^d$ . Indeed, it is easy to see that each two-player game will end up with both agents agreeing that  $\theta = \theta^d$  is the "correct" view, as there are only two possibilities: either the majority member proposes her view first, and the other agrees by condition (40), or the other proposes her view first, the majority member refuses at no cost and counterproposes her opinion, and the other agrees as above.

At the second round, the members of the new majority will exert influence on the agents in the intervals  $[y^d - \eta^1 - \eta^2, y^d - \eta^1)$  and  $(y^d + \eta^1, y^d + \eta^1 + \eta^2]$ , where  $\eta^2$  is chosen to obtain a number of additional players equal to those in the new majority group; another round of games is played, and if the condition in (40) is satisfied for the new players, the process continues for another round, and so on. The conformism game ends when all agents share the same view of what constitutes the "right" strength of the social norm, or when the (always increasing) majority finds, on both sides, a group for which the condition (40) does not hold. In the paper, we have implicitly assumed that the first was the case, mostly for reasons of simplicity; this requires that the cost function increases sufficiently rapidly as differences in group size grow round after round, so as to counteract the also growing distance between  $W(\theta(y^j), y^i)$  and  $W(\theta(y^i), y^i)$  in (40), due to the wider gap in the level of  $\theta$  that, in turn, follows from Assumption 2a.

Crucially, we see that in general the socially accepted value of  $\theta$  will be positive as long as the mode of the *adjusted* distribution is below the mean of the *original* distribution, i.e. as long as  $y^d < \bar{y}$ . However, the weight system as well as the original distribution heavily affect the final outcome. If all groups had the same weight, then we would have that, the more unequal the income distribution, the more towards the bottom would be the mode, and the stronger would be the social norm by Assumption 2a. But if we adopt the arguably more plausible view that the weights increase in income (see above), then the mode of the *adjusted* distribution moves towards the middle of the *original* distribution; the stronger is the effect of income on the weights, the closer will  $y^d$  be to  $\bar{y}$ , and the weaker will be the norm. In an extreme case,  $y^d$  could also be larger than  $\bar{y}$ , i.e. no stigma would be attached to tax dodging. Loosely speaking, we could thus say that a more democratic society, one when all categories have some weight in the social and political discourse, will give more bite to the norm.

There are other factors affecting the strength of the norm. One such factor is the intensity of social competition: by Assumption 2b, if we were to compare two otherwise identical societies differing for the value of  $\beta$ , the one in which social competition is stronger will also have a stronger norm. Another factor is the relationship between the the mode of the adjusted distri-

bution and the median of the original distribution. At this level of generality, it is impossible to say which of the two is larger; again, it is mostly a matter of how the weighting system is specified. In general the socially accepted norm as generated by the conformism game will *not* be the norm that would be preferred by the median voter. However, it is to be expected that if the income distribution is very unequal, so that the mode is very much towards the bottom, then also the median will be relatively far from the mean. Thus, the same factor that introduces strong progressivity in the tax system also favours a strong social norm.

## V Concluding remarks

We have modelled the behaviour of taxpayers trying to decide the amount of income they can hide from the fiscal authorities, assuming that their choices are affected by the presence of a social norm stigmatizing tax dodging and their preferences include a social comparison effect. After identifying the agents' equilibrium, we have evaluated their ideal tax policies, and found that the political equilibrium is of the median voter variety. Then, we discussed the impacts of the social custom and of the social comparison effect on the policy prevailing at the political equilibrium, and argued that both make the tax system more likely to be *statutorily* progressive (the question whether they make also the tax system being more *effectively* progressive remains unresolved).

We also investigated the source of the social norm, introducing an informal mechanism for aggregating the individuals' preferences on the norm which we dubbed the conformism game. We found that the strength of the social custom depends on two factors. First, such a norm plays a useful social role because it makes redistribution more effective; second, it facilitates social competition. As such, it is valued mostly by the low-income individuals, who have much to benefit both from redistribution and social mobility. Hence, it will be particularly felt in societies with stable democratic institutions in which even the poor can make their voice heard by the general public. This is consistent with the observation that in mature democracies like those of the Anglo-Saxon or Scandinavian countries there is much more stigma associated with anti-social acts like tax dodging than in less stable democracies, like those of some Southern European countries or those of the transition and developing countries.

## Appendix A: Introducing enforcement policy

In fn. 6, we suggested that our results are robust to an obvious extension of the model, that of including an active enforcement policy. We proceed now to summarise the main steps needed to reach this conclusion; many details are omitted because the reasoning follows closely the basic model.

In the modified version, we write the monetary cost of avoidance as

$$e(\eta, \theta) k(a), \quad (\text{A1})$$

with  $e \geq 1$ ,  $e_\eta > 0$ ,  $e_\theta > 0$  and  $e(0, 0) = 1$ . Here,  $e$  is the enforcement level, taken to depend positively on government expenditure  $\eta$  as well as on the norm  $\theta$ ; this is because of the argument already alluded to in the Introduction according to which a social climate where avoidance is condemned should be accompanied by less scope for corruption and other forms of antisocial behaviour, thereby making enforcement more effective. Utility becomes

$$u = (1 - t + ta - e(\eta, \theta) k(a) - \theta c(a)) y + T - \beta S \quad (\text{A2})$$

and the first order condition is  $t = ek' + \theta c'$ . The solution is  $a(t, \theta, \eta)$ , and we have (details are in the next Appendix)

$$a_t > 0; a_\theta < 0; a_\eta < 0, \quad (\text{A3})$$

as expected; that is, avoidance is deterred both by the norm and by the government expenditure in enforcement, and boosted by increases in the tax rate. Reported income  $r(t, \theta, \eta)$  is defined, and its properties are characterised, as before. Furthermore, we find that

$$\pi_\eta = (t - ek') a_\eta < 0; X_\eta = y\pi_\eta < 0 \quad (\text{A4})$$

that is, the effective tax rate is increasing, while consumption is decreasing, in enforcement expenditure.

The new public revenue constraint is

$$T(t, \theta, \eta) = t\bar{r}(t, \theta, \eta) - \eta, \quad (\text{A5})$$

and this leads us to rewrite indirect utility as

$$V(t, \eta; \beta, \theta, y) = (1 - t + ta - e(\eta, \theta) k(a) - \theta c(a)) y + t\bar{r}(t, \theta, \eta) - \eta - \beta \bar{X}(\cdot). \quad (\text{A6})$$

It turns out that this specification satisfies the intermediate preferences condition as stated by Grandmont (1978), because it can be written in the form

$$V(t, \eta; y) = V^1(t, \eta) \cdot V^0(y) + V^2(t, \eta) \quad (\text{A7})$$

where  $V^1(t, \eta) = 1 - t + ta - e(\eta, \theta)k(a) - \theta c(a)$  and  $V^2(t, \eta) = t\bar{r}(t, \theta, \eta) - \eta - \beta\bar{X}(\cdot)$  are common across agents and  $V^0(y) = y$  is monotonic in type (income). This implies that, although the policy is bidimensional, the conflict is in fact unidimensional; then, the median voter theorem applies in a standard model of political competition with office-seeking candidates, commitment, and majority voting. We can easily determine the equilibrium policy, adding the usual assumption that the median income is below the mean. The median voter's ideal tax rate is obtained with the same procedure as in the basic model, and has the same qualitative properties, including the comparative statics. The median voter's ideal enforcement expenditure is found by solving

$$V_\eta(y^m) \equiv t\bar{r}_\eta - 1 - \beta\bar{X}_\eta = 0. \quad (\text{A8})$$

Since for the median voter  $\beta = \tilde{\beta}$ , recalling that  $r_\eta = -ya_\eta$  and using (A4), it is easily seen that the above condition becomes  $1 = -(t + \tilde{\beta}\theta c')\bar{y}a_\eta$  or simply

$$1 = -t\bar{y}a_\eta, \quad (\text{A9})$$

as we assumed that  $\tilde{\beta}\theta c' \simeq 0$ . At an interior solution, which we expect to hold normally, the marginal cost of expenditure – unity – is equated to the marginal benefit in terms of larger revenue. Note that since  $a_\eta$  is independent of income, so is condition (A9):<sup>22</sup> all agents agree on the ideal enforcement expenditure, and therefore the equilibrium expenditure is ideal for all.

Turning now to the analysis of the endogenous formation of the norm, the first step is finding the preferred level. Letting  $e^m = e(\eta^m, \theta)$  and  $a^m = a(t^m, \eta^m)$ , we can write

$$W(y, \theta, \beta) = (1 - t^m + t^m a^m - e^m k(a^m) - \theta c(a^m))y + T(t^m, \eta^m, \theta) - \beta\bar{X}(t^m, \eta^m, \theta), \quad (\text{A10})$$

to be maximised w.r.t.  $\theta$  s.t.  $\theta \geq 0$ . We have:

$$W_\theta \equiv V_{t^m} t_\theta^m + V_{\eta^m} \eta_\theta^m - \beta\bar{X}_\theta - y(c + e_\theta k) \leq 0, \quad (\text{A11})$$

plus complementary slackness. Since however the optimal  $\eta$  is the same across agents, we have that  $V_{\eta^m} = 0, \forall y$ ; the derivative is evaluated at the optimum for all individuals. Then, a

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<sup>22</sup>Strictly speaking, the conditions differ for the fact that  $\beta = 0$  for high incomes and  $\beta = \tilde{\beta}$  for low incomes; but since we posit  $\tilde{\beta}\theta c' = 0$ , this difference vanishes too.

comparison between (34) and (A11) readily reveals that from here on, the analysis can proceed exactly in the same way as in the basic model, with the minor difference that the cost of a marginal strengthening of the norm includes now the change in the monetary as well as the psychological costs of avoidance.

## Appendix B: Comparative statics

As mentioned above, this appendix illustrates the details of the comparative statics, both for the agent's and the political equilibrium.

**Comparative statics of the agent's equilibrium.** In the basic model, we know that at an interior solution:

$$u_a = t - k'y - \theta c' = 0; \quad u_{aa} = -k'' - \theta c'' < 0. \quad (\text{B1})$$

It is then immediate to compute:

$$u_{a\theta} = -c' < 0; \quad u_{at} = 1 > 0; \quad (\text{B2})$$

Thus:

$$a_\theta = -\frac{u_{a\theta}}{u_{aa}} < 0; \quad a_t = -\frac{u_{at}}{u_{aa}} > 0. \quad (\text{B3})$$

as reported in (13). In the extended version, we have

$$u_a = t - ek'y - \theta c' = 0; \quad u_{aa} = -ek'' - \theta c'' < 0, \quad (\text{B4})$$

and hence

$$u_{a\theta} = -e_\theta k'y - c' < 0; \quad u_{at} = 1 > 0; \quad u_{a\eta} = -e_\eta k'y < 0, \quad (\text{B5})$$

so that:

$$a_\theta = -\frac{u_{a\theta}}{u_{aa}} < 0; \quad a_t = -\frac{u_{at}}{u_{aa}} > 0; \quad a_\eta = -\frac{u_{a\eta}}{u_{aa}} < 0. \quad (\text{B6})$$

**Comparative statics of the political equilibrium.** In both versions of the model, the ideal tax rate, *for all agents below the average income*, is found by solving

$$V_t \equiv (a - 1)(y - \tilde{\beta}\bar{y}) + (1 - a)\bar{y} - t\bar{y}a_t - \tilde{\beta}\bar{y}a_t\theta c' = 0 \quad (\text{B7})$$



for  $t$ . In order to simplify the derivation of the comparative statics results it is important to recognise that the last term in (B7) is in fact negligible since  $\tilde{\beta}\theta c' \simeq 0$ . Then

$$V_{tt} = a_t \left( y - \left( 1 + \tilde{\beta} \right) \bar{y} \right) - t\bar{y}a_{tt} < 0; \quad (\text{B8})$$

the sign follows because  $a_{tt} \geq 0$  by Assumption 1. Then, we have

$$V_{ty} = a - 1 < 0; \quad (\text{B9})$$

$$V_{t\beta} = -\bar{y}(a - 1) = r > 0; \quad (\text{B10})$$

$$V_{t\theta} = a_\theta(y - \left( 1 + \tilde{\beta} \right) \bar{y}) - t\bar{y}a_{t\theta} > 0; \quad (\text{B11})$$

the sign of  $V_{t\theta}$  follows because  $a_{t\theta} \leq 0$  by Assumption 1. This yields

$$t_y = -\frac{V_{ty}}{V_{tt}} < 0; \quad t_\beta = -\frac{V_{t\beta}}{V_{tt}} > 0; \quad t_\theta = -\frac{V_{t\theta}}{V_{tt}} > 0. \quad (\text{B12})$$

The sign of the first derivative tells us that the ideal tax rate is decreasing in income, as explained informally in the main text. The signs of the second and third derivatives, when applied to the winning policy, the median voter's preferred tax rate, confirm (30).

In the extended version, we also have a condition for the ideal enforcement expenditure; but as we saw, it is independent of income, and the exact way in which it interacts with the norm and the comparison income coefficient is inessential to the results.

## References

- Akerlof, G., 1980, "A theory of social custom of which unemployment may be one consequence", *Quarterly Journal of Economics*, 94, 749-775.
- Anderberg, D., A. Balestrino and U. Galmarini, 2003, "Search and taxation in a model of underground economic activities", *Economic Inquiry*, 41, 647-659.
- Asch, S., 1955, "Opinions and social pressure", *Scientific American*, Nov., 31-35.
- Balestrino, A. and U. Galmarini, 2003, "Imperfect tax compliance and the optimal provision of public goods", *Bulletin of Economic Research*, 55, 37-52.
- Baron, R., J. Vandello, B. Brunsman, 1996, "The forgotten variable in conformity research: impact of task importance on social influence", *Journal of Personality and Social Psychology*, 71, 915-27.
- Boadway, R., M. Marchand and P. Pestieau, 1994, "Towards a theory of the direct-indirect tax mix", *Journal of Public Economics*, 55, 71-88.

- Bond, R. and P. Smith, 1996, "Culture and conformity: A meta-analysis of studies using Asch's line judgement task", *Psychological Bulletin*, 119, 111-137.
- Boskin, M. and E. Sheshinski, 1978, "Optimal redistributive taxation when individual welfare depends upon relative income", *Quarterly Journal of Economics*, 92, 589-601.
- Coleman, J. 1990, *Foundations of social theory*, Harvard University Press.
- Cowell, F., 1990a, *Cheating the government*, MIT Press.
- Cowell, F., 1990b, "Tax sheltering and the cost of evasion", *Oxford Economic Papers*, 42, 231-243.
- Cullis, J and A. Lewis, 1997, Why people pay taxes: from a conventional economic model to a model of social convention, *Journal of Economic Psychology* 18, 305-321.
- Easterlin, R., 2001, "Income and happiness: towards a unified theory", *Economic Journal*, 111, 465-484.
- Dufwenberg, M. and M. Lundholm, 2001, "Social norms and moral hazard", *Economic Journal*, 111, 506-525.
- Falk, A. and M. Knell, "Choosing the Joneses: endogenous goals and reference standard", *Scandinavian Journal of Economics*, 106, 417-435.
- Falkinger, J., 2004, "Noncooperative support of public norm enforcement in large societies", CESifo WP no. 1368.
- Fehr, E. and A. Falk, 2002, "Psychological foundations of incentives", CESifo WP no. 714.
- Feld, L. and B. Frey, 2005, "Tax compliance as the result of a psychological tax contract: the role of incentives and responsive regulation", mimeo, Phillips-University of Marburg and University of Zurich.
- Ferrer-i-Carbonell, A., 2005, "Income and well-being: an empirical analysis of the comparison income effect", *Journal of Public Economics*, 89, 997-1019.
- Friedman, E., S. Johnson, D. Kaufmann, and P. Zoido-Lobaton, 2000, "Dodging the grabbing hand: the determinants of unofficial activity in 69 countries", *Journal of Public Economics*, 76, 459-93.
- Festinger, L., 1950, "Informal social communication", *Psychological Review*, 57, 271-282.
- Gans, J. and M. Smart, 1996, "Majority voting with single-crossing preferences", *Journal of Public Economics*, 59, 219-37.
- Gordon, J. 1989, "Individual morality and reputation costs as deterrents to tax evasion", *European Economic Review*, 33, 797-805.

- Grandmont, J.-M., 1978, "Intermediate preferences and the majority rule", *Econometrica*, 46, 317-330.
- Hogg, M. and E. Hardie, 1992, "Prototypicality, conformity and depersonalised attraction: a self-categorisation analysis of group processes", *British Journal of Social Psychology*, 31, 41-56.
- Ireland, N., 2001, "Optimal tax in the presence of status effect", *Journal of Public Economics*, 81, 193-212.
- Johnson, S., D. Kaufmann and A. Scheifer, 1997, "The unofficial economy in transition", *Brook-  
ing Papers on Economic Activity*, 2, 159-221.
- Johnson, S., D. Kaufmann and P. Zoido-Lobaton, 1998, "Regulatory discretion and the unofficial economy", *American Economic Review Papers and Proceedings*, 88, 387-92.
- Kopczuk, W., 2005, "Tax bases, tax rates and the elasticity of reported income", *Journal of Public Economics*, 89, 2093-2120.
- Lemieux, T., B. Fortin and P. Frechette, 1994, "The effect of taxes on labor supply in the underground economy", *American Economic Review*, 84, 231-254.
- Lindbeck, A., S. Nyberg and J. Weibull, 1999, "Social norms and economic incentives in the Welfare State", *Quarterly Journal of Economics*, 114, 1-35.
- Lindbeck, A. and M. Persson, 2006, "A model of income insurance and social norms", CESifo WP no. 1675.
- Lewin, K., 1965, "Group decision and social change", in H. Proshansky and B. Seidenberg (eds.), *Basic Studies in Social Psychology*, Holt, Rinehart and Winston.
- Meltzer, A. and S. Richard, 1981, "A rational theory of the size of the government", *Journal of Political Economy*, 89, 914-27
- Myles, G. and R. Naylor, 1996, "A model of tax evasion with group conformity and social customs", *European Journal of Political Economy*, 12, 49-66.
- Orviska, M. and J. Hudson, 2002, "Tax evasion, civic duty and the law abiding citizen", *European Journal of Political Economy*, 19, 83-102.
- Schneider, F. and D. Enste, 2002, *The shadow economy*, CUP.
- Sherif, M., 1936, *The psychology of social norms*, Harper.
- Slemrod, J., 2001, "A general model of behavioural response to taxation", *International Tax and Public Finance*, 8, 118-128.
- Smith, P. and M. Bond, 1993, *Social psychology across cultures: analysis and perspectives*, Harvester Wheatsheaf.

Triandis, H., 1989, "The self and social behaviour in different cultural contexts", *Psychological Review*, 96, 506-520.

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