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A. Balestrino

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e-mail: de-child@unito.it
Web site: <http://www.child-centre.it>

Tax avoidance, endogenous social norms, and the comparison income effect*

Alessandro Balestrino[†]

University of Pisa, CESifo and Child

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Abstract

We analyse a model of income tax avoidance with heterogenous agents; we assume the presence of a comparison income effect and of a psychic cost (disutility) of tax dodging. In this context, we show two sets of results. First, we study the policy preferences of the agents, and identify a median-agent political equilibrium. Paralleling previous findings 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. Second, we model the endogenous formation of the stigma attached to the act of avoidance as a "conformism game", and propose a "modal-agent social equilibrium". We also argue that, in general, the stigma is motivated by the desire to make redistribution more effective, as well as by the need to facilitate social competition.

JEL Code: D72, H26, H31, Z13

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[†]University of Pisa, Department of Economics, Political Sciences Faculty Building, via Serafini 3, 56126 Pisa, Italy; e-mail balestrino@sp.unipi.it.

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.¹

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.² In order to do this, we can rely on two important lines of research,

¹According 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.

²For 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 model we employ to investigate the questions posed above has the following timing: 1) agents establish social norms; 2) agents vote on policy; 3) agents make avoidance decisions. In line with the standard backward solution procedure we proceed first to illustrate the third stage (Section 2). Our agents have fixed incomes and must only decide whether to dodge the income tax and if so, to what extent.³ For reasons to be made clear below, we are interested in analysing the role of social competition. To this end, 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.⁴

In Section 3, we move back to the second stage, i.e. we study the agents' 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; 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

social convention. Also, the present paper is related to the research on tax morale, see e.g. Torgler (2005) and the references therein.

³In 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).

⁴For a broader view of social preferences and their relationship with the social norms, see Fehr and Falk (2002).

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, the marginal income tax rates were reduced in Italy, beginning from 2005. The necessity of such a reform had been often announced in terms that clearly signalled 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*"⁵. In 2006, the government has changed, a tougher stance on tax dodging has been taken, and the tax rates pertaining to the higher income brackets have been increased from 2007 onwards (in 2008, the government changed again; the tax rates have *not* been brought back to their previous levels, although a property tax has been canceled, and a more relaxed attitude towards tax dodging has been *de facto* announced in official documents).

Finally, in Section 4, we examine the preferences of the agents concerning the force of the social norm (first stage). 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, first and foremost, the purpose of making redistribution less costly and more effective. This in fact straightforward: when the norm is active, compliance rises, hence there will be less distortion associated with redistributive taxation. One might also argue that the norm serves at least a second, less self-evident, purpose, namely to facilitate social competition. There is in fact evidence (Triandis, 1989; Smith and Bond, 1993) that people from competitive societies like that of the US conform to customs condemning anti-social 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). We should then find that a norm against tax dodging is stronger, the more competitive the society is: where people feel a strong urge of bettering themselves, social mobility is high, and the search for status compelling, norms such

⁵Reported by *Time*, March 1, 2004, p. 17, emphasis added.

as this are extremely important in that they prevent competition from degenerating into a rat race. Our formal analysis turns out to be consistent with this point of view.

Section 5 offers a brief summary and some concluding remarks.

II A model of tax avoidance with social stigma

In order to keep the tax dodging model manageable, we will introduce several simplifications, such as a quasi-linear utility function, or a reduced-form approach to norm adherence based on the notion of psychic cost of violation. None of them is however really crucial for the results we are pursuing; they only reflect our modelling strategy, namely to keep the framework in which the agents make their basic choices as straightforward as possible, so as to be able to build comparatively more elaborate models of voting behaviour and, mostly, social interaction.

The main ingredients

Consider an economy inhabited by agents differing for their gross incomes y . Gross income is fixed, and can take three different values, $y^3 > y^2 > y^1$. There are n^i agents in each income group, $i = 1, 2, 3$, and the median income agents is taken to belong to group 2. We posit $n^1 > n^2 > n^3$, and normalise the total number of agents to unity, $\sum_i n^i = 1$. 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 $a^i \in [0, 1]$ be the percentage of hidden income, such that $r^i = (1 - a^i) y^i$ is the income actually reported, and $h^i = a^i y^i$ is hidden income. In order to avoid taxes,⁶ 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 costs associated with breaking the social norm condemning tax avoidance (provided such norm exists). The m-cost function is written $K(h^i, y^i)$, and the p-cost function is written $\theta C(h^i, y^i)$, where $\theta \in [0, 1]$ measures the strength

⁶We 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).

of the social norm (for $\theta = 0$ the norm is in fact absent). We assume that $K(\cdot)$ and $C(\cdot)$ are both strictly convex in h as well as homogeneous of degree one in h and y , and that

$$K(0, y^i) = K_h(0, y^i) = C(0, y^i) = C_h(0, y^i) = 0. \quad (1)$$

Then, we can write per-unit-of-true-income cost functions as

$$k(a^i) \equiv K(a^i y^i, y^i) / y^i = K(a^i, 1); \quad c(a^i) \equiv C(a^i y^i, y^i) / y^i = C(a^i, 1); \quad (2)$$

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

$$k(0) = k'(0) = c(0) = c'(0) = 0. \quad (3)$$

The functions defined in (2) 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).

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

$$X^i = (1 - t + ta - k(a)) y^i + T. \quad (4)$$

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 increases, and less happy when the consumption 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. Hence, in general such utility function will be written

$$u^i = U(X^i, X^i - S, C^i), \quad (5)$$

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. That is, we let

$$x^i = (1 - \beta) X^i + \beta (X^i - S) = X^i - \beta S \quad (6)$$

where β is a dummy variable taking values

$$0 \text{ for } X^i \geq S; \quad \tilde{\beta} \in (0, 1) \text{ for } X^i < S. \quad (7)$$

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.⁷

The agent's problem

Given the above assumptions, we may write the utility function as $u^i = x(a^i) - y^i \theta c(a^i)$. Substituting the agent's budget and rearranging gives:

$$u^i = (1 - t + ta^i - k(a^i) - \theta c(a^i)) y^i + T - \beta S. \quad (8)$$

Maximising w.r.t. a . we get

$$t = k' + \theta c', \quad (9)$$

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 $a^i = 0$, as it becomes $0 = 0$ by (3).

We denote the solution as $a = a(t, \theta)$. Given quasi-linearity, and first-degree homogeneity of the cost functions, neither gross income nor the reference standard affect the solution.⁸ Straightforward comparative statics yields:

$$a_t > 0; \quad a_\theta < 0, \quad (10)$$

that is, the avoidance activity increases when the tax rate rises and decreases when its sanctionability increases (see the Appendix for details of derivation). We also make the following assumption on the behaviour of second derivatives:

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

⁷Falk 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").

⁸Quasi-linearity also implies that neither the poll-tax nor the parameter β have any impact on the avoidance decision.

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, $r^i = y^i(1 - a)$, it is easy to see using (10) that r^i decreases as t increases, and increases with θ , since $r_z^i = -y^i a_z$, $z = t, \theta$. Moreover, we have $r_y^i = (1 - a) > 0$, that is, reported income rises with true income. However, hidden income $h^i = ay^i$ 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).⁹

Finally, consider net income or consumption. Define

$$\pi(t, \theta) \equiv 1 - t(1 - a(t, \theta)) - k(a(t, \theta)) > 0 \quad (11)$$

as the complement to unity of the *effective* tax rate, the percentage of income which is actually lost due to taxation, including the benefits and costs of avoidance.¹⁰ We can then write $X^i = \pi(\cdot)y^i + T$. First, note that

$$\pi_\theta = (t - k')a_\theta < 0; \quad (12)$$

$$\pi_t = -(1 - a) + (t - k')a_t, \quad (13)$$

where the sign of the first derivative follows from (9) and (10). 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

$$X_\theta^i = y^i \pi_\theta < 0; \quad X_t^i = y^i \pi_t; \quad X_T^i = 1; \quad X_y^i = \pi > 0. \quad (14)$$

⁹This 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).

¹⁰It is possible to show that (9) implies $1 > t(1 - a) + k + \theta c \geq t(1 - a) + k$, so that π 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 $t(1 - a) + k + \theta c \equiv \int_0^a t dz - \int_a^1 \gamma(z) dz < t \equiv \int_0^1 t dz$, since $-\gamma(z) < t$ for $z \in (a, 1)$ by (9). Clearly, if $t(1 - a) + k + \theta c < t$ then $t(1 - a) + k + \theta c < 1$ for $t \leq 1$.

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 gross true income distribution carry over to both the reported and net income distributions. We shall use frequently this fact in what follows, as it facilitates the interpretation of the policy results.

III Voting behaviour

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

$$S = \overline{X}(t, T; \theta) = \pi(t, \theta) \overline{y} + T, \quad (15)$$

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 (14), that

$$\overline{X}_t = \pi_t \overline{y}; \quad \overline{X}_T = 1; \quad \overline{X}_\theta = \pi_\theta \overline{y} < 0. \quad (16)$$

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.

Policy preferences

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

$$V(t, T; \beta, \theta, y^i) = (1 - t + ta - k(a) - \theta c(a)) y^i + T - \beta \overline{X}(\cdot). \quad (17)$$

The marginal rate of substitution between policy tools is

$$MRS_{Tt}^i \equiv -\frac{V_t^i}{V_T} = -\frac{(a-1)(y^i - \beta \overline{y}) - \beta \overline{y} a_t \theta c'}{1 - \beta}, \quad (18)$$

where we used (13) and the fact that $t - k' = \theta c'$ by (9). The MRS is monotonic in type, since

$$\frac{\partial (-V_t^i/V_T)}{\partial y} = \frac{1-a}{1-\beta} > 0. \quad (19)$$

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

$$t\bar{r}(t, \theta) = T, \quad (20)$$

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

$$\bar{r}(t, \theta) = (1 - a(t, \theta))\bar{y}. \quad (21)$$

We can interpret the budget equation as expressing T as a function of t (and θ) and check whether the revenue curve in the (t, T) -space (holding θ fixed) is strictly concave, i.e. if $T_t > 0$ and $T_{tt} < 0$.¹¹ We note that $T_t = \bar{r} + t\bar{r}_t$, where $\bar{r}_t = -\bar{y}a_t < 0$ by (10); this is positive as long as

$$\left| \frac{t}{\bar{r}} \bar{r}_t \right| < 1 \quad (22)$$

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 $T(t, \theta)$:

$$V_t^i = (a - 1)(y^i - \beta\bar{y}) - \beta\bar{y}a_t\theta c' + (1 - a)\bar{y} - t\bar{y}a_t = 0. \quad (23)$$

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

¹¹Incidentally, notice that $T_\theta = t\bar{r}_\theta > 0$, i.e. if the social norm becomes more stringent, revenue will go up.

find that:

$$t(\theta, \beta, y^i) = \frac{(1-a)}{a_t} \left(\left(1 + \tilde{\beta}\right) - \frac{y^i}{\bar{y}} \right) - \tilde{\beta}\theta c' \text{ for } y^i < \bar{y}; \quad (24)$$

$$t(\theta, \beta, y^i) = \frac{(1-a)}{a_t} \left(1 - \frac{y^i}{\bar{y}} \right), \text{ for } y^i \geq \bar{y}. \quad (25)$$

Since $\bar{a}_t > 0$ by (10), it follows that agents with higher than average income would prefer income subsidisation, but we ruled out that possibility, so they will settle for a corner solution, $t = 0$. An hypothetical 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 (24) will readily reveal that the ideal tax rate is monotonically decreasing in income for $y^i < \bar{y}$ (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.

The political equilibrium

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 income¹² (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. As y^2 is the median income, we can in fact write the winning policy as¹³

$$t(\theta, \beta, y^2) = \frac{(1-a)}{a_t} \left(\left(1 + \tilde{\beta}\right) - \frac{y^2}{\bar{y}} \right) - \tilde{\beta}\theta c'. \quad (26)$$

The budget-balancing value of the universal grant will be established via the relationship $T(t(\theta, \beta, y^2), \theta)$. It would be interesting to investigate the impact of changes in β and θ

¹²In the present setup, this means that $y^3 > \bar{y} > y^2 > y^1$.

¹³The term $\tilde{\beta}\theta c'$ is presumably negligible and could be ignored in actual computations: for example, if we solve explicitly for the tax rate with quadratic avoidance cost functions $c(a) = k(a) = 0.5a^2$, it is possible to verify that setting $\tilde{\beta}\theta c' = 0$ does not alter significantly the equilibrium tax rate (up to the third decimal place) no matter how we change the constellation of parameters.

on the equilibrium tax rate. Intuitively, we expect the following.

First, there is a result in the optimal taxation literature that should carry over to our set-up. In contributions like those of Boskin and Sheshinski (1978) and Ireland (2001) it is argued 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 might 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. We therefore expect the equilibrium tax rate to be increasing in the comparison income effect.

There is a second result that is instead entirely specific to our contribution, and offers a complementary explanation of the prevalence of redistributive tax systems; indeed, we might also argue 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).

The analysis (see the Appendix) supports the intuitive arguments. The ideal policy problem is well-behaved, in the sense that $V_{tt}^i < 0$ for all agents with income below the mean (including the median income agent); this allows us to perform a meaningful comparative statics analysis. We find that, under Assumption 1 and a other mild technical conditions, the following is true:

Proposition 1 *The equilibrium tax rate is increasing in the comparison income effect and in the strength of the social norm:*

$$t_\beta(\theta, \tilde{\beta}, y^2) > 0; \quad t_\theta(\theta, \tilde{\beta}, y^2) > 0. \quad (27)$$

IV Endogenous formation of the social norm

In the analysis so far, we have treated θ 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.¹⁴ Agents have preferences over policies, and then the policy preferences are aggregated through a formal mechanism (i.e. voting) yielding the policy choice. In a similar way, agents have preferences over the customs and there is an informal mechanism aggregating these preferences into a society-wide norm. The informal mechanism relies on what we called a tendency to conformism.

This tendency has been studied extensively in social psychology. Among the first proposed explanations, there is one by Festinger (1950) that is especially relevant to our context. He suggested that conformism appears, *inter alia*, when 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. 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. More recently, Wenzel (2004) and Ashby et al. (2009), among others, have investigated the question whether a sense of national identity can incentivate conformity to social norms favouring tax compliance (that is, stigmatising tax dodging): they found that indeed when honest tax-paying is associated with the idea of being a citizen of one's country, those who identify the most are also keener to comply with their tax duties. The idea of social identity as a building block for conformist attitudes goes back at least to Tajfel and Tator (1979) in social psychology, and has been recently emphasised by economists too (Akerlof and Kranton 2000, 2005).

There is also a wealth of experimental evidence in favour of the idea that conformism to the majority or otherwise authoritative groups is a trait shared by all main contemporary cultures. For example, we might want to consider the large social psychology literature based on the "line judgement task", originally devised by Asch (1955). The experiment can be briefly described as follows. An experimenter asks the subject to guess the length of a line traced on a wall in front of an audience that the subject believes to be made of other subjects but actually includes several other experimenters. The hidden experimenters suggest inaccurate guesses as a counterproposal to the subject's guess. Even when counterproposals are evidently wrong, if the hidden experimenters form a majority in their support, the subject normally agrees with them. In fact, in all 100-plus versions of this classical experiment reviewed by Bond and Smith (1996),

¹⁴Including the enforcement procedures, an issue which is however not central to our present approach due to its reduced form structure (the use of a cost-of-avoidance function).

significant fractions of participants end up accepting the opinion of the majority also when they know, as ascertained by personal interviews after the experiment, that such an opinion is factually wrong.

In the light of the results of the above studies, we will take the conformity mechanism as given. This helps to keep the model manageable, and is common in the literature: Akerlof (1980) assumes for example that deviations from a custom entail a loss of reputation. We posit here, more generically, that disobeying a social norm produces a cost in utility term.¹⁵

Preferences over the social norm

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

$$\begin{aligned} W(y^i, \theta, \beta) &\equiv V(t^2, y^i, \theta, \beta) = \\ &= (1 - t^2 + t^2 a(t^2) - k(a(t^2)) - \theta c(a(t^2))) y^i + T(t^2, \theta) - \beta \bar{X}(t^2, \theta) \end{aligned} \quad (28)$$

where $V(\cdot)$ is defined in (17), the budget equation (20) has been used to replace T , $t^2 = t(y^2, \theta, \beta)$ is the equilibrium tax rate, and a is chosen optimally given $t = t^2(\cdot)$. We can now ask what the preferred θ would be for each agent. If we maximise $W(\cdot)$ w.r.t. θ , under the constraint that $\theta \geq 0$, we have that

$$W_\theta^i \equiv V_{t^2 t_\theta}^i + V_\theta = V_{t^2 t_\theta}^i - \beta \bar{X}_\theta - y^i c \leq 0; \theta \geq 0; \theta W_\theta^i = 0. \quad (29)$$

where $V_{t^2}^i = V_t^i|_{t=t^2}$.¹⁶

Consider first agents with income below the *mean* (that is, y^1 and y^2 – see fn. 12) For them, we have in general an interior solution, $\theta(y^i, \beta) > 0$, identified by:

$$V_{t^2 t_\theta}^i - \beta \bar{X}_\theta = y^i c, \quad (30)$$

¹⁵There have been attempts at deriving conformist attitudes endogenously starting from basic assumptions on preferences. Most notably, Bernheim (1994) considers a signaling model where agents care about their own consumptions as well as status, and concludes that when the preference for status is sufficiently large for enough agents, then a social custom is established. Notice that, as the author himself remarks, this result is obtained within a standard self-interested optimisation framework but depends on a non-standard formulation of preferences.

¹⁶We assume that the constraint $\theta \leq 1$ is always satisfied, and also that the problem is well-behaved.

level of y	Marg. benefit		Marg. cost	value of θ
y^1	$V_{t^2}^1 t_\theta^2 - \beta \bar{X}_\theta$	$=$	$y^1 c$	$\theta(y^1, \tilde{\beta}) > 0$
y^2	$-\beta \bar{X}_\theta$	$=$	$y^2 c$	$\theta(y^2, \tilde{\beta}) > 0$
y^3	0	$<$	$y^3 c - V_{t^2}^3 t_\theta^2$	$\theta(y^3, 0) = 0$

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

which can be interpreted as *net* marginal benefit ($V_{t^2}^i t_\theta^2 - \beta \bar{X}_\theta$) equating marginal cost ($y^i c$). The marginal cost of θ 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. As far as the latter is concerned, all agents below the *mean* income benefit from a marginal increase in θ , since it will reduce average consumption, $\bar{X}_\theta < 0$ by (16). As for the former, we know that an increase in θ produces a higher equilibrium tax rate, since $t_\theta^2 > 0$ by (27); hence, a marginally higher θ will represent a gain for all agents with income below the *median* (y^1) who would prefer a higher tax rate than the equilibrium one ($V_{t^2}^1 > 0$), while agents with *median* income (y^2) will be unaffected ($V_{t^2}^2 = 0$), as they have exactly the tax rate they want.

For agents with income above the *mean*, and as such also above the *median*, (y^3), we have instead a corner solution, since they would prefer a lower tax rate ($V_{t^2}^3 < 0$), and have $\beta = 0$, so that $W_t^3 = V_{t^2}^3 t_\theta^2 - y^3 c < 0$, and therefore $\theta(y^3, \beta) = 0$; for the high-income agents the social norm does not generate any benefit, only costs.

Condition (30) takes thus different forms depending on the level of the agent's income; Table 1 summarizes. We can summarise the analysis so far with the following:

Proposition 2 *The agents with income below the mean have a positive ideal level of the norm, i.e. favour an active condemnation of tax dodging.*

This is an important step in the direction we are pursuing, since we argued that the supporters of the norm will prevalently be among the low-income agents (see our Introduction), i.e. those who have more to gain from redistribution and social competition. The analysis allows to us to clarify this, as it points out that both y^1 - and y^2 -agents favor the establishment of the norm, but the intensity of the preference seems stronger for the low-income than for the middle-income group. Indeed, agents in both groups gain from the norm in terms of reduced

disutility from social comparisons, but only those in the former benefit also in terms of more redistribution via the tax system. We expect that $\theta^3 > \theta^2$, and, for the sake of clarity, we will assume that this is the case in what follows, although it is inessential to our arguments.

As we shall see presently, the result summarised in Proposition 2 gives the required structure to the model of social interaction that we will employ below to describe the aggregation of the individual preferences into a social norm.

The conformism game: basic ingredients

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 is intended to capture the idea that we interact with other members of our society in a myriad of circumstances: at home, on the workplace, on the commuter train, when we dine with friends, when we attend a meeting at our children's school, and so on and so forth. In the course of these interactions we shape our ideas (and contribute to shape those of others) on the common values of a society, including the particular object we are focusing on in this paper, namely the attitude towards tax dodging. The emphasis on conformism is meant to underline the fact that the more influential agents in these interactions will be the ones belonging to large communities sharing a common idea; the implicit or explicit support of a numerous group makes a person more capable to impose her own view or anyway to maintain it against the arguments of others who are in disagreement with her.

In our context, the members of a group are identified by the fact that they have the same income, and thus share the same view on what the appropriate level of θ should be. The conformism game consists of a potentially infinite sequence of rounds of simultaneous two-players, one-shot bargaining games, each of them pairing agents with possibly differing views on what is the "correct" strength of the norm (i.e. with possibly differing incomes). The games ends only if an overall agreement is reached, i.e. if it so happens that at some round everybody shares the same view on θ .

We begin by describing the typical two-player game. The players may agree on a norm, and both follow it; or, if no agreement has been reached, they may each continue to follow the same norm as before entering the game. We distinguish two types of games:

1. the **trivial games** are those in which the two agents share the same view on θ to begin with; the straightforward outcome is that they continue to agree.

2. the **non-trivial games** are those in which the agents have different views prior to their interaction; the outcome depends crucially on the costs associated with the two possible courses of action at their disposal – agree or disagree.

In the non-trivial two-player games, there 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 this cost exceeds the cost of switching sides, the agent will adopt the norm supported by her opponent in the game. 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. We define the cost of disagreeing for a y^i -agent facing a y^j -agent as

$$g^i = g(n^j - n^i), \quad (31)$$

with $g'(\cdot) > 0$, $g^i = 0$ for $n^j \leq n^i$ and $g^i > 0$ for $n^j > n^i$.¹⁷ Thus, supposing e.g. that $n^j > n^i$, and that the j -agent makes his proposal first, the pay-offs of a non-trivial typical game are described by the following matrix:

i 's choice	i	j
agree	$W(\theta(y^j), y^i)$	$W(\theta(y^j), y^j)$
disagree	$W(\theta(y^i), y^i) - g^i$	$W(\theta(y^j), y^j)$

Notice that the asymmetry in the cost function implies that there are only two possible outcomes of the non-trivial game: either the majority-backed agent imposes her view, or the two agents continue to disagree. Whenever

$$W(\theta(y^i), y^i) - W(\theta(y^j), y^i) \leq g^i, \quad (32)$$

the i -agent will take the view of j -agent as her own – she will conform to that view and act accordingly. Even if the agent from the minority moves first, the outcome does not change, as the member of the majority rejects the other's idea at no cost, and starts with his counterproposal.

¹⁷We 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).

The conformism game: a solution

We move now to describing the general game. Suppose that, somewhere along the sequence of rounds, there is a round in which all players enter the bargaining games with the same view on θ ; in other words, all the two-player games become trivial, no matter who is paired with whom. Note that if the game were repeated for one more time the same outcome would be replicated, and so on round after round (supposing, of course, that the environment remains unchanged): we therefore assume that the game ends. Now consider the following:

Definition 1 *Suppose that, in one of the rounds, all the simultaneous two-player games end with the agents agreeing on a level of θ , and that this level is the same across games; we call this common outcome "a social norm".*

According to this definition, the conclusion of the conformism game identifies a "social norm". Given this latter building block, we can now illustrate the general procedure by which we can "solve" the conformism game.

First, we have to specify a mechanism whereby players are matched with each other. We start from the observation that in the real world social interactions occur among those who have sufficiently similar characteristics. In everyday life, we confront ourselves with our relatives, our colleagues at work, our fellow travellers on the commuter train, the parents of kids enrolled in the same school as ours, our neighbours. In all cases, these are by and large people in the same social class as we are, or close to it. In this paper's simplified setup, it means that matches for a two-player game are possible among agents with the same or a similar income level. Hence, we might posit that people in the y^1 -group and in the y^3 -group will face either agents of their own group or of the y^2 -group, whereas the latter may face agents of all three groups. Notice that a certain interaction among groups is necessary for our analysis to make sense. If the three groups are each an isolate culture, then no general, society-wide standard will emerge. This is of course possible, and an interesting case in its own right, but is not the sort of situation we are interested in here.

We need now to find a way to model the occurrence of social encounters in which the agents shape their view of tax dodging by comparing their opinion with that of others – the two-player games we described above. An attempt at balancing the claims of realism with those of manageability could be the following:

Assumption 2 *In the first round of the conformism game, agents are paired as follows: ρ^α) each agent in the y^2 -group is paired with an agent of the y^1 -group; the remaining agents of the y^1 -group are matched among themselves, and so are the agents of the y^3 -group. In the second round, we have: ρ^β) each agent in the y^3 -group is paired with an agent of the y^2 -group; each remaining agent of the y^2 -group is paired with an agent of the y^1 -group; the remaining agents of the y^1 -group are matched among themselves. The third round is as the first, the fourth as the second, and so on for as long as necessary.¹⁸*

Other assumptions are possible, and this would clearly modify the analysis that follows in some way, although the general procedure for solving the conformism game would be always the same. The present assumption seems however to capture plausible features of social interaction, because it depicts it as limited to those who are close to each other, but at the same time involving different people at different moments.

Let us then consider the first round (ρ^α). The games in which a y^1 -agent is paired with a y^2 -agent are non-trivial. As we assumed that $n^1 > n^2$, they are won by y^1 -agents, provided condition (32) is satisfied. All middle-earners become then supporters of the strongest possible social norm, θ^1 . In the second round, we have ρ^β . When y^3 -agents are paired with y^2 -agents we have non-trivial games; the latter win, because $n^2 > n^3$, if (32) holds. Therefore also the high-earners have now taken the view that cheating on one's tax returns is unacceptable. Then, at the end of the second round, all agents condemn tax dodging – $\theta = \theta^1 > 0$. The third round would involve only trivial games, and then the overall conformism game ends, and by Definition 1 a social norm, θ^1 , is established.

The above analysis gives us a very simple answer to the issue of how a social norm is formed. If we assume that a conformism factor is at work, then the relative majority, in this case the low-income agents in the y^3 -group, will impose their view. Now, this is not unreasonable at first sight, but it does conflict with the fact that, while virtually in all economies the less well-off constitute a relative majority, tax dodging is not socially condemned everywhere in the same way – indeed, we range from cases of harsh stigmatisation to others of near indifference (if not overt praise).

A simple way out of this problem comes from the same evidence of the social psychology studies that we referred to above – the "line judgement task" experiments. In those studies, it

¹⁸It is possible that one agent in one or more groups stays idle, but this does not affect the result (it is as if he or she had played a trivial game).

has been often noted that not only the sheer numerosity of those who opposed the view of the subject, but also their authoritativeness, as expressed e.g. by their clothes or demeanour, had been crucial in determining the strength of the conformism effect. And, clearly, authoritativeness and numerosity were substitutable for each other. Transposing this observation in our more general context, we might imagine that agents belonging to certain income groups might exert more social influence than others - might therefore gain an advantage in determining the final result quite irrespective of the size of the social group to which they belong.

A straightforward approach to modelling this would be to consider a weight-adjusted size of the income groups, where the weight is taken to reflect social influence. Letting f denote the weight, we have that each income group has an adjusted size of $N^i = f^i n^i$. Then, we can re-normalise the adjusted population size to be equal to unity, and proceed along the same path as before. The two-players game would have the same structure, with the cost-of-disagreement functions now defined in terms of N^i rather than n^i , and Assumption 2 could be maintained. The final outcome would however depend on the ranking of the adjusted populations shares. In principle, there are several possibilities. In order to focus on a case in which the outcome differs from that of the previous subsection, it is enough to consider $N^2 > N^1$ and $N^2 > N^3$ (the relative position of N^1 and N^3 does not matter).

Recalling then Assumption 2, let us start with ρ^α . Again, the non-trivial games involve y^1 -agents vs. y^2 -agents, but since it is the weighted share that counts now, the y^2 -agents win. Therefore, at the end of the first round several low-income agents agree with the "middle class" people that a weak social penalty (θ^2) should be imposed on those who cheat the fisc. In the subsequent ρ^β round, there are only $n^1 - n^2$ supporters of the strong stigmatisation view in the y^1 -group. If one of them is matched against someone in the y^2 -group, then he or she loses under the usual condition, and joins the ranks of the winning side as far as opinions on tax dodging are concerned. In the matches where y^2 -agents face y^3 -agents, the former win because $N^2 > N^3$, under the usual condition. In the third round, then, all agents in the y^2 - and y^3 -groups, and a part of those in the y^1 -group agree that tax avoidance should be socially condemned at the θ^2 intensity. In all the subsequent rounds, both ρ^α and ρ^β , there might be non-trivial games in which low-income agents still adhering to their original view on stigma face a member of the "middle class" and change their opinion, as long as (32) holds (all other games are trivial). This will go on round after round until all the "hard-liners" have disappeared; given a sufficiently large number of rounds, and a sufficiently large cost of non-conformism, we will sooner or later

reach a stage in which the game ends and the norm is established at $\theta = \theta^2$.

Similarly, it is possible to build an example in which N^3 is larger than either N^1 or N^2 , and the final outcome of the conformism game is that no social condemnation of tax dodging arises, because the high-earners impose their view.

The upshot is then that the less weight a society gives to the desires of the low-income class, the more likely is that anti-social behaviours like cheating on one's taxes are forgiven – not considered worthy of social reprobation. This will be true in those society in which democracy is not particularly deep-rooted, where the formal expressions of civil freedom might be preserved, but substantial democratic feelings are absent or scarce. This point can be linked to the role of national identity in tax compliance norms that has been highlighted in the studies cited in the opening of this Section. If tax compliance is an attitude that strongly defines being member of one's nation, then the low-income citizens must have had a prominent role in shaping this view, in making honesty in tax matters a relevant trait of the good citizen. It is reasonable to presume that these citizens could not have contributed to create a national identity with a specific emphasis on tax compliance if they were not granted substantial means and opportunities of social and political participation.

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 that 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 has not been taken up).

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 may facilitate social competition. As such, it is valued mostly by the low-income individuals, who have much

to benefit both from redistribution and social mobility; and, with somewhat less intensity, the norm is also appreciated by the middle-earners, who are satisfied in terms of the redistributive impact of the tax system, but still have advancements to make in terms of social mobility. As is particularly clear in the version of the model that accounts for the social weight of the groups, a norm condemning tax dodging 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 conclusion is consistent with the observation that in mature democracies there is much more stigma associated with anti-social acts like tax dodging than in less stable democracies. This is because much of the strength of the norm will depend on whether the 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. In turn, this will 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. These traits are typical of long-established and well-working democracies like the US, the UK or the Scandinavian countries, but are not yet entirely present in institutionally more fragile nations like, say, Greece or Italy – not to mention transition or developing countries. Also, the argument we present is consistent with the findings on the literature on tax morale, which emphasizes that direct democracy boosts tax compliance, because the citizens perceive that taxes are spent according to their preferences and are thus more inclined to pay them - i.e. have a higher tax morale (Torgler 2005); in a direct democracy, political participation from all economic classes is bound to be large.

Appendix

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

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

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

It is then immediate to compute $u_{a\theta} = -c' < 0$ and $u_{at} = 1$, so that

$$a_\theta = -\frac{u_{a\theta}}{u_{aa}} < 0; \quad a_t = -\frac{u_{at}}{u_{aa}} > 0. \quad (\text{B2})$$

as reported in (10).

Comparative statics of the political equilibrium. We claimed in the main text that the policy problem is well-behaved *for all agents below the average income (including therefore the median voter)*. Indeed, we have

$$V_{tt}^i = a_t \left(y^i - \left(1 + \tilde{\beta} \right) \bar{y} \right) - t \bar{y} a_{tt} - \beta \bar{y} \theta (a_t c'' + a_{tt} c') < 0; \quad (\text{B3})$$

the sign follows because $a_t > 0$ by (10), $y < \bar{y}$, $a_{tt} \geq 0$ by Assumption 1, and $c' > 0$, $c'' > 0$ by strict convexity of $c(\cdot)$. We can now compute

$$V_{ty} = a - 1 < 0; \quad (\text{B4})$$

$$V_{t\beta} = \bar{y} (1 - a) - \bar{y} (\theta a_t c'); \quad (\text{B5})$$

$$V_{t\theta}^i = a_\theta (y^i - (1 + \beta + \beta a_t \theta c'') \bar{y}) - \bar{y} a_{t\theta} t - \bar{y} \beta c' (a_{t\theta} \theta + a_t). \quad (\text{B6})$$

Hence, we have

$$t_y = -\frac{V_{ty}}{V_{tt}} < 0, \quad (\text{B7})$$

that is, the ideal tax rate is decreasing in income, as explained informally in the main text. Concerning specifically the median voter, it is important to understand under what conditions (B5) and (B6) are both positive. We can argue that $V_{t\beta} > 0$ if:

$$(1 - a) > \theta a_t c'; \quad (\text{B8})$$

and that $V_{t\theta}^i > 0$ if

$$\theta |a_{t\theta}| \geq a_t. \quad (\text{B9})$$

To understand the latter inequality, recall that $a_\theta < 0$ by (10) and $a_{t\theta} \leq 0$ by Assumption 1, which together imply that the first and second term in (B6) are both positive; thus, eq. (B9), if satisfied, ensures that also the third term in (B6) is positive. We may safely assume that condition (B8) is generally satisfied on grounds that the r.h.s. term is of second-order magnitude relative to the l.h.s. one. As for condition (B9), which is only sufficient and far from necessary, we note that it is in fact equivalent to

$$\frac{\theta}{a_t} |a_{t\theta}| \geq 1, \quad (\text{B10})$$

that is, that the elasticity of a_t w.r.t. θ is no smaller than unity. In words, a 1% increase in the monetary equivalent of the psychic costs of avoidance must trigger at least a 1% reduction

in the amount by which avoidance increases in response to an increase in the tax rate. If both conditions (B8) and (B9) are satisfied, then

$$t_\beta = -\frac{V_{t\beta}}{V_{tt}} > 0; \quad t_\theta^i = -\frac{V_{t\theta}^i}{V_{tt}} > 0, \quad (\text{B11})$$

confirming Proposition 1.¹⁹

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¹⁹ An alternative approach to solving the comparative statics would be to set $\tilde{\beta}\theta c' = 0$ as suggested in fn. 13. It is then easy to verify that Proposition 1 is confirmed.

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