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Abstract

In this paper we consider amoral taxpayers who access amoral tax preparers in order to receive help in evading taxes. Taxpayers are aware of having a biased perception of the audit probability, but are unable to correct such bias without the help of a tax preparer. The market for tax preparation, characterized by imperfect competition, is described according to the conjectural variation approach. We show that according to the direction of the bias the tax preparer can suggest either a larger or a smaller evasion with respect to the one that the taxpayer would have implemented without the advice, resulting in an evasion smaller or larger than that observed in tax reports of unbiased taxpayers. Such ambiguity provides a motivation for the ambivalent attitudes of tax administrations towards tax preparers. It also turns out that sanctions on taxpayers are more effective than sanctions on tax preparers in order to deter tax evasion.

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1 Introduction

Under the pressure of both the need of balancing the public budget and of a public opinion fed up with tax dodging, many countries and international organizations are launching interventions to fight tax evasion and aggressive tax planning. In this paper we focus on the role of tax consultants in this field. The EU is considering the introduction of new rules to regulate their activity, including the mandatory disclosure of tax avoidance schemes[1]. The topic has been under scrutiny also in the UK, where a public consultation[2] was launched in 2016 about the proper way of sanctioning those who facilitate or enable tax avoidance. In a similar vein, the 2016 guidelines of the Italian national tax service for tax auditors[3] urged them to focus on evasion schemes used by many taxpayers and on the facilitators who devised and marketed them.

In order to build on the previous literature, in this paper we will use the term evasion in its extensive meaning, to refer not only to the standard forms of illegal underreporting, but

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[1]See "Consultation on Disincentives for advisors and intermediaries for potentially aggressive tax planning schemes" on the European Commission, Taxation and Customs Union website.

[2]See HM Reveue & Customs, *Strengthening Tax Avoidance Sanctions and Deterrents. Summary of Responses*, 5 December 2016.

[3]See Agenzia delle entrate, circolare n. 16/E, Roma, 28/04/2016.

also to aggressive tax planning or tax avoidance, as the latter too involve decisions under risk, stemming from the uncertainty about their legal sustainability.

Both from an empirical and from a theoretical perspective it is widely held that many intermediaries, such as firm's financial officers, tax consultants, accountants and financial auditors, tax preparers etc. can have a relevant role in either preventing or fostering evasion. On this purpose the aforementioned UK consultation document maintains that facilitators of tax evasion are a minority of the intermediaries, while the Italian briefing to tax auditors mentions as a motive for pursuing the consultants who facilitate tax evasion also the need of protecting the reputation of the majority not involved. While these statements might pander somewhat to a relevant interest group, they would not have been made if the agents in question were exclusively and systematically fostering tax evasion.

Dubin et al.(1992) in fact consider three motivations (studied by specific streams of the literature) for demanding tax assistance: informational aspects (pertaining, e.g., to the determination of the taxable income), service aspects (pertaining to efficiency gains in filling-in the report, in litigating etc.) and strategic aspects (pertaining to assistance in developing strategies). As for the role of consultants with respect to tax evasion, its ambiguity was pointed out in the literature: for example, consultants appear to foster compliance in report lines for which the tax law is clear, but to support evasion when it is obscure [for a review, see, e.g., Andreoni et al. (1998)]. Moreover, studies adopting the principal-agent model, while assuming amorality on both sides, reached different conclusions about the relative effectiveness of sanctioning either the principal or the agent in order to redress their behavior (Chen and Chu, 2005; Croocker and Slemrod, 2005; Biswas et al., 2013). More recently, applied research has tried to assess whether intermediaries differ in aggressiveness according to various characteristics, such as being also the firm's auditors or not, possessing both auditing and tax skills, providing partial advise or taking a larger responsibility that involves signing the report etc. (McGuire et al., 2012; Klassen et al., 2016).

Damjanovic and Ulph, 2010, model the market for a (fixed cost) evasion scheme, which provides the possibility of reducing the taxpayer's expected tax payment by a given percentage. The scheme is supplied by consultants who compete according to the conjectural variation approach. Since they cannot tell apart the income of their clients, a unique equilibrium market price of the scheme is applied to the whole clientele. In this framework a progressive tax system fosters compliance, since profit maximization implies that only high income taxpayers, who have the largest tax duties, are served at a high price by the suppliers of the scheme. The same effect arises under a proportional income tax and an unequal income distribution, since this too implies different tax duties and a market equilibrium with high prices and a few clients. If the scheme provides percentage benefits that are increasing with income, the government can foster compliance by resorting to more regressive monitoring or penalty systems, in order to induce a high market price for the scheme.

Lipatov (2012) resorts to a game theoretic approach to describe the interaction between taxpayers (firms) and the Tax Administration under a standard proportional tax and penalty system. Evasion can occur only thanks to the advise of an accounting auditor-tax expert, who is a monopolistic supplier. A full evasion equilibrium occurs when the expert finds it convenient to charge a low price per unit of evaded income, leaving some consumer rent to the taxpayers in order to entice them all. Penalties on the firms are more effective than penalties on the tax expert in moving the equilibrium out of full evasion, as they modify the service demand and induce the tax expert to prefer to fully extract the rents of a subset of taxpayers, so that evasion shrinks.

In both Damjanovic and Ulph, 2010, and Lipatov, 2012, the assumptions pertaining to the relationship between the taxpayer and the specialist are strong, as the taxpayer lacks the option of evading when filling in her tax report without resorting to an external advice. According to Klassen et al., 2016, instead, around one out of two large corporations in the U.S. do not resort to external preparers and this correlates with a very aggressive behavior. The problem of direct use of aggressive tax planning is considered in the aforementioned EU public consultation, where, besides mandatory disclosures of schemes for intermediaries, also mandatory disclosure for taxpayers is brought to the attention. Moreover, both Damjanovic and Ulph, 2010, and Lipatov, 2012, clearly describe a subset of consultants, hopefully not representative of the whole profession, since their consultant never exerts a role of fostering tax compliance, while it is known from the empirical literature that also this case can occur. Lipatov also focuses on either monopoly or competition, while the market for specialists, which is usually subject to regulations and restrictions to entry, seems more likely to be oligopolistic.

In this paper we assume that evasion can occur also without the support of an expert and, maintaining the widely used assumption of amorality of the parties involved, make simple hypotheses about the motivations that can justify the resort to a consultant. We assume that there are taxpayers who are not confident in their ability at filling in a tax report involving tax evasion. This is due to the fact that they suffer from a psychological bias - described by the rank-dependent expected utility approach (RDEU from now on) - which implies a misperception of the audit probability[4]. They can improve their lot by accessing tax preparers, who are unbiased. The relationship that ensues, characterized by a kind of asymmetrical information, can be likened to that between the physicians and the patient, which has been studied in the literature on PID (physician-induced demand). In fact the tax preparer, as the physician, instead of acting as a "perfect agent", i.e., as an agent always choosing the optimal solution from the principal's point of view, might manipulate the demand for her services in order to pursue her own goals. We thus aim at assessing if some form of demand inducement can occur with respect to tax evasion.

In this paper the market for tax preparation is represented according to the conjectural variation approach. It turns out that tax preparers can recommend either more or less tax evasion, according to the bias of their clients. By comparing these evasion amounts with those characterizing self made reports compiled by amoral and unbiased taxpayers, we show that the latter are likely to be more aggressive in most cases, and thus that there are justifications for the widely held opinion that the role of tax advisers is often benign from the point of view of the public interest. As in both Damjanovic et al. and in Lipatov, also in our model a more competitive environment in the market for tax preparation entails more tax evasion. As for sanctions, we compare the effectiveness of two types of sanctions on the tax preparer (one based on the revenue and the other on the evaded tax), finding out that the latter is more effective. Moreover, we also find out that sanctions on taxpayers are more effective than sanctions on tax preparers in reducing tax evasion. The intuition for this result is that, whenever the sanction on the taxpayer increases, not only the expected net return of tax evasion is modified - as happen also when the tax preparer is targeted - but also the taxpayers' biased evaluation is affected. Hence the scope for the corrective intervention of the tax preparer is modified, and this influences the mark-up and ultimately reduces the tax evasion amount. Our conclusion on this purpose thus confirms that of Lipatov and extends it to a framework in which tax consultants have an ambiguous role.

The paper is organized as follows. In Section 2 we describe the market for tax preparation,

[4]Such a bias may affect, besides individual taxpayers, also entrepreneurs and managers, and thus involve reports made by firms. Many empirical studies in behavioral economics confirm the role of psychological distortions also in choices made by entrepreneurs and professionals.

whose specific features are discussed in Section 3 for the case of overestimation of the probability by the taxpayer and in Section 4 for the case of underestimation. Section 5 extends the model in various directions and Section 6 concludes.

2 Tax evasion and the market for tax preparation

The tax system is characterized by the following parameters: t, a proportional tax rate; s, a sanction rate (on the evaded tax); p, an exogenously given audit probability (which coincides with the probability of being fined, as audits reveal the true taxpayer's income I). The expected return on tax evasion (per unit of evaded tax) is positive, that is

$$r = (1 - p(1 + s)) > 0$$

Taxes, however, can be evaded only by bearing a hiding cost $g(E)$, where $g : [0, I] \longrightarrow \mathbb{R}_+$ is a strictly increasing convex function, twice differentiable with $g(0) = 0$ and E is the unreported income. Hiding costs arise as evasion would be fully visible unless income is hided, e.g., by doctoring documents, moving assets in foreign jurisdictions, etc.

Consider m identical amoral and risk neutral taxpayers, endowed with an exogenous income I. We focus on the case in which these taxpayers are not self-confident, because they are aware of their limited ability in deciding in tax matters and have learnt from personal and other people experience that delegating an expert can improve their tax report. More specifically, it is assumed that they are plagued by a biased perception of the audit probability, and, while being aware of their bias, ignore both its sign and its amount.

To describe the bias, we rely on the RDEU approach, which assumes that the outcomes of a lottery are arranged in increasing order of utility and that their probabilities are transformed using a function $\omega(.)$ which is increasing and inverse S-shaped (first concave, then convex). In the "lottery" of tax evasion the best outcome (when evasion goes undetected) occurs with probability $(1 - p)$; hence the biased probability $\omega(.)$ is generally presented as $\omega(1 - p)$ (see Hashimzade et al., 2013, for a review of the RDEU approach to tax evasion). Since, however, in the tax evasion problems the focus is on the probability of detection p, we directly consider $\phi(p) = 1 - \omega(1 - p)$.

A. 1 *The function $\phi : [0, 1] \rightarrow [0, 1]$ is differentiable, concave on $[0, a)$ and convex on $[a, 1]$, where $0 < a < 1$. Moreover, if $p = 0$ then $\phi(p) = 0$ and if $p = 1$ then $\phi(p) = 1$.*

If a taxpayer decides to fill in the tax report without external support, she solves the following problem:

$$\max_E \; [1 - \phi(p)(1 + s)]\, tE - g(E) \tag{1}$$

where s is the sanction rate on the evaded tax. To rule out trivial cases, we will restrict our attention to the interior solutions only, i.e., $0 < E^* < I$. The objective function is strictly concave due to the assumption about the convexity of $g(E)$. The FOC is

$$[1 - \phi(p)(1 + s)]\, t - g'(E) = 0 \tag{2}$$

Let us call E^* the unique solution of this problem. Whenever $\phi(p) > p$, the chosen evasion is smaller than the optimal one $\widehat{E}$, which would result under an unbiased perception of the probability, while the opposite holds if $\phi(p) < p$.

A. 2 $[1 - p(1+s)]\, tE^* - g(E^*) \geq 0$, *where* E^* *solves (2).*

Assumption 2 rules out cases in which the bias is very large, so that the resort to $\phi(p)$ would result ex post, under the true probability p, in a loss. This assumption is relevant for the case in which $\phi(p) < p$. If $\phi(p) > p$ it always holds true, since r is positive and the taxpayer's utility is increasing in E for $0 < E < \widehat{E}$. For the case in which $\phi(p) < p$ it introduces an upper bound to the willingness to pay of the taxpayer and to the potential exploitation by the consultant.

By resorting to a comparative static analysis one gets

$$\frac{\partial E^*(s,t)}{\partial s} = -\frac{\phi(p)t}{g''(E^*)} < 0 \tag{3}$$

$$\frac{\partial E^*(s,t)}{\partial t} = \frac{1 - \phi(p)(1+s)}{g''(E^*)} > 0 \tag{4}$$

2.1 The role of tax preparers

Instead of self-preparing the tax return, the taxpayer can entrust a tax preparer. Let us assume that there are n identical amoral tax prepares, who are willing to accept a compensation for supporting taxpayers' evasion. Tax preparers have an advantage over taxpayers: they have an unbiased perception of the probability of audit p, and as a consequence they can actually improve the report with respect to the self-made one.

The interaction between the parties unfolds in this way:

- the taxpayer asks the preparer to fill in and to sign her tax report, setting the tax payment at the most convenient level;

- the preparer asks the taxpayer to reveal her true income and her own assessment of the optimal evasion, and informs the taxpayer that the hiding costs that the taxpayer will have to bear will depend [according to $g(E)$] on the modified report she will suggest;

- the taxpayer, who, on the basis of her own past experience and of the information available from other people, expects that the terms of the deal will not be worse than those available in the market for tax preparation and that they will entail a (at least weak) net benefit, provides truthful information, signs the report and makes the requested payment.

While the service that the preparer performs is illegal, both the parties involved are interested in fulfilling their obligations (that is giving a useful advise and paying the corresponding compensation respectively) since both can threaten the other party of acting as whistle-blowers with respect to the Tax Administration[5]. Moreover, the tax preparer is also interested in preserving her reputation in the field, and this implies that in equilibrium the taxpayer's expectations must be confirmed.

2.2 The market demand for tax preparation

The benefit the representative taxpayer receives from resorting to the representative tax preparer is given by:

$$B(\overline{E}) = rt\overline{E} - g\left(\overline{E}\right) - [rtE^* - g(E^*)] \tag{5}$$

where $\overline{E}$ is the evasion chosen by the tax preparer on behalf of her client in the market equilibrium, while the term in brackets refers to the opportunity cost the taxpayer incurs by renouncing to self-preparation. Note that such opportunity cost is calculated by using the true probability

[5] It is assumed that whistle-blowing does not entail a monetary compensation and thus is never preferred to the implementation of the agreement.

p to assess the gains that the taxpayer would have obtained from the "biased" evasion E^*. In fact the service of the tax preparer can be considered as an experience good, that is, due to information asymmetry, the taxpayer can assess it only *ex-post*, by observing the outcome and comparing it with the outcome arising under self-reporting, which is conditional on the true probability p. As in equilibrium expectations must be fulfilled, we refer to a situation in which the taxpayer has learnt to expect a benefit amounting to $B(\overline{E})$, even without being informed about the parameters that determine it.

In the market for tax preparation n identical tax preparers, with $n < m$, compete in the amount of E_i, that is in the amount of tax evasion that each tax preparer i suggests to her clients. Each tax preparer has a market share of $\theta = \frac{m}{n}$. Tax preparers conjecture that their competitors' reaction if they marginally varied E_i is given by

$$\frac{\partial\left(\frac{\theta}{m}\sum_{j\neq i}E_i\right)}{\partial E_i} = \lambda \text{ for } i = 1, ..., n \text{ and } -1 < \lambda \leq n-1$$

where the market can vary from full competition (as a limit, when $\lambda \to -1$) to full collusion when $\lambda = n - 1$. With respect to the expected per capita quantity in the whole market $\overline{E} = \frac{\theta}{m}\sum_{i=1}^{n}E_i$ this implies the following reaction:

$$\frac{\partial\overline{E}}{\partial E_i} = 0 < \frac{1+\lambda}{n} \leq 1 \tag{6}$$

It is interesting to note that the conjectural variation approach can also be interpreted as describing forms of collusion among suppliers (Escrihuela-Villar, 2015). The latter interpretation on the one hand avoids the critiques raised to the conjectural variation approach with respect to its problematic game-theoretic foundations, while on the other it seems particularly suitable for a market in which suppliers are often subject to regulations, so that the entrance of new firms is restricted and the existing ones form a natural interest group, which is likely to be characterized by some degree of collusion.

The taxpayer's demand price can be conceived as the marginal benefit, corresponding to the marginal willingness to pay, for the service. It is a function of the expected per capita amount of evasion suggested on the market, that is:

$$P(\overline{E}) = \frac{\partial B(\overline{E})}{\partial\overline{E}} = rt - g'(\overline{E}) \tag{7}$$

where $B(\overline{E})$ is given by (5). The demand price is decreasing in quantity as $g'(\overline{E}) > 0$ and becomes negative when $\overline{E} > \widehat{E}$, that is when the suggested evasion exceeds the optimal level. Consumers pay for the improvement $(E_i - E^*)$, which might involve either an increase or a decrease of the evaded amount with respect to the self-made report, according to whether $\phi(p) > p$ or $\phi(p) < p$ occurred. In the latter case, the tax preparer suggests a reduction in tax evasion (i.e., $(E_i - E^*) < 0$), since the evasion the taxpayer would have chosen is too large in view of the true probability p. Since the tax preparer is not a perfect agent, however, the evasion she suggests is not the optimal one, which would entail $P\left(\overline{E}\right) = 0$, but it is still too large, with $E_i > \widehat{E}$ and $P\left(\overline{E}\right) < 0$. The total payment $P\left(\overline{E}\right)(E_i - E^*)$ is thus positive also in this case. A further reduction of tax evasion (involving $E_i < \widehat{E}$) is not viable since it would imply a negative quantity but a positive price, i.e., a negative revenue. Even considering the possibility of charging for such a quantity in absolute value, to reach the same result in terms of the taxpayer's utility[6] a correction much larger than when a negative price is accounted

[6]This is possible thanks to the concavity of the benefit function $B(\overline{E})$.

for would be needed, and this is likely to be unsustainable in front of the actual or potential competition of other tax preparers.

To ensure the participation of taxpayers, tax preparers must provide their clients with a net consumer rent, at least equal to the benefit of self-preparing the tax report, that is, taxpayers' participation in equilibrium is conditional on the following constraint:

$$[rtE_i - g(E_i)] - [rtE^* - g(E^*)] - P\left(\overline{E}\right)(E_i - E^*) \geq 0 \tag{8}$$

where the first term is the expected benefit arising from the tax preparer report, the second term is that arising ex-post from self-preparation and the third term is the due payment.

Lemma 1 *The participation constraint (8) is never binding.*

Proof. See Appendix A ■

Lemma 1 implies that, as long as the tax preparer, in the market equilibrium in which $E_i = \overline{E}$, charges the taxpayer only for the improvement $(\overline{E} - E^*)$, with a price that lies on the consumer demand at point $\overline{E}$, the necessary condition for participation (8) is satisfied.

Lemma 2 *Biased taxpayers never prefer full compliance to the evasion amount suggested by the tax preparer.*

Proof. See Appendix A ■

Lemma 2 trivially holds when $\phi(p) > p$. When the bias is in the opposite direction, the taxpayer pays on the suggested upward correction of her reported income both the due tax $t\,|E_i - E^*|$ and $P\left(\overline{E}\right)(E_i - E^*)$. Assumption 2, however, sets an upper bound to this overpayment, implying that the suggested report is preferable to full compliance.

3 The market equilibrium when $\phi(p) > p$

When $\phi(p) > p$ the profit of the tax preparer is

$$\pi_i(E_i) = \left\{\left[(1 - pF_v)\,P\left(\overline{E}\right) - c\right](E_i - E^*) - pFtE_i\right\}\theta \tag{9}$$

where F_v is the sanction rate on revenue to which the tax preparer is subject whenever her client's evasion is detected, c is the constant marginal cost incurred by the tax preparer per unit of correction $(E_i - E^*)$ suggested to the taxpayer, while F is the rate of a sanction based on the evaded tax to which the tax preparer is subject. It is assumed that audits always reveal also the tax preparer responsibility for evasion E_i. We are thus considering two types of sanction on the tax preparer - while in practice just one type is usually adopted - in order to ease the comparison between them. A sanction like F_v is applicable in the US according to paragraph 6694(a)(1) of the tax code, where $F_v = 50\%$. A sanction like F is provided in the UK for those who favor offshore evasion (where $F = 100\%$), and an extension to domestic evasion is expected in 2017. We proceed by assuming that marginal cost and expected sanction rates are low enough to be compatible with a non negative profit and focus on the interior solution of the tax preparer's problem. This also entails that in equilibrium $E^* < E_i < \widehat{E}$ must occur, that is both the demand price $P\left(\overline{E}\right)$ and the quantity $(E_i - E^*)$ must be positive; a suggested evasion $E_i > \widehat{E}$ would instead imply a positive quantity $(E_i - E^*)$ but a negative price, i.e., a negative revenue.

The FOC for profit maximization of the tax preparer is

$$\pi'(E_i) = \left\{(1 - pF_v)\left[P + \frac{\partial P}{\partial \overline{E}}\frac{1+\lambda}{n}(E_i - E^*)\right] - c - pFt\right\}\theta = 0 \tag{10}$$

Moreover the second order condition is

$$\pi''(E_i) = (1 - pF_v)\left[2\left(\frac{1+\lambda}{n}\frac{\partial P}{\partial \overline{E}}\right) + \frac{\partial^2 P}{\partial \overline{E}^2}\left(\frac{1+\lambda}{n}\right)^2 (E_i - E^*)\right]\theta < 0 \tag{11}$$

In Appendix B we show that in the market equilibrium $E_i = \overline{E}$ and we present the stability condition for this market.

Through the first order condition, we can also express the equilibrium price as equal to the marginal cost, inclusive of the expected sanctions, times the mark-up μ:

$$(1 - pF_v)\, P(\bar{E})\left[1 - \left|\frac{1+\lambda}{n\,\eta}\right|\left(1 - \frac{E^*}{\bar{E}}\right)\right] = c + pFt \tag{12}$$

$$P(\bar{E}) = \left(\frac{c + pFt}{1 - pF_v}\right)\frac{1}{\left[1 - \left|\frac{1+\lambda}{n\,\eta}\right|\left(1 - \frac{E^*}{\bar{E}}\right)\right]} = \left(\frac{c + pFt}{1 - pF_v}\right)\mu \tag{13}$$

where $\eta = \frac{\partial \overline{E}}{\partial P}\frac{P}{\overline{E}} < 0$ is the elasticity of demand. As long as $|\eta| > \frac{1+\lambda}{n}\left(1 - \frac{E^*}{\bar{E}}\right)$ then $\mu > 1$. This is not restrictive, as it is compatible also with $|\eta| < 1$, since $\frac{1+\lambda}{n} \leqslant 1$ and $\left(1 - \frac{E^*}{\bar{E}}\right) < 1$.

The result in (13) is synthesized in the following Lemma.

Lemma 3 *The equilibrium gross price is decreasing in the absolute value of the demand elasticity η and in the competitiveness of the market for tax preparation, while it is increasing in the expected sanctions on the tax preparer and in the percentage difference between the suggested evasion and the evasion amount the taxpayer would have chosen without advice.*

Unlike in a standard conjectural variation problem, here the per-capita quantity $\bar{E}$ affects the price level not only through the demand elasticity, but also because it determines the extent of the correction delivered by the tax preparer with respect to the given biased taxpayer's choice E^*. A larger percentage correction $\left(1 - \frac{E^*}{\bar{E}}\right)$ implies a larger mark-up and a larger opportunity for exploitation.

3.0.1 Comparative static

Let us consider the effect on tax evasion of increasing the rate F_v of the sanction on the tax preparer revenue. By applying the implicit function theorem to (10) one gets:

$$\frac{\partial \overline{E}(F_v)}{\partial F_v} = \frac{-p\left[P + \frac{\partial P}{\partial \overline{E}}\frac{1+\lambda}{n}\left(\overline{E} - E^*\right)\right]}{|\chi|} < 0 \tag{14}$$

where it was kept into account that in equilibrium $E_i = \overline{E}$, while $\chi < 0$ is the stability condition given by (24) in Appendix B, which implies that the representative tax preparer profit decreases following an increase of her own suggested per capita evasion plus the symmetrical per capita evasion responses of rival tax preparers.

By the same reasoning, the effect of an increase of the sanction rate F on the evaded tax is:

$$\frac{\partial \overline{E}(F)}{\partial F} = -\frac{pt}{|\chi|} < 0 \tag{15}$$

Proposition 1 *The sanction on the tax preparer is more effective when it is based on the taxpayer's evaded amount than when it is based on the tax preparer's revenue.*

Proof. Let us call $MR(\overline{E})$ the term in square brackets at the numerator in (14), which represents the (gross) tax preparer's marginal revenue in the case in which no detection occurs [see the FOC, equation (10)]. Then:

$$t > P(\overline{E}) = r - g'(\overline{E}) > MR(\overline{E})$$

that is, the tax rate t is larger than the demand price $P(\overline{E})$ for tax preparation, as evasion involves risks and hiding costs, while in turn $P(\overline{E})$ is larger than the tax preparer marginal revenue $MR(\overline{E})$, bar for the limit case of perfect competition. This implies that the absolute value of the numerator of (15) is larger than that of (14), and, since (14) and (15) have the same denominator, this completes the proof. ■

Let us now drop F_v, which underperforms with respect to F, and consider further effects of the latter. An increase of F increases the price of the service P. Moreover, under given conditions, when F increases, an overshifting of the expected penalty rate on the price and even an increase of the profit of the tax preparer can occur, as shown in Appendix B. In fact this sanction on the tax preparer entails - in expectations - effects similar to those arising from a per unit tax in an environment characterized by imperfect competition and no tax evasion.

Let us now compare the effect of an increase in F to that of an increase of the sanction rate s on the taxpayer. In this case, first of all the biased evasion E^* devised by the taxpayer would be affected, according to (3). The tax preparer, however, would be affected indirectly, through the change in the taxpayer's demand. To assess the effect on tax evasion, we must again apply the implicit function theorem to equatio (10), which can be suitably rewritten as:

$$\pi'(E_i, s) = r(s) - g'(\overline{E}) - \frac{1+\lambda}{n} g''(\overline{E}) [E_i - E^*(s)] - c - pFt = 0.$$

We get:

$$\frac{\partial \overline{E}(s, F)}{\partial s} = -\frac{\left[p + \frac{1+\lambda}{n} \frac{g''(\overline{E})}{g''(E^*)} \phi(p)\right] t}{|\chi|} < 0 \tag{16}$$

Proposition 2 *Increasing the sanction on the taxpayer is more effective than increasing the sanction on the tax preparer based on the evaded tax.*

Proof. By comparing (15) to (16) it turns out that they have the same denominator but (16) has a numerator which is larger in absolute value. ■

To build some intuition about proposition 2 note that there is a symmetrical effect of an equal increase of the sanction based on the evaded tax either on the taxpayer or on the tax preparer, since the former reduces the expected return of tax evasion (thus moving down the constant term r of the demand price), while the latter increases the constant marginal cost of the tax preparer by the same amount, moving it up. This would dictate an equal effect, but one must also consider a further implication of the increase of the sanction on the taxpayer. Her biased evasion choice now leads to a lower value of E^*, i.e., a lower evasion in the preferred "stand alone" report, and this *ceteris paribus* increases the scope for the tax preparer upward correction. More specifically, considering equation (13), as a larger sanction implies a lower value of E^*, then *ceteris paribus* the denominator of the mark-up decreases and thus the price that the tax preparer can charge increases, with a negative effect on the equilibrium evasion amount. Thus an increase in the sanction upon the taxpayer *ceteris paribus* involves an effect similar to a reduction of the demand elasticity. From (16) we also see that the effect of a higher sanction on the taxpayer is larger the larger are $\phi(p)$ and $g'''(E)$. Whenever $g'''(E) > 0$ the evasion demand is convex, and, according to the theory of taxation, overshfting of a per unit tax would be in order; in our framework the effectiveness of the sanction on the taxpayer with respect to that on the tax preparer becomes larger.

4 The market equilibrium when $\phi(p) < p$

Also for the case in which $\phi(p) < p$ it assumed that parameters' values imply an internal solution of the tax preparer problem, with a non negative profit. As a consequence the suggested evasion E_i must be such that $\widehat{E} < E_i < E^*$. A larger suggested correction, i.e., $E_i < \widehat{E}$ is not viable, as it would entail a positive demand price coupled with a negative quantity $(E_i - E^*)$.

The profit function of the tax preparer is:

$$\pi_i(E_i) = \{[(1 - pF_v)P + c](E_i - E^*) - pFtE_i\}\theta \tag{17}$$

Note that (17) is symmetrical with respect to (9), i.e., to the profit function for the case in which $\phi(p) > p$, bar for the cost term $c(E_i - E^*) = -c(E^* - E_i)$. The idea is that the cost depends on the absolute amount of the correction suggested by the tax preparer.

The following specific assumption, whose role will become clear in the following, is necessary for the viability of the market supply:

A. 3 *The parameters' values pertaining to demand and market competitiveness are such that $\mu(c - pFt) > c$, where $\mu > 1$ is the mark-up.*

The first order condition for profit maximization is

$$\pi'(E_i) = \left\{(1 - pF_v)\left[P(\bar{E}) + \frac{\partial P(\bar{E})}{\partial \overline{E}}\frac{1+\lambda}{n}(E_i - E^*)\right] + c - pFt\right\}\theta = 0 \tag{18}$$

As constant production cost has been assumed, the second order condition and the stability condition are symmetrical with respect to those for the case in which $\phi(p) > p$.

From the FOC (18), and with reference to the market equilibrium in which $E_i = \overline{E}$ one gets:

$$(1 - pF_v)P(\bar{E})\left[1 + \frac{1+\lambda}{n\,\eta}\left(1 - \frac{E^*}{\bar{E}}\right)\right] = pFt - c \tag{19}$$

$$\left|P(\overline{E})\right| = \left(\frac{c - pFt}{1 - pF_v}\right)\frac{1}{\left[1 - \frac{1+\lambda}{n\eta}\left(\frac{E^*}{\overline{E}} - 1\right)\right]} = \left(\frac{c - pFt}{1 - pF_v}\right)\mu \tag{20}$$

where in the first line $\eta = \frac{\partial \overline{E}}{\partial P}\frac{P}{\overline{E}} > 0$ is the elasticity of demand, which is positive since here $P < 0$. The RHS of (20) is positive under Assumption 3 and entails a non negative marginal monetary profit. The intuition about the negative sign of the expected sanction rate pFt in (20) is that it reduces the opportunity cost of the advice, since the larger is the downward correction of the report, the smaller is the expected sanction on the tax preparer and vice versa. This is not the case when $\phi(p) > p$, since the advise in that case implies a larger evasion, which increases both the total production cost and the expected sanction on the tax preparer.

Since, however, the reduction of the expected sanction when $\phi(p) < p$ is only an opportunity benefit of a larger production, for the positivity of the monetary marginal profit Assumption 3 is needed.

The intuition for the change of sign of $\left(\frac{E^*}{\overline{E}} - 1\right)$ in (20) with respect to the term $\left(1 - \frac{E^*}{\overline{E}}\right)$ appearing in equation (13) is that, whenever $\phi(p) < p$ and and $E^* > \overline{E}$, a larger suggested evasion $\overline{E}$ *ceteris paribus* reduces the scope of the correction with respect to the given E^* and thus entails a lower market power. As, however, considering $P(\overline{E})$ instead of $\left|P(\overline{E})\right|$ would imply a change of sign, Lemma 3 carries over to this case.

As for the comparative static analysis, due to the symmetry of the relevant derivatives of (9) and (17), all the results for the case in which $\phi(p) > p$ carry over.

5 Extensions

The model presented in Section 2.2 can be extended in order to consider taxpayers endowed with different incomes. Let us redefine evasion as

$$E_h = \beta I_h$$

where $0 < \beta < 1$ is the share of hidden income and I_h can now differ from one taxpayer to another. Let us also redefine

$$g(E_h) = f(\beta)\beta I_h = \varsigma(\beta) I_h$$

where $\varsigma(\beta)$ has the same properties of $g(E)$. In this framework the problems considered in the previous Sections can be suitably reformulated, in order to reach results for β which parallel those obtained for E. In this framework all the choices so far considered can be rescaled according to each taxpayer's income, so that each taxpayer's optimal evasion amount can be expressed as a percentage share β of her income, without affecting the results.

Let us consider also the possibility that the detection probability differs from one group of taxpayers to another, even whenever they have the same true income I. A reasonable assumption is that taxpayers subject to third party reporting have a detection probability close to 1, so that their possible bias becomes irrelevant and they comply[7]. Let us call them the "easy-to-tax taxpayers". Their demand for assistance in the preparation of the tax report might arise out of a service motivation, but this demand is usually served by the Tax Administration itself or by regulated nonprofit bodies. So, only the remaining taxpayers - the "hard-to-tax taxpayers" from now on - actually have an opportunity of evading and may demand the assistance of an amoral tax preparer. We assume that their detection probability is given by:

$$p_g = \varphi v_g$$

where p_g represents the probability of detection for a subgroup $g = 1, ...G$ of hard-to-tax taxpayers, φ represents the percentage of hard-to-tax taxpayers who are routinely audited on the basis of a program set by the Tax Agency according to its budget, while v_g represents the visibility of information pertaining to the subgroup g of taxpayers, so that the larger v_g the larger the actual probability of detection of hidden income during a visit. For example the accounts of firms working as subsidiaries of other firms are usually more easily checked, as also information deriving from the other firm can be used to assess them. Hence different subgroups

[7] See Kleven et al. 2011.

of hard-to-tax taxpayers can differ in their p_g value. Let each tax preparer be active in all the g markets. As $\phi(p_g) > p_g$ at small p_g levels, while the opposite occurs at high p_g levels, the tax preparer will induce less compliance than the one the hard-to-tax taxpayer would have realized without advice in the former case and more compliance in the latter.

As long as there are also hard-to-tax taxpayers who fill confident about their perceptions and who are actually unbiased[8], they will report without assistance. These reports, *ceteris paribus*, will involve a larger evasion than those filled-in by a tax preparer whenever $\phi(p_g) > p_g$, since the tax preparer in order to extract a rent always suggests an evasion smaller than the optimal one - even if larger than the one her client would have chosen without advice. The opposite case arises when $\phi(p_g) < p_g$, that is whenever the tax preparer partially corrects the overconfidence of the taxpayer. Since in this case too the correction is not full, evasion remains larger than the optimal one, i.e., than the one chosen under unbiased self-preparation of the report. To sum up, at any given income level an unbiased taxpayer chooses the optimal evasion $\widehat{E}$, while E^* is the evasion devised by a taxpayer with a biased perception of the probability of detection and $\overline{E}$ is the evasion suggested in the market for tax preparation. Then $\phi(p_g) > p_g \rightarrow \widehat{E} > \overline{E} > E^*$, while $\phi(p_g) < p_g \rightarrow E^* > \overline{E} > \widehat{E}$. As the Tax Administration only observes $\overline{E}$ and $\widehat{E}$, it can notice that tax preparation has ambiguous effects with respect to tax compliance among the hard-to-tax taxpayers, i.e., in the most critical area for its activity.

It is often assumed that in the field of taxation a biased perception of the probability would be characterized by $\phi(p_g) > p_g$, as the number of audits is generally low, and even assuming that just hard-to-tax taxpayers are targeted, only a few of them are likely to be subject to high audit probabilities, which would imply $\phi(p_g) < p_g$. Moreover, behavioral studies showed that the inflection point that separates the cases of over and undervaluation of the probability corresponds to high p values (usually above 0.5), thus further restricting the set of taxpayers potentially characterized by $\phi(p_g) < p_g$. In our framework, this fact implies that the intervention of the tax preparer, whose clients are mostly characterized by $\phi(p_g) > p_g$, results in most cases in a tax evasion amount smaller than that observed in the self-prepared reports of hard-to-tax taxpayers. This implication accords with the positive evaluation of the role of tax advisers that can often be found in the official documents of tax authorities.

6 Conclusion

In this paper we have provided a simple explanation for the ambiguous role that experts play with respect to either favoring or discouraging tax evasion. Psychological bias, coupled with objective differences among agents in the visibility and riskiness of tax evasion, imply that the service provided by tax preparers can consist in some cases in suggesting a larger and in other a smaller evasion with respect to that arising under the biased evaluation of their clients. If there are also unbiased and amoral taxpayers who dispense with the assistance of tax preparers, the ambiguous picture that emerges in terms of relative compliance is compatible with the similarly ambiguous attitude of public institutions toward tax advisers, who on the one hand are praised by Tax Administrations but on the other are threatened with high sanctions in case of misbehavior.

While in principle one might hypothesize that the Tax Administration knows the *a priori* distribution of all the variables that drive the role of tax advisers in one or in the other direction, in practice the framework is so complex that it seems unwise to rely on the signal represented

[8]It is assumed that they cannot comunicate such information to those who have biased perceptions, as they do not posess the credibility of professional tax preparers.

by the signature of a tax preparer on a report to decide about the frequency and the deepness of audits[9]. A policy of this type might also entail unwanted effects, such as a shift toward secret agreements between the parties. This would imply the loss of the restraint exerted by professional organizations through their regulations and ethical rules, and possibly unleash a larger entry in the market for tax preparation and a stronger competition, with adverse effects on compliance.

Sanctions can be used to induce tax preparer to support more tax compliance. On this purpose we have shown that sanctions on the evaded tax are more efficient with respect to sanctions on the revenue arising from the activity. The latter type of sanctions could also entail problems of application, because it might be difficult to measure the actual revenue, while by referring to tax evasion a kind of economy of scale would arise as the same information could be used to punish both the taxpayer and the adviser. We have also shown, however, that the penalties on the taxpayer are more effective than those on the tax preparer, since *ceteris paribus* the latter involve a kind of leverage effect due to the change in demand for tax preparation.

As for the market for tax preparation, our results confirm those of both Damjanovic and Ulph (2010) and Lipatov (2012) about the fact that more competitiveness would result in a larger evasion. While checking this effect would be an interesting topic for future empirical research, there seem to be some rough evidence confirming it. In a study conducted by the Italian Tax Administration (Spingola, 2008), a comparison between Italy and France showed that the market for tax advise is populated by a lot of very small firms in Italy and by a low number of large firms in France. One might thus infer a possible correlation between the degree of competitiveness in those two tax preparation markets and the tax evasion level in the two countries, which is smaller in France.

The asymmetry of information between the tax preparer and her customer are remindful of that occurring between the physician and the patient, and actually we found out that also the tax preparer might in some cases push up the evasion demand as the theory of PID suggests. However, asymmetries of information are likely to be less harmful in the field of taxation than in that of health. Medical treatments can represent credence goods, whose quality is difficult to evaluate even after purchase (Darby and Karni, 1973). While the border between experience and credence goods is blurred, tax advise seems easier to assess as it produces monetary gains or losses. We thus modelled the relationship between taxpayers and tax preparers as occurring in an oligopolistic market, in which there is no deception but only market power exploitation. Further differences between the two cases are due to the fact that usually the patient has scant possibilities of healing herself, so that the physician is more likely to push up than to push down the patient consumption, while the tax adviser has the opportunity of operating in both directions. Some policies that appear as appropriated to reduce PID, however, might also be considered for professions involved in tax advice. Consider, e.g., the resort to some form of entry barrier (through, e.g., limitations to the number of students that can be enrolled in medical schools), which can be replicated with professions involved in tax advise. On this purpose one can also note that the deregulation policies often followed in the field, particularly with respect to legal professions, might have entailed unwanted effects in terms of more competition and lower prices of evasion schemes.

[9] This possibility is considered, e.g., by Reinganum and Wilde, 1991, in a framework, in which, however, tax practitioners have a service role and there is no information asymmetry in their relationship with customers.

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7 Appendix A

To prove Lemma 1, which says that the participation constraint (8) is never binding, let us consider first the case in which $E^* < \overline{E}$. After substituting into (8) from (7) and with reference to the market equilibrium in which $\overline{E} = E_i$ we get

$$g'(\overline{E})(\overline{E} - E^*) - [g(\overline{E}) - g(E^*)] \tag{21}$$

According to the Lagrange Theorem, since $g(E)$ is a continuous and derivable function defined on $[0, I]$, there exist a $k \in \left(E^*, \overline{E}\right)$ such that

$$g'(k)(\overline{E} - E^*) = g(\overline{E}) - g(E^*)$$

Convexity of $g(E)$ and the fact that $E^* < \overline{E}$ imply that

$$g'(\overline{E})(\overline{E} - E^*) > g'(k)(\overline{E} - E^*) = g(\overline{E}) - g(E^*)$$

Hence (21) holds with a positive sign and the constraint (8) is not binding.

Whenever $\overline{E} < E^*$, then $\left(\overline{E} - E^*\right)$ is a negative number. Let us rewrite the constraint as

$$g(E^*) - g(\overline{E}) - g'(\overline{E}) \left|(\overline{E} - E^*)\right|$$

As in the previous case, there exist a a $k \in \left(\overline{E}, E^*\right)$ such that

$$g'(k) \left|(\overline{E} - E^*)\right| = g(E^*) - g(\overline{E})$$

convexity of $g(E)$ and the fact that $\overline{E} < E^*$ imply that:

$$g'(\overline{E}) \left|(\overline{E} - E^*)\right| < g'(k) \left|(\overline{E} - E^*)\right| = g(E^*) - g(\overline{E})$$

so the participation constraint (8) is never binding.

While Lemma 1 would hold also when reporting E^* involves expected losses due to the underestimation of p, Assumption 2 rules out this case. To prove Lemma 2, note that also when $\phi(p) < p$, according to Lemma 1, it holds that:

$$[rtE_i - g(E_i)] - [rtE^* - g(E^*)] - P\left(\overline{E}\right)(E_i - E^*) \geq 0$$

and hence

$$[rtE_i - g(E_i)] - P\left(\overline{E}\right)(E_i - E^*) \geq [rtE^* - g(E^*)] \geq 0$$

where the second inequality is based on Assumption 2. Hence when the taxpayer reports $\overline{E}$ she pays the due taxes on $\left|(\overline{E} - E^*)\right|$ plus the due compensation to the tax preparer and still has a non negative consumer rent: shifting to full compliance is never advantageous.

8 Appendix B

The per capita evasion suggested by firm i is implicitly defined by the first order condition. When $\phi(p) > p$ one gets from (10):

$$E_i = n\left[\frac{(P(\bar{E}) - c - pFt)}{\left|\frac{\partial P(\bar{E})}{\partial \bar{E}}\right|(1+\lambda)}\right] + E^* = nq + E^* \tag{22}$$

where the term in the square brackets is the same for each i. Because both all the tax preparers and all the clients are identical, average evasion will be $\overline{E} = nq + E^*$, so in equilibrium $E_i = \overline{E}$. By the same reasoning, this result holds true also whenever $\phi(p) < p$.

In order to determine the stability condition for this market, following the heuristic approach of Seade (1985), we rewrite the per capita suggested evasion in the market as:

$$\overline{E} = w_i E_i + \sum_{j \neq i} w_j E_j \tag{23}$$

where $0 < w_i \leqslant 1$ are weights, i.e., shares of the market.

Recalling the FOC for profit maximization when $\phi(p) > p$ [see (10)], that is :

$$\left\{(1 - pF_v)\left[P(\bar{E}) + \frac{\partial P(\bar{E})}{\partial \overline{E}}\frac{1+\lambda}{n}(E_i - E^*)\right] - c - pFt\right\}\theta = 0$$

we differentiate it with respect to $\overline{E}$ as defined in (23), considering marginal (unitary) variations of the suggested evasion by all the tax preparers. By setting $dE_i = 1$ and $dE_j = 1$ for all $j \neq i$ we obtain:

$$\chi = (1 - pF_v)\left[\left(1 + \frac{1+\lambda}{n}\right)\frac{\partial P}{\partial \overline{E}} + \frac{\partial^2 P}{\partial \overline{E}^2}\frac{1+\lambda}{n}(\overline{E} - E^*)\right] \tag{24}$$

As long as $\chi < 0$ the total effect of output expansion on marginal profit is negative, and this discourages deviations from the equilibrium. The same stability condition holds true also for the case in which $\phi(p) < p$.

The stability condition $\chi < 0$ can also be rewritten as:

$$1 + \frac{n}{1+\lambda} - G\left(1 - \frac{E^*}{\overline{E}}\right) > 0 \tag{25}$$

$$1 + \frac{n}{1+\lambda} > G\left(1 - \frac{E^*}{\overline{E}}\right) \tag{26}$$

where $G = -\frac{\frac{\partial^2 P}{\partial \overline{E}^2}}{\frac{\partial P}{\partial \overline{E}}}\overline{E}$ is the elasticity of the slope of inverse demand (G is called E by Seade, 1985). The stability condition implies the second order condition (11), with E_i replaced by $\overline{E}$ in the latter since in equilibrium $E_i = \overline{E}$. In order to show this let us rewrite (11) as:

$$\frac{2n}{(1+\lambda)} > G\left(1 - \frac{E^*}{\overline{E}}\right) \tag{27}$$

Whenever both $(1+\lambda) = 1$ and $n = 1$ the LHS in both (25) and in (27) is equal to 2, while for smaller values of λ and/or larger values of n the LHS in (27) is larger.

The elasticity of the slope of inverse demand G has also a very important role with respect to the possibility of shifting expected sanctions onto consumers. The price increase arising from an F increase (when $F_v = 0$) is given by

$$\frac{\partial P(\overline{E})}{\partial \overline{E}} \frac{\partial \overline{E}\,(F)}{\delta F} = \frac{\partial P(\overline{E})}{\partial \overline{E}} \left(-\frac{pt}{|\chi|} \right) = \frac{pt}{1 + \frac{n}{1+\lambda} - G\left(1 - \frac{E^*}{\overline{E}}\right)} \tag{28}$$

where $\frac{\partial \overline{E}(F)}{\delta F}$ results from (15). While the price is clearly increasing in the expected sanction, overshfting occurs only if the denominator is smaller than the numerator. This seems more likely to occur the larger is G, the less competitive is the activity and the larger is the percentage correction of the report.

With respect to the possibility that an increase in F (when $F_v = 0$) entails an increase in the profit of the representative firm, let us differentiate the profit in equilibrium when $\phi(p) > p$, defined as:

$$\Pi \equiv \left\{ P\left[\overline{E}(F)\right] - c \right\} \left[\overline{E}(F) - E^*\right] - pFt\overline{E}(F)$$

then

$$\begin{aligned}
&\frac{\partial \Pi}{\partial F} = \left[P\left(\overline{E}\right) + \frac{\partial P}{\partial \overline{E}} \left(\overline{E} - E^*\right) - c - pFt \right] \frac{\partial \overline{E}}{\partial F} - pt\overline{E} = \\
&\frac{\lambda}{n} \frac{\partial P}{\partial \overline{E}} \left(\overline{E} - E^*\right) \frac{\partial \overline{E}}{\partial F} - pt\overline{E} = \\
&\frac{\frac{\lambda}{n} \frac{\partial P}{\partial \overline{E}} \left(\overline{E} - E^*\right) pt - pt\overline{E} \left[\left(1 + \frac{1+\lambda}{n}\right) \frac{\partial P}{\partial \overline{E}} + \frac{\partial^2 P}{\partial \overline{E}^2} \frac{1+\lambda}{n} \left(\overline{E} - E^*\right) \right]}{\left(1 + \frac{1+\lambda}{n}\right) \frac{\partial P}{\partial \overline{E}} + \frac{\partial^2 P}{\partial \overline{E}^2} \frac{1+\lambda}{n} \left(\overline{E} - E^*\right)} = \\
&\frac{pt\overline{E} \left\{ \left[-\frac{\lambda}{n} \frac{E^*}{\overline{E}} - 1 - \frac{1}{n} \right] \frac{\partial P}{\partial \overline{E}} - \frac{\partial^2 P}{\partial \overline{E}^2} \frac{1+\lambda}{n} \left(\overline{E} - E^*\right) \right\}}{\left(1 + \frac{1+\lambda}{n}\right) \frac{\partial P}{\partial \overline{E}} + \frac{\partial^2 P}{\partial \overline{E}^2} \frac{1+\lambda}{n} \left(\overline{E} - E^*\right)} = \\
&\frac{G\left(1 - \frac{E^*}{\overline{E}}\right) \frac{1+\lambda}{n} - \left(\frac{1}{n} \left(\lambda \frac{E^*}{\overline{E}} + 1\right) + 1 \right)}{\left[\frac{1 + \frac{n}{1+\lambda}}{\overline{E}} - G\left(1 - \frac{E^*}{\overline{E}}\right) \right] / pt}
\end{aligned} \tag{29}$$

where the second line is obtained by substituting for the term in square brackets from the FOC (10); in the third line $\frac{\partial \overline{E}}{\partial F}$ in substituted from (15) [after the substitution of χ from (24)]. Hence the profit is increasing as long as the numerator in (29) is positive, which again is more likely the larger is G and the larger is the percentage correction of the evaded amount suggested in the market for tax preparation. Such an increase arises whenever the effect due to the quantity restriction - which comes closer the monopoly solution - prevails with respect to the cost increase due to the larger sanction. Of course no increase can happen under monopoly, and actually positivity of the numerator in (29) would violate the stability condition (25) whenever $\frac{1+\lambda}{n} = 1$ and $n = 1$.

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