

Corporate Social Responsibility and Tax Avoidance

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Abstract:

We analyse whether oligopolistic firms which maximise a weighted sum of profits and a Corporate Social Responsibility (CSR) objective avoid more or less taxes than a profit-maximising company. CSR is modelled as a dependence of the firm's objective on output and its contribution to the provision of a public good. Our theoretical model shows that making one CSR element more important induces the firm to adhere less to the other and to reduce tax avoidance. Hence, simultaneously a substitutive and a complementary relationship between CSR and tax avoidance can be observed. Therefore, empirical approaches employing composite indicators of CSR will be unable to identify the link.

Keywords:

Corporate Social Responsibility, Public Good, Oligopoly, Output Objective, Tax Avoidance

JEL: H 26, L 13, L 31, M 14

1. Introduction

Corporate Social Responsibility (CSR), as defined by the European Commission is "the responsibility of enterprises for their impacts on society. ... To fully meet their corporate social responsibility, enterprises should have in place a process to integrate social, environmental, ethical, human rights and consumer concerns" (European Commission 2011, p. 6) While there is no consensus about what CSR exactly constitutes, most characterisations have in common the notion that firms pursue objectives, in addition to profits. The feature that political institutions, like the European Commission, are concerned about CSR reflects the tremendous increase in the importance of socially responsible firm behaviour in the last decades. Nowadays virtually all (large) companies document on their webpages how CSR objectives are pursued and attained. Clearly, some components of CSR are not only in the interest of society but also directly beneficial for enterprises. If, for example, a particular human relations policy raises productivity, it may benefit employees and result in higher profits. Similarly, producing goods of high quality may simultaneously make consumers and the firm better off. Hence, profit maximisation may already integrate social and firm objectives. However, such conformity will not always arise and pursuing CSR objectives may have detrimental effects on (short-run) profitability. Assume, for example, that firms have market power, such that output is below the welfare-maximising level. Expanding production in order to take into account consumer concerns will then lower profits.

Therefore, the question arises how firms which experience a decline in profits because they pursue a CSR policy will respond by adjustments at other margins. The mechanism we consider is the amount of taxes paid. There is ample evidence that firms try to (legally) avoid taxes, for example, by appropriate transfer pricing policies, making suitable location choices or exploiting loopholes in tax law.¹ More specifically, we ask whether socially responsible firm behaviour and tax avoidance activities are complements or substitutes. In the former case, more socially responsible firms will avoid taxes to a greater degree, in the latter they will avoid fewer and pay more taxes.

The answer to the above question is of immediate policy relevance. If tax avoidance and CSR are substitutes, fostering socially responsible behaviour by firms will yield a kind of double dividend because tax avoidance declines simultaneously. If, however, the two are

¹ Slemrod (2007, p. 28), for example, reports that the average tax gap for the Corporation Income Tax in the United States – that is, the difference between the amount of taxes due and the amount paid voluntarily and in time – was about 17% in 2001.

complements, the intention to do good by making firms behave socially responsible may then actually have adverse welfare consequences.

The relationship between tax avoidance and CSR has been debated intensively in a non-formal, theoretical manner and also empirically. However, a sound formal framework which predicts how a firm's profit-maximisation and CSR objectives interact is missing to the best of our knowledge. This lack of a thorough analysis is surprising since Christensen and Murphy (2004), for example, stated already more than a decade ago that tax issues have long been neglected in the debate about CSR. Moreover, they proposed that companies should adopt clear CSR standards in the area of taxation. Lanis and Richardson (2012, 2015) argue that a company that avoids taxes can claim to adhere to other CSR objectives with less credibility. Such hypothesis has also been put forward by Hoi et al. (2013) and labelled corporate culture perspective. Desai and Dharmapala (2006a) focus on the divergence of interests between managers of a firm and its owners. Strengthening CSR and restricting tax avoidance activities may both limit a manager's ability to pursue own objectives instead of those of shareholders. In consequence, the above contributions suggest that tax avoidance and CSR are negatively related and constitute substitutes. A contrary hypothesis, based on a risk-management perspective, is formulated by Hoi et al. (2013). They argue that tax avoidance imposes risk on firms, against which they can hedge by more extensive CSR activities. This perspective suggests a complementary relationship.

A second relevant strand of literature takes tax avoidance (or evasion) activities by firms as its starting point. These contributions usually assume firms to be profit-maximising entities.² This simple view of firms has recently been supplemented by the assumption that firm behaviour is governed by managers who do not necessarily act on behalf of the firm's shareholders (see, for example, Joulfaian 2000, Crocker and Slemrod 2005 or Desai and Dharmapala 2006b). The assumption implies that a firm's actions are no longer governed by a profit-maximisation objective. However, the literature on tax avoidance has not explicitly taken CSR concerns into account.

In sum, the assertion by Christensen and Murphy (2004) cited above is still true with respect to theoretical contributions. In partial contrast, the relationship between CSR and tax avoidance has been studied most intensively from an empirical perspective. Lanis and Richardson (2012) analyse the relationship between two measures of expense-based effective

² See, for example, the widely cited contributions on tax evasion or avoidance by Marrelli and Martina (1988), Virmani (1989) or Yaniv (1995). Goerke (2014) provides a survey of the literature on tax evasion by firms.

tax rates and a composite CSR indicator for about 400 Australian corporations. This indicator incorporates items relating to corporate governance, staff, social investment, environment, customer and supplier as well as community and political involvement. Lanis and Richardson (2012) report a negative relationship between the composite CSR indicator and also for some of its components and effective tax rates. Hence, their results are consistent with a substitutive relationship between tax avoidance and CSR. Huseynov and Klamm (2012) focus on the impact of fees to tax auditors on tax payments and also investigate in how far various measures of CSR affect this relationship. In this context they also look at the direct effects of six CSR indicators. Specifically, they utilise variables which measure the strength and the concerns regarding corporate governance, involvement in the community and diversity aspects. For a sample of more than 2,000 American firms, Huseynov and Klamm (2012) mostly find no relationship between measures of CSR and effective tax rates. If estimates are significant, the estimated coefficients relating to the strength of CSR are mostly, but not always negative. Hence, the findings by Huseynov and Klamm (2012) provide moderate support for a complementary relationship between tax avoidance and the strength of CSR. Hoi et al. (2013) look at a sample of about 2,500 US firms and employ a variety of indicators of tax avoidance and a composite CSR indicator taking into account negative social ratings in the areas of corporate governance, employee relations, environment, community, diversity, human rights, product quality and safety. Hoi et al. (2013) consistently find that firms which score lower on the CSR indicator are more likely to avoid taxes. Moreover, they use a legal change to ascertain the impact of tax avoidance on CSR and again observe a negative correlation. Hence, their evidence suggests that CSR and tax avoidance are substitutes. Watson (2015) employs a broadly based binary indicator of CSR and reports that cash-based effective tax rates of US firms are correlated positively with low CSR scores, but only if profitability is less than average. These findings for about 2,000 firms are compatible with a complementary linkage between tax avoidance and CSR for low profit firms. Davis et al. (2016) use a sample of more than 5,000 US firms and find evidence of a negative relationship between various indicators of CSR and the effective cash tax rate. This result provides evidence of a complementary relationship between tax avoidance and CSR. Finally, Amidu et al. (2016) analyse a sample of about 500 firms from Ghana. They also use a effective tax rates as indicator of tax avoidance and a composite CSR indicator, Amidu et al. (2016) investigate whether earnings management and tax avoidance, on the one hand, and CSR, on the other, are related and find no evidence of such linkage for tax avoidance activities of firms. Therefore, the empirical contributions provide a mixed picture.

Our theoretical contribution is based on the idea that a firm which has market power maximises a weighted sum of net profits and a CSR objective. Net profits can be raised by tax avoidance activities. If firms act in a first best environment, profit-maximisation results in a Pareto-efficient outcome. Accordingly, a CSR objective can cause a welfare improvement only if such an objective counteracts deviations from a first-best environment. In the present framework, there are two distortions: The firm has market power, such that output is inefficiently low, and it reduces public good provision by lowering its tax payments. Therefore, the CSR component of the firm's objective consists of two elements which can potentially induce the firm to behave in a welfare-maximising manner.³ The first CSR element is increasing in output and the second in the firm's tax payments. In order to analyse the relationship between CSR and tax avoidance, we change the importance of the CSR elements in the firm's objective and alter the marginal payoff from paying and avoiding taxes. This modelling set-up does not predetermine the relationship between CSR and tax avoidance. If the importance of the output objective rises, the firm produces a higher quantity and the CSR element is attained to a greater degree. At the same time, the rise in output increases the tax base, such that more taxes are avoided, prior to any adjustment in the firm's behaviour. Thus, this part of the model is a priori compatible with a complementary relationship between CSR and avoidance activities. If, however, the costs of avoidance rise, tax avoidance goes down and tax payments rise. Therefore, the CSR element of better public good provision and tax avoidance are negatively related and constitute substitutes. Again, this line of argument applies to a situation in which alterations in firm behaviour have not yet been taken into account.

To preview our findings, however, we have to incorporate adjustments in firm behaviour. When doing so, the model predicts that if a particular CSR element becomes more important or is realised to a greater degree, tax avoidance activities fall. This suggests that CSR and tax avoidance are substitutes. However, if one CSR element, the primary one, becomes more important and is attained to a greater degree, the firm will achieve the other, secondary element to a lesser degree. This is the case because the relative payoff from pursuing this secondary element of CSR shrinks. Hence, the two CSR elements – output and public good provision – are substitutes. This, in turn, implies that lower tax avoidance occurs simultaneously with a lower attainment of the secondary CSR element because of adjustments

³ In terms of language, we distinguish the CSR objective of the firm which encompasses all aspects of CSR, on the one hand, and CSR elements on the other hand. CSR elements refer either to the output or the public good aspect of the CSR objective.

in firm behaviour. That is, tax avoidance goes down when this secondary CSR element is becoming more important or realised to a greater degree.

Our findings suggest that empirical approaches based on composite indicators of CSR are bound to generate conflicting evidence with respect to the relationship between CSR and tax avoidance. If the composite indicator attaches sufficient importance to what we have called the primary element of CSR, the theoretical analysis predicts that empirically a substitutive relationship will be observed. If, however, the weight attached to the secondary indicator is high enough, empirically a complementary relationship is anticipated. Consequently, empirical analyses of CSR on tax avoidance should be based on measures of CSR which focus on separate aspects, such as employee relations or product quality.

Moreover, our theoretical investigation shows that if tax avoidance is made less attractive, firms pursue both CSR elements to a greater extent. Thus, a substitutive relationship is predicted between tax avoidance and both CSR elements. This prediction arises because higher output and greater tax payments both lower tax avoidance. This theoretical prediction suggests that empirical approaches which consider changes in CSR due to variations in tax avoidance can yield different outcomes than if the reverse relationship is looked at.

The remainder of the paper is structured as follows: In the next section we describe the model. Section 3 derives the firm's optimal behaviour. In Section 4 we look at the consequences of making the CSR elements more important, changing the marginal gains from providing the public good and avoiding taxes. In each case we are interested in the relationship between tax avoidance activities and the extent to which the CSR element is attained. An appendix collects proofs of the propositions summarising our findings. Finally, Section 5 concludes.

2. Model

We consider a firm which has market power because it is a monopolist or a (Cournot-) oligopolist. It maximizes a weighted sum of net profits and a CSR indicator with respect to output and tax avoidance. Gross profits are denoted by $\pi(x)$, where x represents the quantity of the commodity which the firm produces. They are zero if there is no production and strictly concave in x , implying that $\pi(0) = 0$, $\pi' \geq 0$ for $x \leq x^{pm}$, where x^{pm} denotes the profit-maximising output choice, and $\pi'' < 0$. Gross profits are subject to a linear tax at rate τ , $0 < \tau < 1$. Tax avoidance activities reduce the official tax burden, $\tau\pi$, by a fraction α , $0 \leq \alpha \leq 1$, at costs K . These costs are not tax deductible and an increasing and convex function of the

amount of taxes avoided, $K = K(\alpha\tau\pi)$, such that $K(0) = 0$ and $K', K'' > 0$. Consequently, net profits equal $\pi(1 - \tau(1 - \alpha)) - K(\alpha\tau\pi)$.

The CSR component in the firm's objective, which we denote by Z , is represented by two elements. The first element captures the idea that the government provides a public good. More specifically, the firm gains from contributing to the provision of the public good, albeit at a decreasing rate. The public good is financed by tax revenues such that higher tax payments by the firm have a beneficial impact on the public good element of CSR. We model this aspect by assuming that the firm's payoff rises with H , where H is an increasing and strictly concave function of the sum of taxes, T , paid by other agents than the firm and the firm's tax payments $V = \tau\pi(1 - \alpha)$, $H = H(T + V)$, $H' > 0 > H''$. The strict concavity of H implies that the increase in the firm's payoff due to a greater provision of the public good is becoming smaller the more of the public good is provided and the lower the relative contribution of the firm is. The implicit assumption in this modelling set-up is that the firm is relatively large and, hence, has a sizeable impact on tax revenues and that public good production is not too expensive relative to the firm's tax payments. The importance of this public good element of CSR is measured by a parameter θ , $0 \leq \theta$, where $\theta = 0$ indicates the absence of such a CSR element.⁴

The second CSR element reflects the fact that the profit-maximising quantity x^{pm} is less than the socially optimal amount because of the firm's market power. Hence, we assume that the firm's payoff rises with G , where G is an increasing function of output, x . This specification is compatible with the notion that the firm's payoff rises with consumer surplus (cf., for example, Goering 2008, Lambertini et al. 2016, Planer-Friedrich and Sahm 2016). In this case, and assuming linear demand, $G'' > 0$ would hold. However, it is also conceivable that the gain from producing higher output declines with x , such that $G'' < 0$. Therefore, a priori no restriction on the sign of G'' seems feasible. The importance of this output component of CSR is measured by a parameter γ , $0 \leq \gamma$, where $\gamma = 0$ indicates the absence of such a CSR element.

Summing up all of the above information, the firm's objective, Z , can be written as:

$$Z(x, \alpha) = \pi(x)(1 - \tau(1 - \alpha)) - K(\alpha\tau\pi(x)) + \theta H(T + (1 - \alpha)\tau\pi(x)) + \gamma G(x) \quad (1)$$

If the production of the good entails negative externalities, the output element of CSR could also reduce the firm's payoff. In this case, $\gamma < 0$ will be the appropriate assumption if the gain from lower production, say due to less detrimental environmental effects, dominates the

⁴ If the firm derives a positive payoff from the public good directly and not only via the CSR element, $\theta = \bar{\theta} > 0$ would indicate the absence of such CSR element and $\theta > \bar{\theta}$ its presence.

benefits of higher output, resulting from counteracting the impact of market power.⁵ We will show below that our main findings continue to hold for the case of $\gamma < 0$ (see Section 4.3). Hence, our results also apply if CSR relates to environmental aspects.

3. Optimal Choices

The first-order conditions for the firm's optimum are given by $\partial Z/\partial x = \partial Z/\partial \alpha = \tau\pi(x)Z_\alpha = 0$, which can be expressed as:

$$\frac{\partial Z}{\partial x} = \pi'(x)(1 - \tau + \tau\alpha(1 - K'(x, \alpha) - \theta H'(x, \alpha)) + \theta H'(x, \alpha)\tau) + \gamma G'(x) = 0 \quad (2)$$

$$Z_\alpha = 1 - K'(x^*, \alpha^*) - \theta H'(x^*, \alpha^*) = 0 \quad (3)$$

As usual, a subscript denotes a partial derivative. Since tax avoidance can only be beneficial if the tax rate, τ , and profits, $\pi(x)$, are positive, the optimal choice of tax avoidance activities, α^* , balances the marginal gain in terms of lower tax payments with the marginal costs of avoidance, K' , and the reduction in the payoff resulting from lower public good provision, H' . Given this optimal choice, substituting (3) into (2) yields:

$$Z_x = \pi'(x^*)(1 - \tau(1 - \theta H'(x^*, \alpha^*))) + \gamma G'(x^*) = 0 \quad (4)$$

The firm's optimal choice of output, x^* , balances the (negative) marginal effect of more output on after-tax profits, on the one hand, with the gain from a higher production level, for example, in terms of a rise in consumer surplus, on the other hand.⁶ We define after-tax profits as gross profits, multiplied by 1 minus the effective tax rate, $\tau(1 - \theta H')$. The effective tax rate, in turn, equals the statutory tax rate, τ , corrected by the marginal impact of tax payments on the public good element of CSR, $\theta H'$.

The optimal choice of output as defined by equation (4) implies that profits decline with output, that is, the firm produces more than its profit-maximising output level, $x^* > x^{pm}$. This is due to the output objective, $\gamma G(x) > 0$.⁷ Moreover, equation (4) clarifies that the firm's output choice will be distorted, irrespective of whether the tax is levied on profits or on another tax base.

⁵ Such a modelling approach is, inter alia, pursued by Lambertini et al. (2016).

⁶ Note that the firm's optimal choice of tax avoidance activities implies that $1 - \theta H' = K' > 0$, such that $K', H' < 1$. Hence, $1 - \tau(1 - \theta H') > 0$.

⁷ In the absence of the output objective ($\gamma = 0$), the standard separability result would arise, namely that tax avoidance (or evasion) does not affect the firm's output decision (cf. Yaniv 1995).

The second-order conditions for a maximum of Z are given by:

$$Z_{xx} = \pi''(1 - \tau(1 - \theta H')) + (\pi'\tau)^2 \theta H''(1 - \alpha^*) + \gamma G'' < 0 \quad (5)$$

$$Z_{\alpha\alpha} = -\tau\pi(K'' - \theta H'') < 0 \quad (6)$$

$$\begin{aligned} D &= Z_{xx}Z_{\alpha\alpha} - Z_{\alpha x}Z_{x\alpha} \\ &= \underbrace{-\tau\pi}_{(-)} \left\{ \underbrace{[\pi''(1 - \tau(1 - \theta H')) + \gamma G'']}_{(+)} \underbrace{(K'' - \theta H'')}_{(+)} + \underbrace{(\pi'\tau)^2 \theta H'' K''}_{(-)} \right\} > 0, \quad (7) \end{aligned}$$

where $Z_{x\alpha}$ and $Z_{\alpha x}$ equal:

$$Z_{x\alpha} = -\pi'\tau^2 \theta H'' \pi < 0 \quad (8)$$

$$Z_{\alpha x} = -\tau\pi'(K''\alpha^* + \theta H''(1 - \alpha^*)) \quad (9)$$

The determinant of the system, D , will surely be positive if the term in square brackets in (7) is non-positive, i. e, if the profit function is sufficiently concave, relative to the weighted impact of output in the firm's objective. Henceforth, this restriction, $\pi''(1 - \tau(1 - \theta H')) + \gamma G'' < 0$, is assumed to hold.

4. Comparative Statics

4.1 Modelling the Interaction of CSR and Tax Avoidance

In the present setting, the impact of changes in exogenous parameters on tax avoidance can be measured by the resulting variation in α^* , that is, in the fraction of the tax liability, $\tau\pi$, which is not paid. An alternative indicator of avoidance is the total amount of taxes avoided, $A = \alpha^*\tau\pi$. This indicator incorporates changes in the tax base, i. e. profits, π . Additionally, total tax payments, $V = (1 - \alpha^*)\tau\pi = \tau\pi - A$, can be looked at. This is a relevant indicator because the extent to which the public good objective is attained depends positively on V , as long as public good provision increases in tax revenues. We will consider all three measures below since they capture different aspects of the firm's behaviour.

In order to analyse the relationship between CSR and tax avoidance empirically, one could compare tax avoidance activities of firms with and without CSR objective, or with differentially pronounced CSR aims. This approach has generally been pursued (cf. Huseynov and Klamm 2012, Lanis and Richardson 2012, Hoi et al. 2013, Watson 2015, Davis et al. 2016, Amidu et al. 2016). Alternatively, the intensity of CSR objectives could be contrasted for firms with differential tax avoidance activities (cf. Hoi et al. 2013, Amidu et al. 2016). In

the context of the present model, the first approach is tantamount to analysing the effect of an increase in the parameters γ and θ on tax avoidance activities and output, as well as public good provision. Alternatively, one can consider a change in the amount of the public good provided by other agents, that is, the variable T . This will alter the firm's payoff from paying taxes and, hence, public good provision will change. The alteration in tax avoidance can, once again, provide information about the relationship we are interested in. The theoretical counterpart to the second empirical approach is an analysis of an exogenous change in tax avoidance and of the resulting effect on output and public good provision. Such a variation in avoidance activities can be attained, for example, by altering its marginal costs.

Therefore, for further use, the derivatives of the first-order conditions with respect to the weight of the CSR elements, θ and γ , tax payments by other agents, T , and the marginal costs of tax avoidance, K' , are required. They are given by $Z_{xK'} = Z_{\alpha\gamma} = 0$, $Z_{x\theta} = \pi'\tau H'$, $Z_{\alpha\theta} = -H'$, $Z_{\alpha K'} = -1 < 0$, and $Z_{xy} = G'$, $Z_{xT} = \pi'\tau\theta H''$, $Z_{\alpha T} = -\theta H'' > 0$.

4.2 Greater Importance of Public Good Element of CSR

We first consider the impact of a greater importance of the public good element in the firm's objective, that is, of a rise in the parameter θ . The subsequent Proposition summarises our findings:

Proposition 1: Greater Importance of Public Good

A greater importance of public good provision in the firm's objective reduces output and tax avoidance, while public good provision increases.

Proof: See Appendix A.1

A greater importance of public good provision raises the firm's incentives to pay taxes. It can achieve this aim via two channels, namely by raising the tax base, that is profits, and by reducing tax avoidance. Profits can be increased by lowering output because the output element of CSR implies that the firm produces a quantity in excess of the profit-maximising level. In consequences, the optimal output quantity, x^* , and the optimal fraction of taxes avoided, α^* , are reduced. Since higher profits, *ceteris paribus*, raise the amount of taxes avoided, a priori the overall impact of the fall in x^* and α^* on the amount of taxes avoided is uncertain. However, it is possible to show (cf. Appendix A.1, equation (A.3)) that the direct

effect via avoidance activities dominates the tax base impact. Consequently, not only tax payments, V , rise, but also the total amount, A , of taxes avoided declines.

Proposition 1 allows us to provide a first answer to the main question of the paper, namely whether firms respond to a greater extent of CSR by increasing or decreasing tax avoidance. In order to do so, we differentiate between the primary CSR element, which is directly affected by the change in the parameter θ , namely public good provision, and the secondary element. The change of this secondary element is attained only indirectly, in that a rise in the parameter θ also alters output and, hence, the CSR element $G(x)$. Proposition 1 shows that the public good element of CSR and tax avoidance are substitutes. The importance of the public good objective rises, while tax avoidance goes down and total tax payments rise. Thus, more socially responsible firms which finance a greater amount of the public good, also avoid taxes to a smaller extent. If, however, we look at the correlation between tax avoidance and the secondary CSR element, we can note that less output and, hence, a lower degree to which the output element is attained go hand in hand with less tax avoidance. This indicates a complementary relationship.

4.3 Greater Importance of Output Element of CSR

We next analyse a greater importance of the output element of CSR, i.e. a rise in the parameter γ . Our findings are contained in:

Proposition 2: Greater Importance of Output

A greater importance of output in the firm's objective raises output, has uncertain effects on the fraction of the tax obligation avoided, lowers the amount of taxes avoided and public good provision.

Proof: See Appendix A.2

A greater importance of the output objective induces the firm to raise production. Higher output, in turn, reduces profits. Therefore, the marginal costs of avoidance decline and tax avoidance, *ceteris paribus*, rises. Lower profits, however, also reduce tax payments, V , such that the marginal gain from public good provision rises, *Ceteris paribus*, tax avoidance declines. The net effect depends on the extent of tax avoidance, i.e., the optimal fraction, α^* , of tax payments avoided. If $\alpha^* < (>) \theta H'' / (\theta H'' - K'') < 1$, the optimal fraction avoided will fall (rise) with a greater importance of the output objective until $\alpha^* = 0$ (1). This finding implies

that a firm which has no output-related CSR objective and does not avoid taxes ($\alpha^* = 0$) will not start doing so if a CSR objective is added. However, even if the fraction α^* of tax payments not paid rises with γ , the amount of taxes avoided, A , unambiguously declines. This is the case because the fall in the tax base dominates a possible rise in the fraction of tax obligations avoided. Tax payments, V , and thus also public good provision decline since the tax base effect is relatively large, compared to the fall in taxes avoided.

In the case looked at in Proposition 2, the primary CSR element is the output level and the secondary given by public good provision because the latter is only affected indirectly by a rise in γ . Proposition 2 implies that the output element of CSR and the total amount of tax avoided are substitutes. This implication ties in with the finding summarized in Proposition 1. The same is true with regard to the correlation between the secondary, public good CSR element and tax avoidance. A greater importance of the output element reduces public good provision, since tax payments decline, and also reduces tax avoidance. Hence, we again observe a complementary relationship.

Thus far, we have assumed that the firm's payoff rises with more output due to the CSR objective ($\gamma > 0$). Assume instead that $\gamma < 0$ holds, for example, because production harms the environment and this negative externality is not internalised in the firm's profit objective. In this case, a greater importance of the CSR element is tantamount to a decline (not an increase) in the parameter γ . Furthermore, $\gamma < 0$ implies that the firm produces less than the profit-maximising quantity, such that $\pi'(x) > 0$ at $x = x^*$. Inspection of equations (A.5) and (A.6) in Appendix A.2 clarifies that the changes in the fraction of taxes avoided, α^* , the amount, A , and total tax payments, V , owing to a fall in the parameter γ , will be the same for $\pi' > 0$ as they are obtained with respect to a rise in γ and assuming $\pi' < 0$. Hence, Proposition 2 also applies to a setting in which the output element of CSR requires a quantity which is lower than the profit-maximising one, obviously with the exception of the variation in output itself.

4.4 Exogenous Decline in Public Good Provision

Suppose other agents contribute less to the costs of providing the public good. This is tantamount to a reduction in T and to a rise in the firm's marginal gain, H' , from public good provision. If T falls, the firm can achieve a higher payoff from paying more taxes, such that the importance of this CSR element effectively rises. An alternative interpretation of the fall in T is that two firms with different CSR elements are compared. In one case, the firm's

contribution to public good provision is relatively low, because T is high, and the firm can, thus, influence the CSR objective only to a relatively small degree. This may be the case if the public good is relatively expensive and financed by many agents and could, for example, be true if a national public good is considered. In the other case, the firm's contribution to public good provision is relatively large and it can affect the CSR objective to a substantial degree. This may be true if the public good is relatively cheap and financed by few agents and could, for example, be an adequate assumption if a local public good is affecting the CSR component. The findings for a decline in T and a higher marginal payoff from contributing to the public good are summarised in:

Proposition 3: Higher Marginal Payoff From Paying Taxes

A higher marginal payoff from public good provision, i.e. a fall in T , lowers output and tax avoidance and raises public good provision.

Proof: See Appendix A.3

If T falls, the marginal costs from avoiding taxes rise. Hence, the fraction and total amount of tax payments avoided falls, while tax payments, V , go up. The overall effect on public good provision, that is $d(T + V)/dT$, is negative, such that the marginal gain from the public good element of CSR rises.⁸ Such an increase in H' lowers the effective tax rate $\tau(1 - \theta H')$.⁹ Since output exceeds the profit-maximising level, $x^* > x^{pm}$, the profit tax effectively mitigates the incentives to raise output. Accordingly, the firm reduces output.

Turning to the main question of this paper, we can note that the decline in T reduces tax avoidance and raises public good provision. Once again, the primary CSR element and tax avoidance represent substitutes. However, while tax avoidance rises, output also increases such that the secondary, output element of CSR is satisfied to a greater degree. Therefore, we once more have a case in which the relationship between tax avoidance and the secondary CSR element is complementary.

⁸ $\frac{d(T+V)}{dT} = \frac{D}{D} + \frac{dV}{dT} = -\frac{\tau\pi K''(\pi''(1-\tau(1-\theta H'))+\gamma G'')}{D} > 0$

⁹ The fact that the decline in T results in a rise in H' clarifies that the analysis of a lower contribution to the costs of providing the public good by other agents is formally identical to the investigation of a rise in H' .

4.5 Marginal Costs of Tax Avoidance

A rise in the marginal costs of tax avoidance, that is an increase in K' , can be achieved if, for example, the costs of tax advisors rise. Alternatively, authorities may close tax loopholes, such that a given amount of avoidance is more difficult and costly to achieve. Proposition 4 condenses how the variables of interest change.

Proposition 4: Marginal Costs of Tax Avoidance

An increase in the marginal costs of tax avoidance induces the firm to expand its output, to lower the fraction and absolute amount of taxes avoided and results in a higher level of public good provision.

Proof: See Appendix A.4

Higher marginal costs of avoidance imply that the optimal fraction, α^* , of the legal tax burden not paid declines. If tax avoidance activities become less pronounced, *ceteris paribus*, more of the public good is financed by the firm. Consequently, the marginal gains from providing the public good, and from paying taxes, decrease. For a given tax rate, tax payments can be lowered by reducing profits. One way to achieve this objective is to expand output, because output exceeds the profit-maximising level, x^{pm} . If the fraction of the tax burden avoided becomes smaller and output rises, the amount of taxes avoided declines because the tax base falls, as well. A smaller amount of taxes avoided, *ceteris paribus*, enhances total tax payments. However, the increase in output lowers the tax base, *ceteris paribus*, decreasing total tax payments. Since the tax avoidance impact dominates the tax base effect (see Appendix A.4, equation (A.16)), higher marginal costs of tax avoidance, K' , raise total tax revenues and result in a greater amount of the public good.

In consequence, lower tax evasion and greater tax payments, which are tantamount to a higher level of public good provision, coincide. This is equivalent to a substitutive relationship between tax avoidance and the public good element of CSR. In this case, also the other, output-related CSR element is attained to a higher degree. Hence, in contrast to variations of parameters affecting the importance of CSR elements, the induced change in tax avoidance is related in a substitutive manner to the extent to which CSR elements are achieved.

5. Conclusions

to be written

6. References

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7. Appendix

A.1: Greater Importance of Public Good Element of CSR

$$\frac{dx^*}{d\theta} = \frac{Z_{\alpha\theta}Z_{x\alpha} - Z_{x\theta}Z_{\alpha\alpha}}{D} = \frac{\pi'\tau^2H'\pi K''}{D} < 0 \quad (\text{A.1})$$

$$\frac{d\alpha^*}{d\theta} = \frac{Z_{\alpha\alpha}Z_{x\theta} - Z_{xx}Z_{\alpha\theta}}{D} = H' \frac{\pi''(1 - \tau(1 - \theta H')) + \gamma G'' - (\pi'\tau)^2 K'' \alpha^*}{D} < 0 \quad (\text{A.2})$$

$$\frac{dA}{d\theta} = \tau \left[\alpha^* \pi' \frac{dx^*}{d\theta} + \pi \frac{d\alpha^*}{d\theta} \right] = \frac{\tau \pi H'}{D} [\pi''(1 - \tau(1 - \theta H')) + \gamma G''] < 0 \quad (\text{A.3})$$

$$\frac{dV}{d\theta} = \underbrace{\tau \pi'}_{(+)} \frac{dx^*}{d\theta} - \frac{dA}{d\theta} > 0 \quad (\text{A.4})$$

A.2: Greater Importance of Output Element of CSR

$$\frac{dx^*}{d\gamma} = \frac{-G'Z_{\alpha\alpha}}{D} > 0 \quad (\text{A.5})$$

$$\frac{d\alpha^*}{d\gamma} = - \underbrace{\frac{\tau \pi' G'}{D}}_{(-)} (K'' \alpha^* + \theta H''(1 - \alpha^*)) \quad (\text{A.6})$$

$$\frac{dA}{d\gamma} = \tau \left[\alpha^* \pi' \frac{dx^*}{d\gamma} + \pi \frac{d\alpha^*}{d\gamma} \right] = - \frac{\tau^2 \pi' G' \pi \theta H''}{D} < 0 \quad (\text{A.7})$$

$$\frac{dV}{d\gamma} = \tau \pi' \frac{dx^*}{d\gamma} - \frac{dA}{d\gamma} = \frac{\tau^2 \pi' G' \pi K''}{D} < 0 \quad (\text{A.8})$$

A.3 Exogenous Change in Public Good Provision

$$\frac{dx^*}{dT} = \frac{Z_{\alpha T}Z_{x\alpha} - Z_{xT}Z_{\alpha\alpha}}{D} = \frac{\theta H'' \pi' \tau^2 \pi K''}{D} > 0 \quad (\text{A.9})$$

$$\frac{d\alpha^*}{dT} = \frac{Z_{\alpha\alpha}Z_{xT} - Z_{xx}Z_{\alpha T}}{D} = \theta H'' \frac{\pi''(1 - \tau(1 - \theta H')) + \gamma G'' - K'' \alpha^* (\tau \pi')^2}{D} > 0 \quad (\text{A.10})$$

$$\frac{dA}{dT} = \tau \left[\alpha^* \pi' \frac{dx^*}{dT} + \pi \frac{d\alpha^*}{dT} \right] = \frac{\tau \pi \theta H'' (\pi''(1 - \tau(1 - \theta H')) + \gamma G'')}{D} > 0 \quad (\text{A.11})$$

$$\frac{dV}{dT} = \underbrace{\tau\pi' \frac{dx^*}{dT}}_{(-)} - \underbrace{\frac{dA}{dT}}_{(+)} < 0 \quad (\text{A.12})$$

A.4: Marginal Costs of Tax Avoidance

$$\frac{dx^*}{dK'} = \frac{Z_{\alpha K'} Z_{x\alpha} - Z_{xK'} Z_{\alpha\alpha}}{D} = \frac{\pi' \tau^2 \theta H'' \pi}{D} > 0 \quad (\text{A.13})$$

$$\frac{d\alpha^*}{dK'} = \frac{Z_{xx}}{D} < 0 \quad (\text{A.14})$$

$$\frac{dA}{dK'} = \tau\alpha^* \underbrace{\pi'}_{(+)} \frac{dx^*}{dK'} + \tau\pi \underbrace{\frac{d\alpha^*}{dK'}}_{(-)} < 0 \quad (\text{A.15})$$

$$\frac{dV}{dK'} = \tau\pi' \frac{dx^*}{dK'} - \frac{dA}{dK'} = -\frac{\tau\pi}{D} [\pi''(1 - \tau(1 - \theta H')) + \gamma G''] > 0 \quad (\text{A.16})$$