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Private firms' tax aggressiveness and lightweight pre-tax-audit interventions by the tax administration



Hannu Ojala ^{a,*}, Pekka Malo ^b, Esko Penttinen ^b

^a University of Eastern Finland and Aalto University, Kuopio, Finland

^b Aalto University School of Business, Espoo, Finland

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ABSTRACT

This study examines private companies' tax aggressiveness and its changes in response to interventions by the government tax administration. While scholars have researched authorities' interventions extensively, this study is the first to consider the "light" technique of tax adjustments made by the tax administration immediately after the firm submits its tax return. We utilized a large-scale proprietary dataset obtained from Finland's tax administration (covering 85,155 firm-years), the hypotheses addressed the relationship between the firm's level of tax aggressiveness and the tax-administration intervention (H1) and that between the intervention and companies' response to it (H2). The empirical findings support both hypotheses. Its lightweight nature notwithstanding, the pre-tax-audit intervention can serve as a tool for ameliorating firms' overly tax-aggressive behavior. Finally, we present management implications that should be of interest to tax administrations and regulatory authorities, related to the potential effectiveness of a tax administration's monitoring processes in mitigating the tax aggressiveness of private companies.

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1. Introduction

Despite recent efforts to abrogate tax non-compliance, concretized by initiatives such as the Foreign Account Tax Compliance Act in the United States (US) and the Fiscalis 2020 program in the European Union (EU), tax non-compliance by both corporations and individuals remains one of the leading concerns of governments in developed countries (Gale & Krupkin, 2019). The standard metric for tax non-compliance is the "tax gap," the amount of taxes owed but not paid. US Internal Revenue Service estimated the tax gap at \$406 billion per year for 2008–2010 (IRS, 2016), equivalent to 18% of annual federal revenue over that time. Attention has been drawn to similar concerns and estimates of non-compliance with tax-reporting obligations in most other developed countries.

Our study focused on one specific manifestation of tax non-compliance: a firm's tax aggressiveness. This refers to the extent of differences in how income is reported between the financial statements and the company's tax returns, or book-tax differences, which "are by definition differences between book and tax reporting of the same transaction" (Hanlon & Heitzman, 2010, 131). If the tax administration considers book-tax differences to indicate some form of tax aggressiveness, this raises the cost of engaging in aggressive tax reporting by increasing the likelihood of detection by the

* Corresponding author at: Microkatu 1 F, Technopolis, PB 1627, 70211 Kuopio, Finland.

E-mail addresses: hannu.ojala@uef.fi (H. Ojala), pekka.malo@aalto.fi (P. Malo), esko.penttinen@aalto.fi (E. Penttinen).

tax administration (Cloyd et al., 2006; Hanlon & Heitzman, 2010; Mills & Newberry, 2001). This paper examines the associated dynamics of private companies' tax aggressiveness in the presence of interventions connected with the tax administration's monitoring of companies' tax reports. In our case context, the tax administration has a spectrum of intervention mechanisms at its disposal, from strict, formal tax audits to more lightweight techniques (Subsection 3.1 addresses the types of intervention in more detail). Our study focused on a "light" technique involving tax adjustments made immediately after the firm submits its return to the tax administration.

We identified two distinct gaps in the literature examining firms' reactions to the intervention by tax administrations. First, studies so far focus primarily on probing the effects of formal tax audits on firms' tax aggressiveness (Bauer et al., 2021; Chan & Lan Mo, 2000; D'Agosto et al., 2018; DeBacker et al., 2015; Gemmell & Ratto, 2012; Klassen et al., 2016; Kleven et al., 2011; Tauchen et al., 1993). We did not find any studies delving into the kind of lightweight pre-tax-audit intervention described above. Second, while prior theoretical work on tax non-compliance has increased understanding of the antecedents to non-compliance by both individuals (Allingham & Sandmo, 1972) and corporate entities (Chen & Chu, 2005), empirical studies of private (non-listed) companies' behavior remain scarce. This is most likely due to the inherent problems with accessing relevant datasets for research purposes, as fewer hurdles exist for material from public companies, which must adhere to stricter government- or stock-market-imposed reporting requirements. We posit that studying the behavior of private companies is crucial: these companies, most of which are small and medium-sized enterprises (SMEs), account for increasing percentages of gross domestic product and employment figures, and they show higher growth rates and innovation levels than large corporations (Simonen & McCann, 2008).

Motivated by the gravity and sheer size of the tax-non-compliance problem overall and by the lack of empirical research probing private companies' non-compliance behavior in conjunction with intervention in it, we developed our main research question: *How do firms adjust their level of tax aggressiveness in response to a lightweight pre-audit intervention by the tax administration?* Drawing on a unique proprietary dataset from the Finnish Tax Administration, we obtained a sample covering approximately 155,000 firm-years of observations suited to the focus of our study's analysis. This confidential dataset includes the complete tax returns and financial statements submitted to the tax administration by these companies for six years, coupled with details of the tax administration's intervention in response to those statements.

Our main contribution is an empirical one. First, drawing on the unique dataset obtained from Finland's tax administration, we found an association between private firms' level of tax aggressiveness and taxation adjustments by the tax administration. Our work with recent data corroborates earlier findings that the tax administration detects and reacts to private firms' tax aggressiveness. Further, we found that the lightweight intervention leads to firms adjusting their level of tax aggressiveness. We interpret and theorize upon these main findings in the discussion near the end of the paper.

Next, we outline the development of our hypotheses against the backdrop of prior theoretical work on tax non-compliance. This background is followed in Section 3 by a description and justification of our methodological choices, after which we present the empirical findings. The final sections are devoted to discussing our findings and presenting theory-oriented claims and implications for practice. We conclude the paper by discussing the main limitations and the avenues they represent for further research.

2. Theory review and hypotheses development

Firms engage in tax non-compliance for various reasons. We know from the literature that this activity can result in substantial cash tax savings (Dyreng et al., 2008). Employing a metric that covers book-tax differences, permanent book-tax differences, and long-run cash effective tax rates (ETRs), Goh et al. (2016) provided empirical evidence that equity investors do not demand as high an expected rate of return when positive cash-flow effects of corporate tax non-compliance are present (Goh et al., 2016). Lower cost of capital is an obvious incentive to avoid taxes. On the other hand, Dyreng et al. (2019) found that "tax-avoiders" firms with relatively low cash ETRs represent significantly greater tax uncertainty than do firms with higher cash ETRs. In the same vein, Hasan et al. (2014) offered evidence that companies displaying more extensive tax non-compliance encounter larger spreads when applying for bank loans.

Many factors affect firms' tax compliance. Frey and Torgler (2007) examined the relevance of social context for compliance with taxation rules. With survey data from 30 European countries, they uncovered a strong positive correlation between perceptions that others are engaging in tax non-compliance and lower "tax morale" (social norms of compliance) and also between institutional quality (key social structures' reliability) and tax morale.

In related research, Scholz and Pinney (1995) examined why people generally fulfil the obligations connected with citizenship when doing so runs counter to their short-term interests. The authors proposed that two levels of motivation are at play: the duty to obey and fear of getting caught. In their argument, based on cognitive mechanisms, the latter is influenced by objective information on the likelihood of getting caught, while the risk perceived by uninformed taxpayers, who lack such information, is strongly influenced by beliefs about duty. Those feeling little obligation end up perceiving little risk of getting caught, while those with a strong sense of duty perceive high risks. Thus, many taxpayers, partly on account of the difficulty of obtaining accurate information about the actual risks, unconsciously rely on their sense of duty to derive a "best guess" about these risks. Furthermore, the authors concluded that citizens systematically overestimate the penalties for getting caught.

As for empirical work connected with trust in the institutions and their power, [Wahl et al. \(2010\)](#) provided experimental evidence that both are predictive of compliant tax payments, and [Hoopes et al. \(2012\)](#) found that public firms in the US adopt less aggressive tax positions when tax enforcement is stricter. By the same token, when the perceived risk of getting caught is lower, firms become more tax-aggressive. For example, [Kim and Zhang \(2016\)](#) found politically connected firms to be more aggressive in their tax approach, presumably due to the lower cost expected from any tax enforcement and their better access to confidential information on tax-law and enforcement changes.

The duty heuristic may be highly important in these dynamics. Empirical evidence suggests that it biases self-interest-relevant perceptions in a direction consistent with beliefs about duty ([Scholz & Pinney, 1995](#)): citizens who report greater commitment to obeying US tax laws systematically overestimate the likelihood of getting caught by the IRS were they to “cheat.” Again, the implication is that duty enhances compliance not only by supplying direct motivation to comply but also by indirectly biasing self-interest beliefs in the same direction.

The sense of duty may be connected, additionally, to the regulator’s enforcement style and to trust in the authorities, both of which are cited as of possible importance in conditioning tax compliance ([Dowling et al., 2018](#); [Gao et al., 2019](#); [Kastlunger et al., 2013](#); [Mickiewicz et al., 2019](#)). For instance, [Mickiewicz et al. \(2019\)](#) showed that the perceived legitimacy of the tax administration and the government, one’s sense of belonging to the nation, and perceptions as to the risk and severity of punishment are all associated with greater tax compliance by business-owners and managers. These findings are consistent with several earlier studies in which societal trust was found to contribute to the transparency and credibility of earnings reporting, and this work suggests that firms operating in more trusting societies are likely to manifest less taxation-motivated earnings management ([Chen et al., 2012](#); [Freedman, 2010](#); [Pevzner et al., 2015](#)). By minimizing the conflict between duty and fear in one’s compliance decisions, the duty heuristic exerts a secondary effect of minimizing conflict between individual- and collective-level rationality.

Proceeding from our theoretical review above and a grounding in seminal works examining tax non-compliance by individuals ([Allingham & Sandmo, 1972](#)) and corporations ([Chen & Chu, 2005](#)), we undertook an empirical investigation of the effect of tax-administration interventions on corporate tax aggressiveness. For this purpose, we developed two hypotheses. With the first (H1), we addressed the link between the level of tax aggressiveness and those tax adjustments. Positing that a firm decides to lower its level of tax aggressiveness after the tax administration intervenes, we developed the second hypothesis (H2) to investigate the relationship between the change in firms’ tax aggressiveness and the tax adjustments made.

2.1. Tax-aggressiveness level and the adjustments made by the tax administration

As a public agency, a tax administration must optimize the use of its resources, so it has to allocate its supervisory resources effectively. This is reflected in how the body selects which firms to audit. For instance, prior work attests that larger firms get audited more often than smaller ones ([DeBacker et al., 2015](#)), a phenomenon that most likely stems from the fact that bigger firms are more complex and have higher transaction volumes. Furthermore, auditing bigger companies may yield greater profit as measured by tax receipts per hour of tax-clerk time. Hence, it is safe to posit that the tax administration is likely to perform careful assessment related to the characteristics of those firms it considers for closer scrutiny.

The firm’s level of tax aggressiveness is one such trait. Research already attests that tax aggressiveness increases the likelihood of the tax administration not accepting the firm’s taxable income as reported ([Ojala et al., 2020](#)). These authorities can detect clear changes in firms’ level of tax aggressiveness. For instance, in its tax returns a company may increase the amount it claims in non-taxable revenue while decreasing the amount of non-tax-deductible expenses claimed. Such observations have led scholars ([Hoopes et al., 2012](#); [Lennox et al., 2013](#)) to observe that companies cannot take their book and taxable income in opposite directions without awakening the tax administration’s interest. Furthermore, researchers ([Khurana & Moser, 2009](#)) have found that tax aggressiveness increases the probability of additional taxes in the long run. It is in line with this reasoning that we formed the first hypothesis:

H1: The tax adjustments made by the tax administration are positively correlated with the target firm’s preceding level of tax aggressiveness.

2.2. Change in firms’ tax aggressiveness and the adjustments made by the tax administration

Perhaps the first formal examination of the relation between the extent of tax non-compliance and both the probability of its detection and the level of punishment was conducted by [Allingham and Sandmo \(1972\)](#). Per their model, the extent of tax non-compliance should be negatively correlated with the probability of detection and with the amount of punishment ([Allingham & Sandmo, 1972](#); [Chen & Chu, 2005](#)). Under the model presented by [Allingham and Sandmo \(1972\)](#), the risk of being detected is articulated as a decision-maker’s subjective view of the probability of detection. We argue that the tax administration intervening to make corrections to a company’s tax reporting acts as a signal of a higher risk of detection. It would be natural to assume that intervention by the tax administration should lead to revising each decision-maker’s view as to the subjective probability of tax aggressiveness being detected. This view is supported by some empirical work on taxpayers’ behavioral responses to tax audits ([D’Agosto et al., 2018](#); [DeBacker et al., 2015](#); [Gemmell & Ratto, 2012](#)), although it must be acknowledged that high degrees of intervention and auditing can “backfire” and lead to perceiving the tax admin-

istration's actions as excessive and unfair (Mendoza et al., 2017). In the aforementioned model, an increase in the subjective probability would imply later reporting a higher income. Similar conclusions can be drawn in light of the model presented by Chen and Chu (2005), which suggests that a firm's likelihood of evading taxes will decrease if the probability of auditing or the penalty for non-compliance is higher.

We know that taxpayers update their estimates of the probability of auditing on the basis of experience (DeBacker et al., 2015), which may act as a proxy for objective information on risk. For instance, Spicer and Hero (1985) reported on an experiment in which each participant submitted a mock tax return in each of 10 rounds of play, having been supplied with a given total income, a random audit probability, and a preset penalty rate. Tests revealed a statistically significant negative correlation between tax non-compliance in the final round and the number of "audits" in prior rounds. Research shows that, for various risk preferences, Bayesian updating increases imminent and expected future tax non-compliance and reduces tax payments, inclusive of expected fines (Chen et al., 2019).

Proceeding from the discussion above, we argue that the tax administration acting to intervene in companies' tax reporting constitutes a signal that should lead companies to adjust their tax aggressiveness. Our second hypothesis follows from this:

H2: Firms will reduce their tax aggressiveness after a tax adjustment is made.

3. Methodology

3.1. Corporate taxation and the various forms of intervention by the tax administration

We conducted our study in Finland, where corporate taxation follows the same classical principles overall as the systems in such countries as Germany, Norway, and Sweden. In all of these contexts, a firm's taxation is separate from the owner's tax.

In the time spans for which we had data available for our study, 2008–2011 and 2019–2020, the tax rate in Finland was moderate, at 24.5% and 20.0%, respectively. In Finland, corporate taxation follows a process whereby a company, over the course of the tax year, makes advance-tax payments based on its estimated taxable income. As the outline in Fig. 1 shows, a firm is obliged to submit its tax return no later than four months after the end of the fiscal year. At this point, upon their receipt, all tax returns are processed and reviewed electronically. The electronic review flags a subset of the submitted tax returns to be investigated further by tax clerks working with the tax administration (Finnish-Tax-Administration, 2011). They have six months to review and correct the firm's tax return, so the review process leads to a tax decision no more than 10 months after the end of the fiscal year (in line with the norms set forth in the Finnish Tax Process Act, or *Laki Verotusmenettelystä*, of Dec. 18, 1995: 1558/1995). If the firm does not undergo a formal tax audit after the decision, the final tax due comes to the amount stated in the tax decision. To initiate a formal tax audit, the tax administration has a window of three to six years, depending on the type of issue. Audits may be more or less expansive as the tax administration deems necessary.

In the Finnish context, there exist three types of intervention by the tax administration for a company's tax return. These are listed in Table 1 in order of increasing severity. For a manageable scope, we confined our focus to the correction measure carried out by tax clerks, which we follow Ojala et al. (2020) in labeling "tax adjustment." Our work looked at this adjustment, its antecedents (mainly firm size, investment in shares, and the amount of interest and other financial revenue), and the effects it seems to have on levels of tax aggressiveness.

Tax adjustment is quite different in nature from tax audits, which have received greater attention in the literature. Relative to these, whether "soft" or "deep" audits as discussed by D'Agosto et al. (2018), the tax adjustment is a lighter mechanism and part of the normal tax-review process. Indicating that the tax administration has taken immediate interest in the return submitted, this net catches a fairly large number of firms (as Table 1 indicates). While researchers have not identified any signs pointing to whether a tax adjustment is going to be followed by a formal tax audit, one might infer that the probability of a formal audit is greater when an adjustment has been performed.

3.2. The data

We obtained data from the tax returns of all limited-liability companies in Finland filing returns with the Finnish Tax Administration for financial years 2008–2011 and 2019–2020 that indicated sales revenue not exceeding 10 million euros. Most companies of this size average seven employees and utilize the services of external preparers to create financial statements and tax reports (Höglund & Sundvik, 2019). Importantly, though, the size distribution of Finland's private companies is not linear. A study with a sample of Finnish private firms from 2008 to 2010 suggests that approximately a third of all private firms in the country are very small "micro-companies" that exceed no more than one of the following thresholds: turnover of €200,000 per year, total assets of €100,000, and > 3 personnel (on average) (Ojala et al., 2016).

The proprietary dataset we used includes financial-statement information, tax-return details, audit status, and any adjustment of the taxable income imposed by the tax administration. This confidential information was obtained through

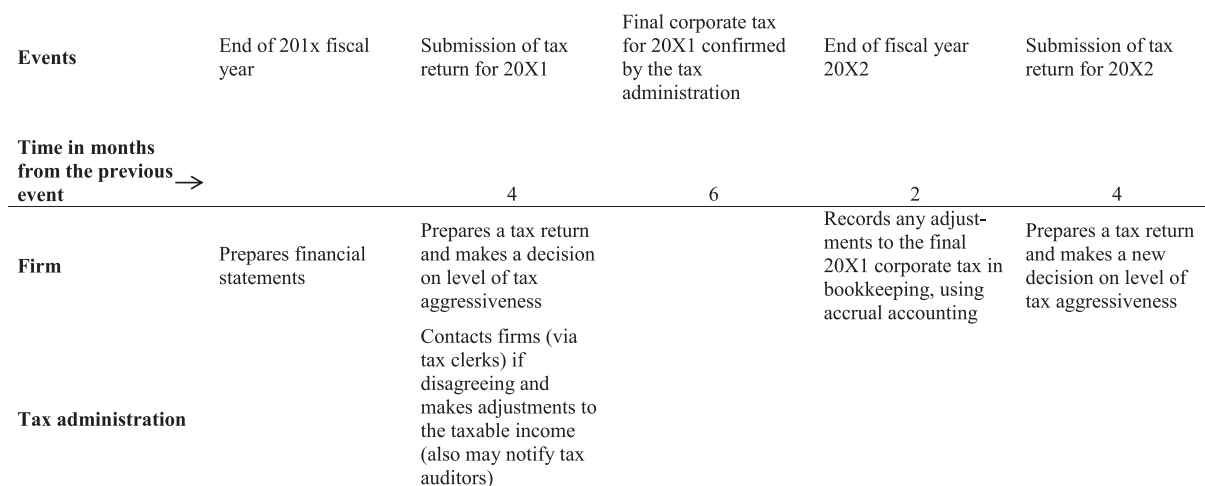


Fig. 1. The interventions by the tax administration.

Table 1

Types of intervention by the tax administration, modified from the agency's 2012 annual report (Tax Administration, 2012).

Type of intervention	Description	Volume (2011)
Tax adjustment before tax decision (the focus of our study)	A tax adjustment before a tax decision is a correction made by the tax administration to the firm's tax return. The correction is made by the tax clerk working at the corporate-taxation unit after the unit's electronic review system, relying on national review criteria, has flagged the firm for a tax clerk's intervention. Before making the correction, the tax clerk consults the firm, asking for clarifications and receipts.	10,815 firms
Formal tax audit	A formal tax audit, conducted by the tax-audit unit's tax auditor, is composed of five steps. First, the auditor reviews the documents filed by the firm and makes initial contact. Then, the firm's representatives present the main aspects of their business to the auditor. In the third step, the auditors perform a review of the firm's receipts and contracts, and they discuss matters with the firm's representatives. Fourth, the auditor and the firm's representatives go through the findings from the review. Finally, a final document is handed to the firm, to which the firm can submit its response.	3,428 firms
Formal tax audit including a site visit	A formal tax audit including a site visit is the more severe form of tax audit, wherein the tax auditor conducts a site visit to enable physical verification of the firm's receipts and associated documents on the firm's premises.	687 firms

the government-established development program Real-Time Economy, the aim of which is to improve the flow of financial information between Finnish companies and interest groups (their stakeholders and others) by means of Extensible Business Reporting Language (XBRL).¹

We began our data pre-processing by filtering out companies below the aforementioned reported-revenue threshold. To assure that we were not capturing only a single-year effect, we retained all firm-years for which we could calculate the change in tax aggressiveness. Because H2 required calculating the change in tax aggressiveness, we were able to use three-year data (for 2008–2010) and data from a further year (2019–2020) for examination of the limited-liability companies in our sample. We excluded the smallest firms, micro-companies that reported revenue of less than €30,000 from the respective firm-year. In addition, we removed companies that reported exactly the same figure for their taxable income and their net financial profit, because that reflects zero tax aggressiveness by conventional metrics.

In the context of their work on Finnish private micro-companies, Ojala et al. (2020) noted their sample to be highly asymmetric with respect to the treatment (tax adjustment) and the control companies (non-tax-adjusted firms). Considering the entire population of private limited-liability firms, we would expect some with tax adjustments that engage in extreme tax avoidance, to the point of committing actual tax crimes, not to have proper matches among the non-adjustment companies. To handle this imbalance in the data appropriately, we followed the procedure employed in prior tax-aggressiveness studies by applying Coarsened Exact Matching (CEM) (Cen et al., 2018; Cohen & Li, 2020; Gallemore et al., 2019; Lee et al., 2021;

¹ While data from this tax administration are not publicly available, access to this material can be obtained for research purposes.

Maso et al., 2020), to identify a no-tax-adjustment counterpart for each company for which the tax administration adjusted the taxable-income figure. A monotonic imbalance-reducing matching method, CEM enables finding exact matches within industries and years, on the basis of the covariates from the empirical analysis (Iacus et al., 2012). After CEM, our final sample covers 81,857 non-tax-adjusted firm-years (from 151,704 before CEM) and 3,298 tax-adjusted firm-years (from 3,542 before CEM). This left us with 85,155 out of 155,246 firm-years of material for testing our two hypotheses. The final sample is almost evenly balanced in the number of unique firms between the two time spans, with 22,379 for 2008–2011 and 22,826 from 2019 to 2020.

3.3. Tax-aggressiveness measurements

To test the tax-aggressiveness impact of receiving tax-adjustment notices and of tax-adjustment magnitude, we subjected the tax-return data confidentially obtained from the tax administration to the measurement expressed by Eq. (1). We constructed Eq. (1) to capture private companies' tax aggressiveness in the relevant institutional setting without bias and noise, following the procedure of Ojala et al. (2020).

$$TAXAGGRESSIVENESS = \frac{\text{Non-taxable revenue} - \text{Non-tax-deductible expenses}}{\text{Total revenue}} \quad (1)$$

The figures for non-taxable revenue and non-tax-deductible expenses are obtained from the company's claims in its returns for the 2008–2011 and 2019–2020 tax years. Our metric describes the book-tax difference reported by the company in the returns submitted to the tax administration. The principle behind this measurement is that a tax-aggressive company trying to reduce its tax burden seeks ways to maximize its non-taxable revenue (for example, by classifying revenue as non-taxable rather than taxable) and minimize its non-deductible expenses (for instance, by classifying expenses as deductible rather than non-deductible) in its tax filing. According to Steijvers and Niskanen (2014), the most important exceptions with regard to taxable revenue are related to monies received from the sale of shares listed under the firm's permanent assets and dividends received from other limited-liability companies. Non-taxable revenue encompasses certain realization of long-term assets, certain reversals of impairments, extraordinary items, decreases of reserves, and all dividends from other limited-liability companies. Among non-tax-deductible items are certain entertainment expenses, depreciation items, impairment charges, donations, realization of long-term assets, increases of reserves, and all penalty fees.

To account for size differences, we used total revenue (the sum of net sales and other revenue) as the size deflator, rather than total assets. Our main metric uses the actual values from Equation (1), but to enable straightforward interpretation of the result, we also apply a rank order² for tax aggressiveness, from 1 to 100, based on tax-aggressiveness percentile. The results from using rank order to assess tax aggressiveness are qualitatively similar to those reported upon in the next subsection.

3.4. Empirical models

For our analyses, we employed regressions and covariance-based generalized structural equation modeling to examine the hypotheses presented in Fig. 2 via the associated variables (described in Table 2). The figure presents the overall picture of the associations connected with the hypotheses. Our analysis proceeded in two steps. First, for H1, we examined the direct association between TAXAGGRESSIVENESS and TAXADJUSTMENT. Second, for H2, we looked at whether intervention by the tax administration (TAXADJUSTMENT) affects the $\Delta TAXAGGRESSIVENESS$ variable, the change in the level of tax aggressiveness between year t (when the tax clerks adjusted the amount of tax due) and year $t + 1$ (when the firm in question had received the information on whether or not it was subject to adjustments by the tax administration). Structural equation modeling enables us to present how variables are theoretically linked and test the directionality of the significant relationships (Schreiber et al., 2006). Fig. 3

To estimate the tax aggressiveness of each company in our sample, we employed the following regression:

$$\begin{aligned} TAXAGGRESSIVENESS = & \alpha_0 + \alpha_1 LNSIZE + \alpha_2 SALES GROWTH + \alpha_3 ROA \\ & + \alpha_4 LEVERAGE + \alpha_5 NODEBT + \alpha_6 PETTYCASH + \alpha_7 SHARE INVESTMENT \\ & + \alpha_8 INTEREST REVENUE + \alpha_9 Y2008 + \alpha_{10} Y2009 + \alpha_{11} Y2019 + \sum_{k=12}^{87} \alpha_k INDUSTRIES_{13-k}. \end{aligned} \quad (2)$$

The dependent variable is TAXAGGRESSIVENESS in Eq. (1). To capture the known factors in the tax aggressiveness of private companies, we added several independent variables for Eq. (2). An arguably important independent variable here is the natural logarithm of firm size (LNSIZE). Many prior studies suggest a relationship between firm size and levels of tax aggressiveness (Gupta & Newberry, 1997; Mills & Newberry, 2001; Rego, 2003). Another factor is SALES GROWTH, calculated as a logarithmic change – i.e., the natural logarithm of sales revenue in year t minus the natural logarithm of sales revenue in year $t-1$. Because earnings quality decreases with financial leverage (Dechow et al., 2010) and on the assumption that tax aggressiveness reduces earnings quality, we controlled for LEVERAGE. We added bank lending as a control variable because

² Rank orders are widely used in the finance literature; consult Boyer and Vorkink (2014) for an example.

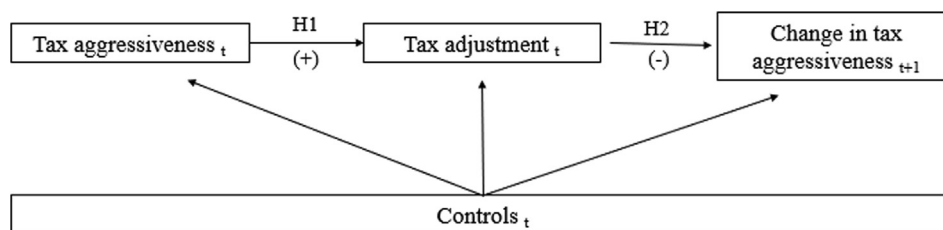


Fig. 2. The theoretical model.

Table 2

Variables used in the empirical analysis.

Variable	Definition
TAXAGGRESSIVENESS	Tax aggressiveness of the firm, measured by the book-tax difference per proprietary tax-return data: (non-taxable revenue - non-tax-deductible expenses as reported in the tax return) / total revenue; the measurement is winsorized at ± 1
TAXADJUSTMENT	An indicator variable coded 1 if the tax administration has made an adjustment to the taxable income reported in the firm's tax return and 0 otherwise.
Δ TAXAGGRESSIVENESS	$TAXAGGRESSIVENESS_t - TAXAGGRESSIVENESS_{t-1}$
TAXADJSIZE	Euro amount of the adjustment to the taxable income made by the tax administration for the firm's tax return divided by total revenue
LNSIZE	Natural logarithm of sales revenue
SALESGROWTH	The natural logarithm of sales revenue in $year_t$ minus the natural logarithm of sales revenue in $year_{t-1}$, divided by 100
ROA	Return on assets, defined as the sum of earnings before interest and taxes and salaries, divided by total assets
LEVERAGE	Total liabilities of the firm divided by its total assets
NODEBT	An indicator variable coded 1 if the firm has short- or long-term debt on its balance sheet at the end of the fiscal year and 0 otherwise
PETTYCASH	An indicator variable coded 1 if the firm had cash on hand at the end of 2010 (rather than cash in bank) and 0 otherwise
SHAREINVESTMENT	Share investments of the firm divided by its total assets
INTERESTREVENUE	Interest revenue and other financial income of the firm divided by its sales revenue
Y2008	An indicator variable coded 1 if the observation is from the 2008 tax year and 0 otherwise
Y2009	An indicator variable coded 1 if the observation is from the 2009 tax year and 0 otherwise
Y2010	An indicator variable coded 1 if the observation is from the 2010 tax year and 0 otherwise
Y2019	An indicator variable coded 1 if the observation is from the 2019 tax year and 0 otherwise
INDUSTRIES	Binary industry indicators for $INDUSTRIES_j$ ($j = 1, \dots, 75$) for 75 industries each represented by more than 100 companies in our sample

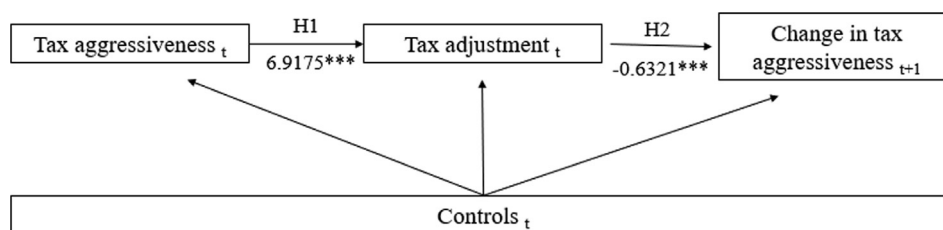


Fig. 3. Summary of the main empirical findings. Note: Regression equations (2–4) have been used in examination of the associations presented in Fig. 2.

prior studies have revealed a stronger influence of positive cash-flow effects from corporate tax avoidance for those firms with more extensive outside monitoring (Goh et al., 2016). To incorporate monitoring (or lack thereof) by banks, we coded the value of *NODEBT* as 1 if the firm had no external debt (bank) financing and 0 otherwise.

We excluded all unprofitable firms from the sample. It is reasonable to suspect that unprofitable companies are less motivated to show tax aggressiveness aimed at avoiding taxes (Ojala et al., 2020). After all, a loss-making company seldom has to pay income tax for the loss-making year (on the assumption that its final taxable income is negative). That said, under the loss carry-forward system, wherein losses are tax-deductible in subsequent years, loss-making companies may still have an incentive to show tax aggressiveness. Nevertheless, we would expect this incentive to be moderated for two reasons: the tax effect is not immediate, and the tax savings are predicated on the company being profitable in subsequent years.

PETTYCASH is an indicator variable coded 1 if the company had petty cash on hand (rather than cash with banks) and 0 if it did not. Very high petty-cash balances may indicate weaknesses in the internal control and administration of the company (Ojala et al., 2020). They may also point to a heightened risk of fraud or misappropriation of assets. Therefore, we would expect a positive coefficient.

We augmented the regression equation with controls for possible sources of non-taxable revenue and non-tax-deductible costs that might reflect the business environment of various types of private firm rather more than decisions to behave in a tax-aggressive manner: *SHAREINVESTMENT* and *INTERESTREVENUE*. Arguably, larger firms are more likely to show a higher proportion of share investments and interest revenue. Our motivation for including these two variables in the regression equation is, again, an effort to exclude the possibility of interpreting a mere difference in operation environment as tax aggressiveness of the firm in question.

Finally, we controlled for fixed effects of industry by including binary industry indicators: in our analyses *INDUSTRIES_j* ($j = 1, \dots, 75$) referred to the 75 industries that were represented by more than 100 companies each in our sample.

To test H1 (the hypothesis that adjustment by the tax administration is positively correlated with the level of tax aggressiveness), we employed a logistic regression:

$$\Pr(\text{TAXADJUSTMENT} = 1) = \frac{1}{1 + e^{-z}} \quad (3)$$

where

$$\begin{aligned} Z = & \beta_0 + \beta_1 \text{TAXAGGRESSIVENESS} + \beta_2 \text{LNSIZE} + \beta_3 \text{SALESGROWTH} + \beta_4 \text{ROA} \\ & + \beta_5 \text{LEVERAGE} + \beta_6 \text{NODEBT} + \beta_7 \text{PETTYCASH} + \beta_8 \text{SHAREINVESTMENT} \\ & + \beta_9 \text{INTERESTREVENUE} + \beta_{10} \text{Y2008} + \beta_{11} \text{Y2009} + \beta_{12} \text{Y2019} + \sum_{k=13}^{88} \beta_k \text{INDUSTRIES}_{14-k} + \varepsilon. \end{aligned}$$

The dependent variable in the first-stage model is *TAXADJUSTMENT*, which was assigned a value of 1 if the company submitted a tax return with values subsequently adjusted by the tax administration and 0 otherwise. The main variable of interest here is *TAXAGGRESSIVENESS*. If $\beta_1 > 0$, H1 finds empirical support. The independent control variables in the second regression equation (Eq. (3)) are the same as in the first one (Equation (2)).

To test H2, we examined whether a prior adjustment of taxation by the tax administration is connected with a decrease in firms' later tax aggressiveness, as expressed by Eq. (4):

$$\begin{aligned} \Delta \text{TAXAGGRESSIVENESS}_{t+1} = & \gamma_0 + \gamma_1 \text{TAXADJUSTMENT}_t + \gamma_2 \text{TAXADJSIZE}_t \\ & + \gamma_3 \text{TAXAGGRESSIVENESS}_t + \gamma_4 \text{LNSIZE}_t + \gamma_5 \text{SALESGROWTH}_t + \gamma_6 \text{ROA}_t \\ & + \gamma_7 \text{LEVERAGE}_t + \gamma_8 \text{NODEBT}_t + \gamma_9 \text{PETTYCASH}_t + \gamma_{10} \text{SHAREINVESTMENT}_t \\ & + \gamma_{11} \text{INTERESTREVENUE}_t + \gamma_{12} \text{Y2008} + \gamma_{13} \text{Y2009} + \gamma_{14} \text{Y2019} + \sum_{k=15}^{90} \gamma_k \text{INDUSTRY}_{16-k}. \end{aligned} \quad (4)$$

If $\gamma_1 > 0$, the size of a prior adjustment by the tax administration is correlated with a decrease in firms' subsequent tax aggressiveness in the data. Eq. (4) includes tax aggressiveness for year t so as to capture the aggressiveness level before the measurement of change in tax aggressiveness (seen in year $t + 1$) because they are clearly associated with each other. Also, the relevant control variables of fixed year and industry effects are taken into consideration.

4. Results

4.1. Descriptive statistics and univariate tests

Descriptive statistics for the dependent and independent variables used in testing of our hypotheses are presented in Table 3. Panel A in the table compares non-tax-adjustment firms ($n = 151,704$) to adjusted-tax ones ($n = 3,542$) in our original sample, and Panel B presents non-tax-adjustment firms ($n = 81,857$) alongside adjusted-tax ones ($n = 3,298$) in the hypothesis-testing CEM sample. The table reports the p -values from testing the mean differences between the subsamples.

Both panels show that a significant difference in tax aggressiveness exists between firms experiencing and not experiencing tax adjustment (p -value < 0.001). As Panel B indicates, the mean for the relevant companies' tax aggressiveness is 0.003 for no-adjustment firms and 0.042 for those firms subject to adjustment. Panel B also suggests that companies experiencing adjustments are larger (p -value < 0.001), are more highly leveraged (p -value < 0.001), more frequently report having a petty-cash balance (p -value < 0.001), and show larger investments in shares and higher interest and other financial revenue (p -value < 0.001). In addition, companies with tax adjustments display lower sales growth ($p < 0.001$).

4.2. Correlation analyses

Table 4 presents a Pearson correlation matrix for the variables used in testing H1 and H2. We can see that being tax-adjusted (*TAXADJUSTMENT*) is positively and significantly (with a 0.05 p -value) correlated with *TAXAGGRESSIVENESS*, *TAXADJSIZE*, *LNSIZE*, *ROA*, *LEVERAGE*, *PETTYCASH*, *SHAREINVESTMENT*, and *INTERESTREVENUE* while it is negatively correlated with Δ *TAXAGGRESSIVENESS* and *SALESGROWTH*. *TAXAGGRESSIVENESS* has a significant positive correlation (at 0.05 p -value level) with *TAXADJSIZE*, *NODEBT*, *SHAREINVESTMENT*, and *INTERESTREVENUE* while being negatively correlated with Δ *TAXAGGRESSIVENESS*, *LNSIZE*, *ROA*, *LEVERAGE*, and *PETTYCASH*. Finally, Δ *TAXAGGRESSIVENESS* has a significant positive cor-

Table 3
Descriptive statistics.

A) Original sample (n = 155,246)								
Variable	No tax adjustment (n = 151,704)			Tax adjustment (n = 3,542)			Diff. of means	
	Mean	Median	Std. dev.	Mean	Median	Std. dev.	Diff.	p-value
TAXAGGRESSIVENESS	0.003	0.000	0.040	0.044	0.009	0.115	0.041	<0.001
△TAXAGGRESSIVENESS	0.013	0.000	0.438	-0.695	-0.492	1.113	-0.708	<0.001
TAXADJSIZE	0.000	0.000	0.000	0.006	0.007	0.003	0.006	<0.001
LNSIZE	13.070	13.075	1.084	13.248	13.300	1.047	0.178	<0.001
SALESGROWTH	-0.013	0.000	0.232	-0.012	0.000	0.240	0.001	0.792
ROA	0.628	0.446	0.590	0.571	0.415	0.554	-0.057	<0.001
LEVERAGE	0.452	0.419	0.295	0.487	0.468	0.330	0.035	<0.001
NODEBT	0.565	1.000	0.496	0.486	0.000	0.500	-0.079	<0.001
PETTYCASH	0.406	0.000	0.491	0.438	0.000	0.496	0.032	<0.001
SHAREINVESTMENT	0.017	0.000	0.074	0.018	0.000	0.073	0.001	0.278
INTERESTREVENUE	0.002	0.000	0.006	0.004	0.000	0.009	0.002	<0.001
Y2008	0.250	0.000	0.433	0.337	0.000	0.473	0.087	<0.001
Y2009	0.243	0.000	0.429	0.309	0.000	0.462	0.066	<0.001
Y2010	0.246	0.000	0.430	0.257	0.000	0.437	0.011	0.124
Y2019	0.262	0.000	0.440	0.097	0.000	0.297	-0.165	<0.001
B) CEM sample (n = 85,155)								
Variable	No tax adjustment (n = 81,857)			Tax adjustment (n = 3,298)			Diff. of means	
	Mean	Median	Std. dev.	Mean	Median	Std. dev.	Diff.	p-value
TAXAGGRESSIVENESS	0.003	0.000	0.038	0.042	0.009	0.112	0.039	<0.001
△TAXAGGRESSIVENESS	0.012	0.000	0.431	-0.699	-0.493	1.105	-0.711	<0.001
TAXADJSIZE	0.000	0.000	0.000	0.006	0.007	0.003	0.006	<0.001
LNSIZE	13.156	13.157	1.023	13.224	13.272	1.032	0.068	<0.001
SALESGROWTH	0.002	0.000	0.054	-0.003	0.000	0.168	-0.005	<0.001
ROA	0.487	0.367	0.452	0.568	0.417	0.547	0.081	<0.001
LEVERAGE	0.450	0.428	0.294	0.487	0.469	0.331	0.037	<0.001
NODEBT	0.496	0.000	0.500	0.490	0.000	0.500	-0.006	0.469
PETTYCASH	0.393	0.000	0.489	0.439	0.000	0.496	0.046	<0.001
SHAREINVESTMENT	0.004	0.000	0.031	0.012	0.000	0.057	0.008	<0.001
INTERESTREVENUE	0.001	0.000	0.005	0.003	0.000	0.008	0.002	<0.001
Y2008	0.246	0.000	0.431	0.332	0.000	0.471	0.086	<0.001
Y2009	0.238	0.000	0.426	0.311	0.000	0.463	0.073	<0.001
Y2010	0.241	0.000	0.427	0.260	0.000	0.439	0.019	0.011
Y2019	0.275	0.000	0.446	0.097	0.000	0.296	-0.178	<0.001

Notes: See the variables' definitions in Table 2. CEM (in Panel B) refers to coarsened exact matching used to identify a no-tax-adjustment counterpart for each company for which the tax administration adjusted the taxable-income figure.

relation (at 0.05p-value level) with *LNSIZE* and *SALESGROWTH*. It is negatively correlated with *TAXADJSIZE*, *ROA*, *SHAREINVESTMENT*, and *INTERESTREVENUE*.

4.3. Regression results

Our main test results from estimation of the regression models (per Eqs. (2)–(4)) are presented in Table 5. For H1 and H2, we examined the direct associations between *TAXAGGRESSIVENESS*, *TAXADJUSTMENT*, and Δ *TAXAGGRESSIVENESS*.

As the second column in Table 5 shows, the coefficient of *TAXAGGRESSIVENESS* is positive, at 6.9175, with a p-value of < 0.001. This highly significant result indicates good support for H1: the probability of adjustment by the tax administration increases with firms' tax aggressiveness.

For H2, we examined whether intervention by the tax administration (*TAXADJUSTMENT*) affects Δ *TAXAGGRESSIVENESS*, the change in the level of tax aggressiveness between year *t* (the year of the adjustment) and year *t* + 1 (again, when the company had received the information on whether its tax would be adjusted). The results of ordinary least squares regression, provided in the third and fourth column of Table 5, were obtained via Equation (4). The model reported upon in the third column includes *TAXADJUSTMENT* and control variables. The coefficient of *TAXADJUSTMENT* is negative and displays significance (the coefficient is -0.6321, with a p level of 0.001). This result supports hypothesis 2, that private companies decide to scale back their tax aggressiveness in response to intervention by the tax administration.

The fourth column in Table 5 adds *TAXADJSIZE*, capturing the size of the adjustment. *TAXADJSIZE* has a negative coefficient that is highly significant (-0.0121, with p < 0.001). Hence, there is support for the suggestion that the strength of a private company's response correlates with the extent of the adjustment imposed by the tax administration. Here, the magnitude of

Table 4Pearson correlation matrix ($n = 85,155$).

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) TAXADJUSTMENT	1.00											
(2) TAXAGGRESSIVENESS	0.17***	1.00										
(3) Δ TAXAGGRESSIVENESS	-0.28***	-0.24***	1.00									
(4) TAXADJSIZE	0.88***	0.19***	-0.32***	1.00								
(5) LNSIZE	0.01***	-0.02***	0.01***	-0.01	1.00							
(6) SALESGROWTH	-0.02***	0.00	0.01*	-0.01***	0.01**	1.00						
(7) ROA	0.03***	-0.05***	-0.02***	0.03***	-0.08***	-0.01**	1.00					
(8) LEVERAGE	0.02***	-0.07***	-0.00	0.03***	0.19***	0.03***	0.05***	1.00				
(9) NODEBT	-0.00	0.02***	-0.00	-0.00	-0.29***	-0.01***	0.13***	-0.56***	1.00			
(10) PETTYCASH	0.02***	-0.05***	-0.00	0.02***	0.19***	0.00	0.08***	0.12***	-0.15***	1.00		
(11) SHAREINVESTMENT	0.05***	0.05***	-0.01*	0.03***	-0.00	-0.00	-0.04***	-0.12***	0.08***	-0.05***	1.00	
(12) INTERESTREVENUE	0.07***	0.12***	-0.01*	0.07***	0.03***	-0.00	-0.08***	-0.23***	0.16***	-0.05***	0.07***	1.00

Notes: See Table 2 for variable definitions. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5Regression results for testing firm size, tax aggressiveness, and intervention effects ($n = 85,155$).

<i>TAXAGGRESSIVENESS</i> p-value			<i>TAXADJUSTED</i> p-value	Δ <i>TAXAGGRESSIVENESS</i> p-value	Δ <i>TAXAGGRESSIVENESS</i> p-value	Δ <i>TAXAGGRESSIVENESS</i> p-value	Δ <i>TAXAGGRESSIVENESS</i> p-value
<i>TAXAGGRESSIVENESS</i> (H1)		6.9175	<0.001	-2.2902	<0.001	3.4034	<0.001
<i>TAXADJUSTMENT</i> (H2)				-0.6321	<0.001	0.0304	0.079
<i>TAXADJSIZE</i>						-1.2102	<0.001
<i>LNSIZE</i>	-0.0005	0.002	0.0867	<0.001	0.0070	<0.001	0.0045
<i>SALESGROWTH</i>	0.0024	0.310	-0.5650	<0.001	0.0122	0.636	0.0094
<i>ROA</i>	-0.0021	<0.001	0.1319	<0.001	-0.0172	<0.001	-0.0223
<i>LEVERAGE</i>	-0.0069	<0.001	0.7347	<0.001	-0.0091	0.187	-0.0065
<i>NODEBT</i>	-0.0035	<0.001	0.1329	0.005	-0.0069	0.093	-0.0058
<i>PETTYCASH</i>	-0.0020	<0.001	0.2194	<0.001	-0.0050	0.172	-0.0059
<i>SHAREINVESTMENT</i>	0.0430	<0.001	4.0298	<0.001	0.1646	0.001	0.1278
<i>INTERESTREVENUE</i>	0.8937	<0.001	28.0553	<0.001	2.6975	<0.001	2.6602
<i>Y2009</i>	-0.0001	0.788	-0.0009	0.985	-0.0040	0.380	-0.003
<i>Y2010</i>	0.0009	0.037	-0.1731	<0.001	-0.0009	0.840	-0.0015
<i>Y2019</i>	0.0017	<0.001	-1.1716	<0.001	-0.0092	0.074	-0.0229
constant	0.0139	<0.001	-4.7877	<0.001	-0.0728	0.005	-0.0354
Fixed industry effects	included		included		included		included
Observation count	85,155		85,155		85,155		85,155

Note: See Table 2 for variable definitions.

the tax adjustment (*TAXADJSIZE*) can be regarded as an interaction and *TAXADJUSTMENT* as the main effect. *TAXADJSIZE* subsumes the main effect of *TAXADJUSTMENT*, which is not significant at the five percent confidence level when the regression model encompasses both variables simultaneously.

5. Discussion and conclusions

Our effort to examine the tax aggressiveness of private companies was motivated by the lack of empirical studies of private firms' behavioral response to government interventions, which is particularly disturbing when one considers the gravity of the problem of tax non-compliance. Our hypotheses to probe tax-aggressiveness levels and these companies' decisions on whether (and how much) to adjust it in response to tax-administration intervention were grounded in several theoretical principles. Accordingly, we strove to assess how private firms alter their level of tax aggressiveness in response to these interventions. To the best of our knowledge, this study was the first attempt to provide empirical evidence addressing this set of questions in the context of private companies and pre-tax-audit interventions of a lightweight nature performed by the tax administration. While prior theoretical work on tax non-compliance informs us about various antecedents to evasion of personal taxation (Allingham & Sandmo, 1972) and corporate tax obligations (Chen & Chu, 2005), empirical studies of companies' behavior have remained scarce, most probably due to barriers researchers have accessing suitable datasets.

5.1. Implications for theory

Our empirical results are consistent with the theoretically oriented models of Allingham and Sandmo (1972) and Chen and Chu (2005), if we view the tax adjustment as new information on the basis of which decision-makers can revise their subjective probabilities upward. Both models imply that such tuning of the perceived probability of detection should reduce tax aggressiveness. In that connection, it is worth noting that the kind of negative feedback from the tax administration dealt with in this paper (a lightweight pre-tax-audit intervention) is not a penalty *per se* but a flag to update the reported income, bringing it more in line with the company's actual taxable income. The assumption that managers constantly estimate the probability of uncertain outcomes and update their estimates is aligned well with Bayesian decision theory, wherein the notion of probability is associated with degrees of belief or confidence in one's knowledge (McCann, 2020). From this perspective, we treat probabilities as a way to quantify how sure an individual is that a particular belief is valid. In the case of tax aggressiveness, we are therefore considering the subjective probability distribution of both the perceived risk of being detected and the expected penalty amount. A Bayesian update of the probabilities can be said to take place when the managers combine their existing or prior beliefs pertaining to the detection risk and penalty amount with their assessment of the weight of the new information provided by the tax administration.

The Finnish Tax Administration's decision not to accept tax returns without adjustments after its intervention has led to dramatic reductions in the tax aggressiveness displayed in the subsequent tax return. Furthermore, we identified a positive correlation between the amount of the tax adjustment imposed and a private firm's subsequent change in its level of tax aggressiveness. We interpret these findings by theorizing that, while the tax administration's signal that the firm has been singled out for scrutiny functions well in clamping down on tax aggressiveness, also the adjustment size plays a role in this act of constraining the aggressiveness. When crafting its response in the form of the following year's tax return, a company might well ponder the likelihood and possible consequences of additional investigation. We suggest that theory could fruitfully focus on the importance of the signaling directed from the authorities to companies. Though adjustments may be

perceived as lightweight measures when compared to full-scale tax audits, they appear able to influence firms' tax-non-compliance behavior.

Analyzing our control variables reveals that company size plays a role in tax-aggressiveness decisions of private firms and also in the tax-adjustment decisions by the tax administration. We stress that caution should be applied in generalizing these results, because it is possible that a correlated variable not examined explains the findings, irrespective of our efforts to exclude this possibility via control variables (*SHAREINVESTMENT* and *INTERESTREVENUE*). While research shows larger firms to be more risk-averse, the perceived risk of tax non-compliance might appear lower when the company has access to highly skilled accountants who can assure the legality of their tax-minimization strategies. As pointed out by [Blaufus et al. \(2016\)](#), being able to cast a given tax-non-compliance opportunity as lawful could alleviate tension between the decision-makers' self-concept and their tax-management actions. When managers perceive their tax-minimization strategy as a legal one that represents shrewd management actions, they might be more likely to seize the opportunity without experiencing further psychic costs. Naturally, there might be fewer internal efficiency losses accumulated in connection with the principal-agent problem if the managers neither reduce the effort they put in nor require costly compensation mechanisms for offsetting the perceived risks of tax minimization. Should adopting a resource perspective help managers rationalize their reporting decisions on the basis of the perceived legality of tax-minimization strategies, the outcome would be consistent with the research in which [Bauer \(2016\)](#) found a negative correlation between tax non-compliance and weaknesses in the tax function's internal control. A larger company is likely to be better equipped to improve its internal control and, thereby, successfully implement legal tax-non-compliance strategies. This conclusion is in line with work by [Guenther et al. \(2017\)](#), who found that corporate tax non-compliance generally is associated with neither future tax-rate volatility nor later overall risk for the firm.

5.2. Management implications

Our empirical study yielded several insights for practitioners. The signaling effect of government intervention that we observed through the companies' response is encouraging, in that government interventions do have an impact. Thus, one can clamp down effectively on private companies' aggressive tax behavior. This points to value in the tax administration's allocation of appropriate resources for identifying highly tax-aggressive companies and then intervening to correct their tax statements. Our findings suggest also that the monitoring process employed by Finland's tax administration serves to mitigate tax aggressiveness of private companies. Such mechanisms should be of interest to tax administrations and regulatory authorities more generally. Finally, by shedding light on various factors in corporate decision-making and the taxation infrastructure, the study may inform governance work, social-responsibility initiatives, management-level discussions, and societal debate alike. The insight generated could ultimately advance dialogue and practice for everyone from psychologists to auditing firms.

5.3. Limitations and further research

Most empirical studies have their limitations, and ours is no exception. First, our quantitative data do not allow us to distinguish between inadvertent errors and willful acts of tax non-compliance. Detecting the extent to which firms engage in deliberate tax planning would most likely require a qualitative approach. Further research could qualitatively examine and compare the responses by various companies to official interventions, probing the differences related to purposeful vs. non-purposeful tax aggressiveness. Second, our primary focus was on the immediate effects of the tax administration's responses to tax aggressiveness. An interesting extension from our study would be to investigate the effects in a more general, dynamic setting wherein the companies work through a sequence of interrelated decisions. As pointed out by [Allingham and Sandmo \(1972\)](#), the decisions made today are influenced by past declarations, because the latter form a large component in determination of the penalty if one is found guilty of tax non-compliance. Simultaneously, a decision to cheat today involves discounting the future, in that the stochastic penalties are delayed. So far, we can state only that the tax administration's interventions are effective in the short run; we cannot draw conclusions about long-term dynamics without further research. Finally, one should apply caution in generalization of our findings to larger firms. The tax administration granted access to data from private firms with a maximum of 10 million euros' revenue, with the resulting sample representing an average of seven employees per firm. We regard this as a considerable limitation and, hence, propose that similar analysis with larger firms would be a fruitful avenue for future research.

Data availability

The authors do not have permission to share data.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

- Allingham, M. G., & Sandmo, A. (1972). Income tax evasion. The theoretical analysis. *Journal of Public Economics*, 1, 323–338.
- Bauer, A. (2016). Tax avoidance and the implications of weak internal controls. *Contemporary Accounting Research*, 33(2), 449–486. <https://doi.org/10.1111/1911-3846.12151>.
- Bauer, A., Fang, X., & Pittman, J. (2021). The importance of IRS enforcement to stock price crash risk: The role of CEO power and incentives. *Accounting Review*, 96(4), 81–109. <https://doi.org/10.2308/TAR-2018-0375>.
- Blaufus, K., Hundsdoerfer, J., Jacob, M., & Sünwoldt, M. (2016). Does legality matter? The case of tax avoidance and evasion. *Journal of Economic Behavior and Organization*, 127, 182–206. <https://doi.org/10.1016/j.jebo.2016.04.002>.
- Boyer, B. H., & Vorkink, K. (2014). Stock options as lotteries. *The Journal of Finance*, 69(4), 1485–1527. <https://doi.org/10.1111/jofi.12152>.
- Cen, L., Chen, F., Hou, Y., & Richardson, G. (2018). Strategic disclosures of litigation loss contingencies when customer-supplier relationships are at risk. *The Accounting Review*, 93(2), 137–159. <https://doi.org/10.2308/accr-51869>.
- Chan, K., & Lan Mo, P. (2000). Tax holidays and tax noncompliance: An empirical study of corporate tax audits in China's developing economy. *The Accounting Review*, 75(4), 469–484. <https://doi.org/10.2308/accr.2000.75.4.469>.
- Chen, K., & Chu, C. (2005). Internal control versus external manipulation: A model of corporate income tax evasion. *RAND Journal of Economics*, 36(1), 151–164. <https://www.jstor.org/stable/1593759>.
- Chen, L., Dhaliwal, D., & Trombley, M. (2012). Consistency of book-tax differences and the information content of earnings. *Journal of the American Taxation Association*, 34(2), 93–116. <https://doi.org/10.2308/atax-50174>.
- Chen, S., Schuchard, K., & Stomberg, B. (2019). Media coverage of corporate taxes. *The Accounting Review*, 94(5), 83–116. <https://doi.org/10.2308/accr-52342>.
- Cloyd, C. B., Pratt, J., & Stock, T. (2006). The use of financial accounting choice to support aggressive tax positions: Public and private firms. *Journal of Accounting Research*, 34, 23–43. <https://doi.org/10.2307/2491330>.
- Cohen, D., & Li, B. (2020). Customer-base concentration, investment, and profitability: The US government as a major customer. *The Accounting Review*, 95(1), 101–131. <https://doi.org/10.2308/accr-52490>.
- D'Agosto, E., Manzo, M., Pisani, S., & D'Arcangelo, F. (2018). The effect of audit activity on tax declaration: Evidence on small businesses in Italy. *Public Finance Review*, 46(1), 29–57. <https://doi.org/10.1177/1091142117698035>.
- DeBacker, J., Heim, B., Tran, A., & Yuskavage, A. (2015). Legal enforcement and corporate behavior: An analysis of tax aggressiveness after an audit. *The Journal of Law and Economics*, 58(2), 291–324. <https://doi.org/10.1086/684037>.
- Dechow, P., Ge, W., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics*, 50(2–3), 344–401. <https://doi.org/10.1016/j.jacceco.2010.09.001>.
- Dowling, C., Knechel, W. R., & Moroney, R. (2018). Public oversight of audit firms: The slippery slope of enforcing regulation. *Abacus*, 54, 353–380. <https://doi.org/10.1111/abac.12130>.
- Dyregang, S. D., Hanlon, M., & Maydew, E. L. (2008). Long-run corporate tax avoidance. *Accounting Review*, 83(1), 61–82. <https://doi.org/10.2308/accr.2008.83.1.61>.
- Dyregang, S. D., Hanlon, M., & Maydew, E. L. (2019). When does tax avoidance result in tax uncertainty? *Accounting Review*, 94(2), 179–203. <https://doi.org/10.2308/accr-52198>.
- Finnish-Tax-Administration. (2011). *Annual Report 2011*. Retrieved from https://www.vero.fi/contentassets/f818015e6f314932b40a3caccia71c87/vero_vsk2011_en_net.pdf.
- Freedman, J. (2010). Improving (not perfecting) tax legislation: Rules and principles revisited. *British Tax Review*, 6, 717–736.
- Frey, B. S., & Torgler, B. (2007). Tax morale and conditional cooperation. *Journal of Comparative Economics*, 35(1), 136–159. <https://doi.org/10.1016/j.jce.2006.10.006>.
- Gale, W., & Krupkin, A. (2019). How big is the problem of tax evasion? *Brookings Institution*. Retrieved from <https://www.brookings.edu/blog/up-front/2019/04/09/how-big-is-the-problem-of-tax-evasion/>.
- Gallemore, J., Gipper, B., & Maydew, E. (2019). Banks as tax planning intermediaries. *Journal of Accounting Research*, 57(1), 169–209. <https://doi.org/10.1111/1475-679X.12246>.
- Gao, Z., Lu, L. Y., & Yu, Y. (2019). Local social environment, firm tax policy, and firm characteristics. *Journal of Business Ethics*, 158(2), 487–506. <https://doi.org/10.1007/s10551-017-3765-2>.
- Gemmell, N., & Ratto, M. (2012). Behavioral responses to taxpayer audits: Evidence from random taxpayer inquiries. *National Tax Journal*, 65(1), 33–57. <https://doi.org/10.17310/ntj.2012.1.02>.
- Goh, B. W., Lee, J., Lim, C. Y., & Shevlin, T. (2016). The effect of corporate tax avoidance on the cost of equity. *The Accounting Review*, 91(6), 1647–1670. <https://doi.org/10.2308/accr-51432>.
- Guenther, D. A., Matsunaga, S. R., & Williams, B. M. (2017). Is tax avoidance related to firm risk? *The Accounting Review*, 92(1), 115–136. <https://doi.org/10.2308/accr-51408>.
- Gupta, S., & Newberry, K. (1997). Determinants of the variability in corporate effective tax rates: Evidence from longitudinal data. *Journal of Accounting and Public Policy*, 16(1), 1–34. [https://doi.org/10.1016/S0278-4254\(96\)00055-5](https://doi.org/10.1016/S0278-4254(96)00055-5).
- Hanlon, M., & Heitzman, S. (2010). A review of tax research. *Journal of Accounting and Economics*, 50, 127–178. <https://doi.org/10.1016/j.jacceco.2010.09.002>.
- Hasan, I., Hoi, C. K. (Stan), Wu, Q., & Zhang, H. (2014). Beauty is in the eye of the beholder: The effect of corporate tax avoidance on the cost of bank loans. *Journal of Financial Economics*, 113(1), 109–130. <https://doi.org/10.1016/j.jfineco.2014.03.004>.
- Höglund, H., & Sundvik, D. (2019). Do auditors constrain intertemporal income shifting in private companies? *Accounting and Business Research*, 49(3), 245–270. <https://doi.org/10.1080/00014788.2018.1490166>.
- Hoopes, J. L., Mescall, D., & Pittman, J. A. (2012). Do IRS audits deter corporate tax avoidance? *The Accounting Review*, 87(5), 1603–1639. <https://doi.org/10.2308/accr-50187>.
- Iacus, S., King, G., & Porro, G. (2012). Causal inference without balance checking: Coarsened exact matching. *Political Analysis*, 20(1), 1–24. <https://doi.org/10.1093/pan/mpr013>.
- IRS. (2016). *Federal Tax Compliance Research: Tax Gap Estimates for Tax Years 2008–2010*.
- Kastlunger, B., Lozza, E., Kirchler, E., & Schabmann, A. (2013). Powerful authorities and trusting citizens: The Slippery Slope Framework and tax compliance in Italy. *Journal of Economic Psychology*, 34, 36–45. <https://doi.org/10.1016/j.joep.2012.11.007>.
- Khurana, I., & Moser, W. (2009). *Shareholder investment horizons and tax aggressiveness..* <https://doi.org/10.2139/ssrn.1517913>.

- Kim, C., & Zhang, L. (2016). Corporate political connections and tax aggressiveness. *Contemporary Accounting Research*, 33(1), 78–114. <https://doi.org/10.1111/1911-3846.12150>.
- Klassen, J., Lisowsky, P., & Mescall, D. (2016). The role of auditors, non-auditors, and internal tax departments in corporate tax aggressiveness. *The Accounting Review*, 91(1), 179–205. <https://doi.org/10.2308/accr-51137>.
- Kleven, H., Knudsen, M., Kreiner, C., Pedersen, S., & Saez, E. (2011). Unwilling or unable to Cheat? Evidence From a tax audit experiment in Denmark. *Econometrica*, 79(3), 651–692. <https://doi.org/10.3982/ecta9113>.
- Lee, Y., Ng, S., Shevlin, T., & Venkat, A. (2021). The effects of tax avoidance news on employee perceptions of managers and firms: Evidence from glassdoor.com ratings. *The Accounting Review*, 96(3), 343–372. <https://doi.org/10.2308/TAR-2019-0148>.
- Lennox, C., Lisowsky, P., & Pittman, J. (2013). Tax aggressiveness and accounting fraud. *Journal of Accounting Research*, 51(4), 739–778. <https://doi.org/10.1111/joar.12002>.
- Maso, L., Lobo, G., Mazzi, F., & Paugam, L. (2020). Implications of the joint provision of CSR assurance and financial audit for auditors' assessment of going-concern risk. *Contemporary Accounting Research*, 37(2), 1248–1289. <https://doi.org/10.1111/1911-3846.12560>.
- McCann, B. T. (2020). Using Bayesian updating to improve decisions under uncertainty. *California Management Review*, 63(1), 26–40. <https://doi.org/10.1177/0008125620948264>.
- Mendoza, J. P., Wielhouwer, J. L., & Kirchler, E. (2017). The backfiring effect of auditing on tax compliance. *Journal of Economic Psychology*, 62, 284–294. <https://doi.org/10.1016/j.joep.2017.07.007>.
- Mickiewicz, T., Rebmann, A., & Sauka, A. (2019). To pay or not to pay? Business owners' tax morale: Testing a neo-institutional framework in a transition environment. *Journal of Business Ethics*, 157(1), 75–93. <https://doi.org/10.1007/s10551-017-3623-2>.
- Mills, L., & Newberry, K. (2001). The influence of tax and non-tax costs on book-tax reporting differences: Public and private firms. *The Journal of the American Taxation Association*, 23(1), 1–19. <https://doi.org/10.2139/ssrn.228340>.
- Ojala, H., Collis, J., Kinnunen, J., Niemi, L., & Troberg, P. (2016). The demand for voluntary audit in micro-companies: Evidence from Finland. *International Journal of Auditing*, 20(3), 267–277. <https://doi.org/10.1111/ijau.12070>.
- Ojala, H., Kinnunen, J., Niemi, L., Troberg, P., & Collis, J. (2020). What turns the taxman On? Tax aggressiveness, financial statement audits and tax return adjustments in small private companies. *International Journal of Accounting*, 55(3), 2050011. <https://doi.org/10.2139/ssrn.2617179>.
- Pevzner, M., Xie, F., & Xin, X. (2015). When firms talk, do investors listen? The role of trust in stock market reactions to corporate earnings announcements. *Journal of Financial Economics*, 117(1), 190–223. <https://doi.org/10.1016/j.jfineco.2013.08.004>.
- Rego, S. O. (2003). Tax-avoidance activities of US multinational corporations. *Contemporary Accounting Research*, 20(4), 805–833. <https://doi.org/10.1506/VANN-B7UB-GMFA-9E6W>.
- Scholz, J. T., & Pinney, N. (1995). Duty, fear, and tax compliance: The heuristic basis of citizenship behavior. *American Journal of Political Science*, 39(2), 490–512. <https://doi.org/10.2307/2111622>.
- Schreiber, J., Nora, A., Stage, F., Barlow, E., & King, J. (2006). Reporting structural equation modelling and confirmatory factor analysis results: A review. *The Journal of Educational Research*, 99(6), 323–338. <https://doi.org/10.3200/JOER.99.6.323-338>.
- Simonen, J., & McCann, P. (2008). Innovation, R&D cooperation and labor recruitment: Evidence from Finland. *Small Business Economics*, 31, 181–194. <https://doi.org/10.1007/s11187-007-9089-3>.
- Spicer, M. W., & Hero, R. E. (1985). Tax evasion and heuristics. A research note. *Journal of Public Economics*, 26(2), 263–267. [https://doi.org/10.1016/0047-2727\(85\)90009-X](https://doi.org/10.1016/0047-2727(85)90009-X).
- Steijvers, T., & Niskanen, M. (2014). Tax aggressiveness in private family firms: An agency perspective. *Journal of Family Business Strategy*, 5(4), 347–357. <https://doi.org/10.1016/j.jfbs.2014.06.001>.
- Tauchen, H., Witte, A., & Beron, K. (1993). Tax compliance: An investigation using individual taxpayer compliance measurement program (TCMP) data. *Journal of Quantitative Criminology*, 9(2), 177–202. <https://doi.org/10.1007/BF01071167>.
- Tax Administration. (2012). *Verohallinto - Vuosikertomus 2012* (In Finnish).
- Wahl, I., Kastlunger, B., & Kirchler, E. (2010). Trust in authorities and power to enforce tax compliance: An empirical analysis of the “slippery slope framework”. *Law and Policy*, 32(4), 383–406. <https://doi.org/10.1111/j.1467-9930.2010.00327.x>.