View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Brunel University Research Archive

What Turns the Taxman On?

Audit Opinion and Tax Return Adjustments in a Voluntary Audit Environment

HANNU OJALA, *University of Tampere* and *Aalto University School of Business, Finland*

JUHA KINNUNEN, *Aalto University School of Business, Finland*

LASSE NIEMI, *Aalto University School of Business, Finland*

PONTUS TROBERG, *Hanken School of Economics, Finland*

JILL COLLIS, *Brunel University London, UK*

Correspondence address:
Professor Hannu Ojala
University of Tampere and Aalto University School of Business
Tel: +358 (0)44 3290604
Fax: +358 (0)9 454 6067
Email: hannu.ojala@aalto.fi

Acknowledgements

The authors would like to thank Norman Wong, David Hay, Jilnaught Wong, Robin Jarvis, Len Skerratt, Steven Cahan, Chen Chen and Caroline Bridges for their valuable comments. We are also grateful to those who participated AAA Auditing Section Midyear Meeting 2017 in Orlando, and in the research seminars held at Auckland University and Brunel University London in December 2014, the University of Tampere in March 2015 and Aalto University in April 2015. Last, but not least, we are indebted to the University of Tampere and Aalto University for funding the study, and to the Real Time Economy Program and the Finnish Tax Administration for giving us access to the data.

What Turns the Taxman On?

Audit Opinion and Tax Return Adjustments in a Voluntary Audit Environment

Abstract

Using a large proprietary data set obtained from the Finnish Tax Administration, we examine the factors that trigger adjustments by the tax authority to the taxable income reported by around 25,000 small private companies in their tax returns. After controlling for tax aggressiveness and other relevant factors, we find that having a voluntary audit with an unqualified audit opinion decreases the likelihood of the tax authority not accepting taxable income as reported. At the same time, it moderates the otherwise significant positive effect of tax aggressiveness on the likelihood of tax authority making adjustments.

Keywords

Audit opinion, tax adjustments, tax aggressiveness, voluntary audit

JEL descriptors

M410, M420, F38

What Turns the Taxman On?

Audit Opinion and Tax Return Adjustment in a Voluntary Audit Environment

1. Introduction

Conflicts of interest, information asymmetry and the problem of moral hazard that are inherent in any principal-agent relationship (Jensen and Meckling, 1976) certainly apply to the relationship between the tax authority and the taxpayer. Due to the taxpayer's accountability to the tax authority, the latter is a quasi-shareholder of companies of all sizes. *"The state, thanks to its tax claim on cash flows, is de facto the largest minority shareholder in almost all corporations"* (Desai et al., 2007: 592). The need to prepare financial statements for tax purposes arises from a company's accountability to the tax authority and the latter's need for information in order to determine the company's annual taxable income with sufficient accuracy. For small private companies with little or no external funding, the tax authority is likely to be the primary principal to whom the owner-manager is accountable. Indeed, for the majority of small private companies, the main function of financial reporting may be entirely fiscal. In such cases, the credibility of the financial information is the main issue for the tax authority. "*It is important to recognize that tax authorities are not interested in improving financial reporting quality per se. The effect on financial reporting quality is a by-product of the tax authorities' interest in the accurate reporting of taxable income*" (Hanlon et al., 2014: 138). Nevertheless, the monitoring role of tax authorities and the factors related to financial reporting credibility (or fair presentation) from their perspective offer an opportunity to explore the reporting behaviour of small private companies.[1]

[1] According IAS 1, *Presentation of Financial Statements* (IASB, 2014: paragraph 15), financial statements "shall present fairly the financial position, financial performance and cash flows of an entity", and ISA 700 (Revised), *Forming an Opinion and Reporting on Financial Statements* (IAASB, 2015: paragraph 10) "The auditor should form an opinion on whether the financial

Applying the agency-theoretical framework to small private companies, the tax authorities are in a situation where they receive (1) no information, i.e. information asymmetry prevails (no voluntary audit), (2) good news (unqualified opinion), or (3) bad news (qualified opinion) regarding the credibility of the financial statements. Consequently we address the following research question: What are the factors that influence adjustments by the tax authority to the taxable income reported in a voluntary audit environment? In particular, we seek to provide evidence on the effect of voluntary audit and audit opinion on the likelihood of tax adjustments in small private companies below the audit exemption threshold. Small private companies are not only of economic importance to the many small and medium-sized accounting practices that service their needs, but they are also important at macro-level. For example, in the EU, 98 percent of businesses are small and provide 48 percent of jobs (EC, 2013b). They are considered the key to ensuring economic growth, innovation, job creation, and social integration' (EC, 2016). In Finland, small firms play an important role in the economy by contributing 35 percent of turnover and 48 per cent of employment (The Federation of Finnish Enterprises, 2015). We expect that our research findings on the economic implications of voluntary audit on taxation can be extended to other countries, within or outside EU, with voluntary audit of small companies. Extensions to other countries may also shed light on whether different (higher) thresholds for voluntary audit have differing effects on tax authorities' reactions.

In general, the literature on the credibility of financial reporting from the tax authority's perspective is somewhat limited. While Hanlon and Heitzman's (2010) extensive review of the literature identifies four broad areas of relevant tax research, we are not aware of any study that

statements are presented fairly, in all material respects, in accordance with the applicable financial reporting framework."

has examined the credibility of financial reporting and auditing from the tax authority's perspective, despite its inherent importance.[2] We are aware of only two[3] prior studies that examine the tax authorities' responses to firms' tax reporting behaviour. First, using tax return data confidentially[4] obtained from the U.S. IRS for about 1,500 firm-years over the period 1982-1992, Mills (1998) documents that tax adjustments by the IRS (as measured by the amount of adjusted revenue) are positively associated with the firms' tax aggressiveness (as measured by the book-tax difference).[5] Second, Cho et al. (2006) reports similar findings using internal data obtained from the New Zealand Inland Revenue for 81 tax audit cases during 1991-2000. In addition to differences in the national settings, the study by Cho et al. (2006) differs from Mills (1998) because the data are not confined to manufacturing firms, but extend across a number of industries, thus providing a more diverse sample.

A key advantage of using tax return data is that it permits the use of a direct measure of taxable income, which is difficult to estimate from publicly available financial statement data (Graham and Mills, 2008). Similar to Mills (1998) and Cho et al. (2006), our study is based on a proprietary data set obtained from the Tax Administration. However, our data contains the entire population of around 25,000 small private companies in Finland[6] that reported a positive net income for 2011 and were exempt from the statutory audit. More importantly, our unique set of confidential data

[2] The areas of tax research identified by Hanlon and Heitzman (2010) are: (1) the informational role of income tax expense reported for financial accounting, (2) corporate tax avoidance, (3) corporate decision-making including investment, capital structure, and organizational form, and (4) taxes and asset pricing.

[3] It is likely that the main reason for the dearth of research in this area is that data are not readily available

[4] Other studies use confidential tax return data, but examine different questions, and these include Plesko (2004), Lisowsky (2010) and Beck and Lisowsky (2014).

[5] As 71 percent of the firms analysed by Mills (1998) were public companies, her study focused on the opposite end of the size continuum to the present study.

[6] Companies in the financial services sector were excluded.

allows us to examine the response of the tax authority to the companies' tax reporting practices as it includes (1) the complete tax returns submitted by these companies for 2011, (2) the status of their financial statement audit at the time of filing the return, and (3) any adjustments to taxable income made by the Finnish tax authority. In addition, our data set allows us to control for several other fundamental characteristics of the companies not examined in previous studies.

Unlike Mills (1998) and Cho et al. (2006), we restrict our analysis to small private companies. In the European Union (EU), Member States can exempt small, non-publicly accountable companies below a certain threshold from the statutory audit. In Finland, the size tests are lower than the EU maxima and audit exemption is only given to very small private companies. However, in contrast to many other jurisdictions, all companies in Finland, regardless of size, are required to prepare annual financial statements, which are attached to the tax declaration, which must be filed with the tax authority no later than four months after the balance sheet date. The annual financial statements are automatically sent from the tax office to the company register electronically. Therefore, we are able to document for the first time in the literature any effect that voluntary audit and the associated audit opinion have on the tax authority's propensity to make adjustments to the taxable income reported by the company. At the same time, our confidential tax return data allows us to control for the effect of the company's tax aggressiveness using the difference between non-taxable revenues and non-tax deductible expenses as claimed in the company's tax return.

After controlling for tax aggressiveness and other relevant factors, we find that having a voluntary audit with an unqualified audit opinion decreases the likelihood of the tax authority not accepting taxable income as reported. At the same time, it moderates the otherwise significant positive effect of tax aggressiveness on the likelihood of tax authority making adjustments. However, we do not

find statistically significant support for our hypothesis that having a voluntary audit with a qualified audit opinion would increase the likelihood of tax authority not accepting taxable income as reported. The main results are insensitive to whether the full sample is used or a balanced sample based on propensity score pairing of tax-adjusted companies with their non-adjusted counterparts. This study contributes to the emerging literature on the tax authority's role in monitoring financial reporting quality. It is the first to document the effect of voluntary audit on tax return adjustments and whether the tax authority's response is associated with a qualified or unqualified audit opinion.

Our proprietary data obtained from the Finnish Tax Administration provides us with details of the taxable income reported by the population of small private companies in their tax returns, together with the auditors' opinion if the company has a voluntary audit. As we include a measure of tax aggressiveness in the analysis, we are able to use the book-tax difference reported by the company in its tax return. Conventional measures of tax avoidance used in previous studies are based on publicly available data, such as effective tax rates or book-tax differences computed from published financial statements (see Hanlon and Heitzman, 2010). Unlike prior related studies that use indirect measures of tax aggressiveness (Mills, 1998; Cho et al., 2006), our direct measure is free from bias and noise because it is based on the difference between non-taxable revenues and non-tax deductible expenses, as claimed in the company's tax return. By analysing whether our measure of tax aggressiveness predicts the response of the tax authority (i.e. adjusting the taxable income reported by the company) and whether a voluntary audit and the audit opinion affects the tax authority's response, we contribute to the emerging literature (cf. Hanlon et al., 2014) on the tax authority's role in monitoring financial reporting quality.

The remainder of this paper is organized as follows. In section 2 we describe our institutional setting (Finland) and go on to develop our hypotheses in section 3. The data and model used in empirical tests are explained in section 4 and we report out results in section 5. In the final section we draw conclusions.

2. Institutional setting

The institutional setting for this study is Finland, which joined the EU in 1995 and is bound by the requirements of all EU Directives. At the time of the study, the Fourth Company Law Directive (78/660/EEC)[7] was in force and required limited liability entities to prepare and register annual accounts, which must be audited by one or more persons entitled to carry out such audits. However, since 1994, Member States have been able to offer audit exemption to qualifying small entities. In general, the company must satisfy at least two of the three size criteria for two consecutive years, up to the EU maxima shown in Table 1, although national jurisdictions can set lower thresholds. Audit exemption was introduced in Finland by the Auditing Act 2007 and exemption has been an option for very small companies since 2008 (see Table 1).

Although small companies are audit exempt, they are still required to register their articles of association with the Finnish Patent and Registration Office where they are placed on the public record. The articles of association state whether an exempt company will opt for voluntary audit. The annual report and accounts must be sent to the Finnish Tax Administration within four months of the company's reporting year-end and the tax authority then forwards them to the Finnish

[7] Accounting Directive (EC, 2013a) revised, repealed and consolidated the Fourth and Seventh Company Law Directives. It also raised the EU maxima for medium and small reporting entities and introduced a new category of micro-entities. At the time of the study, the new Accounting Directive had not been incorporated in Finnish company law.

Patent and Registration Office where they are available to the public. The majority of all Finnish limited liability companies (58 percent in our matched-paired sample) submit their tax return by the end of April because their corporate year-end is the same as the calendar year-end. Any tax adjustments are made when the final taxable income for the fiscal year is confirmed by the tax authority, which will be within ten months of the company filing its tax return. The information in the financial statements placed on the public record excludes the breakdown of taxable and non-taxable revenues as well as the tax deductible and non-tax deductible expenses that the company provides solely for the Finnish Tax Administration.

Under the Finnish Companies Act 2006, reporting entities must present their audited financial statements to shareholders at the annual general meeting within six months of the year-end. Therefore, the annual general meeting may take place after the tax return has been submitted. For some companies, this may mean that the planned voluntary audit has not been completed by the time they submit their tax return. However, the tax authority will know from the tax return filings whether the audit has already been completed or whether it is still forthcoming. This prevents companies receiving a qualified audit report from getting round it by changing their policy to audit exemption.

Finland provides an appropriate setting for this study of small private companies for three reasons. All limited liability companies in Finland, regardless of size, are required to file a copy of the full income statement and balance sheet at the public register. In addition, since 2008, small companies in Finland meeting certain size tests have been exempt from mandatory audit, but may choose to have their accounts audited on a voluntary basis. Finally, Finland is characterized by a

relatively high financial-tax alignment (Kasanen et al., 1996; Eberhartinger, 1999)[8]. Unlike many other jurisdictions, all Finnish companies are also required to file their full financial statements (irrespective of whether they have been audited) with the tax authority when submitting their tax returns. In Finland, taxable income is derived from the net income reported in the official financial statements. Deductibility in tax returns requires prior recognition in the financial statements because the Finnish Business Tax Law (EVL 1968/360) § 54 (1976/1094) requires expensing in financial statements as a prerequisite for tax deductibility.

3. Hypothesis development

3.1 Voluntary audit and tax adjustments

The link between voluntary audit and tax adjustments rests on the assumption that voluntary auditing of financial statements has a positive effect on the credibility (or fair presentation) of the financial statements leading to less need for tax authorities to make adjustments. Therefore, we expect that voluntary audit of financial statements will have an impact on the likelihood of the tax authority making tax adjustments.

A number of studies provide empirical evidence of a positive relationship between audit and the quality of financial statements. For example, Dedman and Kausar (2012) examine a large sample of UK private companies and find that those opting for voluntary audit receive significantly higher

[8] According to Eberhartinger (1999), there are two different approaches to the relationship between tax accounts and financial accounts in Europe: (1) accounting rules and fiscal (tax) rules are independent of one another, and (2) taxation depends on financial reporting. In the latter approach, all entries in the books are relevant for taxation. Eberhartinger notes that while the former approach can be found mainly in Anglo-American countries, the latter approach prevails in most European jurisdictions, including Finland. As Atwood et al. (2010: note 22) point out, the close tie between tax and book numbers in Germany applies to single entity company accounts, not to group accounts as examined by Atwood et al. This close tie is also present in Finland and our sample comprises single entity companies only.

credit scores than those that file audit exempt accounts. Their results show that unaudited accounts are associated with less conservative financial reporting and this explains why such companies earn higher profits and yet receive lower credit ratings. Results of a study by Höglund (2014), based on a sample of some 500 Finnish micro-companies choosing audit exemption, are consistent with Dedman and Kausar (2012) regarding the effect of audit on earnings quality.

However, auditors' conservatism may work against external auditing being a positive signal to the tax authority. Kim et al. (2003) note that both managers and auditors have incentives to prefer income-decreasing accrual choices and are, therefore, not in conflict (see also Fortin and Pittman, 2007). Consistent with this, Kim et al. (2003) find that higher quality audit firms are more effective in deterring or monitoring income-increasing accruals but less effective in monitoring income-decreasing accruals. In a similar vein, Scott (2009: 213) draws the following conclusion: *"Anticipating the investor's loss asymmetry, the auditor reacts by being conservative. When current value has decreased, writing assets down to current value benefits the investor… by avoiding the utility loss… [and] thereby decreasing the likelihood of the investor suing the auditor."* Because tax authorities are likely to be aware of the external auditors' tendency towards accounting conservatism leading to lower taxable income for the period, it is not obvious that external auditing always decreases the likelihood of tax adjustment. Nevertheless, given the empirical evidence from the studies mentioned above, and assuming that the audit report is unqualified (thereby providing no cause for concern regarding financial statement credibility), we posit that opting for voluntary audit reduces the likelihood of tax adjustments by the tax authority.

In contrast, we expect a qualified audit report to have an opposite effect. Our expectation is based on prior empirical studies that document a negative relationship between audit report qualification and the quality of financial statement information. For example, the results of studies in the US

(Francis and Khrishnan, 1999) and China (Chen et al., 2001) are consistent with the notion that the likelihood of a qualified audit report increases with earnings management.[9] Regarding small companies, however, there are presumably less incentives of upward earnings management due to predominantly one level of hierarchy as compared to large companies with several hierarchical levels and thus concerns about loss of control. Indeed Abdel-Khalik (1993: 35) notes that "*In a small company with one level of hierarchy, the owner (manager) controls operations primarily by means of direct supervision and personal observation.*" In a very small company where ownership and management is not separated, the incentive to earnings management may be income decreasing rather than income increasing because of tax considerations.[10]

Assuming that the tax authority is aware of these relationships, we posit that a qualified audit report will be seen as a negative signal, thereby increasing the likelihood of tax adjustments. To summarize, we formulate our first hypothesis as follows:

H1: Compared to non-audit, a voluntary audit leading to an unqualified (qualified) opinion decreases (increases) the likelihood of tax adjustments by the tax authority.

[9] This relationship may not be robust across jurisdictions. For example, Tsipouridou and Spathis (2012) report that in Greece the size of the audit firm (Big 4 vs. non-Big 4), as well as the audit opinion qualification, is *not* related to management's opportunistic behavior (earnings management). The authors attribute this to the institutional context of Greece, which is characterized by the strong economic bonding of auditors and clients, low investor protection, weak enforcement mechanisms, and low litigation and reputation costs for auditors. Nevertheless, an earlier study based on Greek data (Caramanis and Lennox, 2008) shows that low audit effort (measured by audit hours) increases the extent to which companies are able to report aggressively high earnings.

[10] For example, to minimise the owner-manager's total tax burden (s)he has incentive to record personal expenses to the company's books to obtain tax deductibility.

3.2 Moderating and intensifying effects of voluntary audit

As discussed above, the auditor's opinion may have an effect on the likelihood of tax adjustment by the tax authority. In addition to this direct effect, the audit opinion may have an indirect effect, interacting with the degree of tax aggressiveness[11] of the firm. Given that the tax authority will pay more attention to the tax return when book income diverges significantly from taxable income (Hoopes et al., 2012; Lennox et al., 2013), it follows that being tax aggressiveness increases the likelihood of tax adjustments. Consistent with this, Mills (1998) and Cho et al. (2006) provide evidence that adjustments made by the tax authority increase when the excess of book income over taxable income increases, supporting the view that firm's tax aggressiveness increases the likelihood of tax authorities' adjustments.

Voluntary audit may moderate the impact of the firm's tax aggressiveness. Therefore, in addition to a direct effect, it may have an indirect effect on the likelihood of tax adjustments. As a professional accountant, the auditor is an expert not only in accounting and auditing, but also in taxation. Therefore, he or she is able to advise the owner-manager on technical details[12], such as what constitutes deductible expenses and non-taxable income (Niemi et al., 2012; Ojala et al. 2016). Owner-managers of small companies, who do not hire an auditor, may not have this knowledge and this may result in the company being overly aggressive by attempting to report non-deductible expenses as deductible and taxable income as non-taxable. As the tax authority is aware of this, an unqualified audit report is likely to moderate the positive impact of tax

[11] Following Hanlon and Heitzman (2010: 131), we define a tax aggressive firm as a company that is aggressive for tax reporting purposes and takes actions to lower reported taxable income, while keeping book income unchanged (see section 4.2 and Appendix 1).

[12] Auditors of small companies in Finland are expected to possess the knowledge needed for small company taxation. This is tested as part of the Finnish CPA examinations. Also, auditors have to annually report to the Auditing Board of Finland on how they have been keeping their knowledge up-to-date.

aggressiveness on tax adjustments. Therefore, among highly tax aggressive companies, those with unqualified audit reports are less likely to attract the attention of the tax authority.

In accordance with H1, which suggests a negative relationship between an unqualified audit report and tax adjustments, we hypothesize that an unqualified audit report moderates the positive impact of tax aggressiveness on these adjustments. We expect the opposite effect with a qualified opinion. In conclusion, we posit our second hypothesis as follows:

> **H2:** An unqualified (qualified) opinion from a voluntary audit moderates (intensifies) the positive impact of tax aggressiveness of a firm on the likelihood of tax adjustments by the tax authority.

3.3. Effect of a forthcoming voluntary audit

In addition to improving financial statement credibility via the auditor's examination of the accounts and potential detection of misstatements in financial reports, an audit may serve as a signal in itself (Titman and Trueman, 1986[13]). Consistent with this, Lennox and Pittman (2011) found that after the removal of mandatory audit for small companies in UK, companies that continued to have an audit on a voluntary basis improved their credit scores (signaling value), while those choosing audit exemption experienced a decrease in their credit scores (assurance effect). Consequently, even a forthcoming voluntary audit (an audit that has been announced in the company's tax return, but which has not been completed yet) can be regarded by the tax authority as a positive signal and decrease the likelihood of tax adjustments. However, indicating a

[13] Titman and Trueman (1986) develop a theoretical model in which an entrepreneur with favorable information about his/her firm's value is able to signal that to the market by hiring a higher-quality auditor. The idea that auditor choice serves as a signal is applicable to the choice of being voluntarily audited.

forthcoming audit in the company's tax return may be seen as a sign that the audit has revealed problems that have delayed completion of the audit, especially if peer companies have completed their audits by the date of the tax return. Therefore, a forthcoming audit might also be seen as a negative sign and thus increase the likelihood of tax adjustments. In addition, a forthcoming audit could have an indirect effect, as it might be perceived by the tax authority as leading to a more accurate tax return, thereby moderating the positive impact of tax aggressiveness on the likelihood of tax adjustments. Therefore, it is possible that announcing a forthcoming audit in the tax return either intensifies or moderates the effect of tax aggressiveness on the likelihood of attracting the attention of the tax authority.

As we have sufficient grounds to expect that a forthcoming audit can convey a positive or a negative signal to the tax authority, we leave it to our empirical data to show us the direction of any effect. Based on these lines of reasoning, we formulate our third and final hypothesis as follows:

H3: A forthcoming voluntary audit has an impact on the likelihood of tax adjustments by the tax authority.

Figure 1 summarizes our hypotheses on the effects of voluntary audit and tax aggressiveness on the likelihood of attracting the attention of the tax authority.

4. Data and empirical model

4.1 Data and sample selection

We obtained proprietary data for all limited liability companies in Finland that submitted tax returns for 2011 and had sales revenue not exceeding 10 million euros. The data include financial statement information, tax return details, the audit status and any adjustment to taxable income made by the tax authority. This confidential information was obtained from the Finnish Tax Administration under the *Real Time Economy Program*, the aim of which is to improve the flow of financial information between Finnish companies, their stakeholders and other interest groups by the adoption of XBRL (see Eierle et al., 2014).[14] The data delivery agreement prevents us from revealing the exact number of tax adjustments, which we refer to as '$n^{tax\text{-}adjusted}$'. This does not affect the results of the statistical tests, our ability to communicate them to the reader or our ability to draw conclusions.

The initial list comprised 100,803 companies. After removing all financial institutions, companies exceeding the size thresholds for voluntary audit, a reporting period other than 12 months, negative after-tax net income or missing data for variables in the analysis, the final sample comprised 24,802 companies (see Table 2). Of these, a non-trivial number of companies ($n^{tax\text{-}adjusted}$) had their 2011 tax returns adjusted by the tax authority and the remaining companies ($24{,}802 - n^{tax\text{-}adjusted}$) did not.

[14] The *Real Time Economy Program* is a national program in Finland with a track-record of successful development projects in the field of financial reporting and administration. The XBRL project was supervised by the Real-Time Economy advisory board, which comprised representatives of the Bank of Finland, the Tax Office, the Ministry of Employment and the Economy, the Federation of Finnish Enterprises and other national institutions. The advisory board also benefitted from the participation of system integrators, the Association of Accountants, and representatives of the Aalto University School of Business.

As our sample is asymmetric in respect of the treatment (tax adjusted) and control (non-adjusted) companies, we apply the propensity score matching procedure to identify a non-tax adjusted pair for each of the companies for which the tax authority adjusted the taxable income. In identifying the one-to-one pairs, we use our control variables (explained below) excluding tax aggressiveness as criteria in the propensity score matching[15]. We base our tests on our full sample with 24,802 observations and nearest-neighbour matching of each tax-adjusted observation firm to a non-adjusted matched pair. We apply matching with replacement because this "produces matches of higher quality than matching without replacement by increasing the set of possible matches" (Abadie and Imbens, 2006: 140). The procedure estimates the selection model with common support and satisfies the balancing property. The results are reported in section 5.

4.2 Regression models

To control for the effects of potential endogeneity[16] between voluntary audit choice and tax aggressiveness on our results, we apply the Heckman two-stage modelling approach to test our hypotheses. To start, we estimate the following first stage probit model for voluntary audit choice:[17]

$$Prob(VOLAUDIT = 1) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{Z'} e^{-t^2/2} dt \qquad (1)$$

where

[15] The reason for leaving the variable measuring tax aggressiveness out from propensity score matching is that this variable has not only the role of control variable but is also used as test variable in interactions terms as explained below.

[16] For endogeneity and possible solutions for it in accounting research, see Larcker and Rusticus (2010) and Lennox et al. (2012).

[17] Heckman (1979) suggests that a probit model is more appropriate than a logit model for this purpose.

$$Z' = \alpha_0 + \alpha_1 LNASSETS + \alpha_2 LNSALES + \alpha_3 ASSETURN + \alpha_4 LEVERAGE + \alpha_5 CURRENTRATIO + \alpha_6 ROA + \alpha_7 NEWISSUE + \alpha_8 RECASSETS + \alpha_9 INVASSETS + \alpha_{10} NEWFIRM + \alpha_{11} STICKYNESS + \alpha_{12} GROWTH + \alpha_{13} GROUPCO + \alpha_{14} TAXAGGR$$

The dependent variable in this first stage model is *VOLAUDIT* which is coded 1 if the firm chooses to have voluntary financial statement audit in year 2011 for fiscal year 2010, and 0 otherwise. The independent variables in the model are derived from the determinants of audit choice (voluntary audit or exemption) documented in prior literature (see Chaney et al., 2004; Lennox et al., 2012; Niemi et al., 2012; Dedman et al., 2014; Ojala et al., 2016). Based on that evidence, we use the following variables on the right hand side of equation 1 (all variables except *STICKYNESS* refer to fiscal year 2010): logarithm of total assets (*LNASSETS*); logarithm of net sales (*LNSALES*); asset turnover (*ASSETURN*); total liabilities divided by total assets (*LEVERAGE*); current ratio (*CURRENTRATIO*); return on assets (*ROA*); a binary variable (*NEWISSUE*) which is coded 1 if there has been a share-issue or the amount of long-term debt has increased by 5 percent or more, and 0 otherwise; accounts receivable divided by total assets (*RECASSETS*); inventories divided by total assets (*INVASSETS*); a binary variable (*NEWFIRM*) which is coded 1 if the firm has been established after 2009, and 0 otherwise; a binary variable (*STICKYNESS*) which is coded 1 if the firm has opted for voluntary audit for fiscal year 2009, and 0 otherwise; net sales in year 2010 divided by net sales in *2009* (*GROWTH*); and a binary variable (*GROUPCO*) which is coded 1 if the firm is a parent company or a subsidiary in a group, and 0 otherwise. Based on prior literature mentioned above (Chaney et al., 2004 and Dedman et al., 2014, among others), we expect positive signs on the coefficients of all variables apart from *ASSETTURN* and *ROA*, where we expect negative coefficients.

We augment the model with a measure of the company's tax aggressiveness (*TAXAGGR*) that we define in equation 3. The inclusion of this variable allows us to control for the possibility that the choice of voluntary audit and the level of tax aggressiveness are endogenous and will be correlated if they are both determined by the company. We do not predict the sign for the coefficient of *TAXAGGR*.[18]

Finally, we control for industry fixed effects by including binary industry indicators $INDUSTRY_j$ (j = 1, …, 9) for nine of the ten main industries in our sample.[19]

After estimating equation 1, we proceed to estimate equation 2 as our main (second stage) logit model:

$$Prob(TAXADJ = 1) = \frac{1}{1+e^{-Z}} \quad (2)$$

where

$$\begin{aligned} Z = {} & \beta_0 + \beta_1 AUDITUN + \beta_2 AUDITQU + \beta_3 AUDITFO + \beta_4 (AUDITUN \times TAXAGGR) + \\ & \beta_5 (AUDITQU \times TAXAGGR) + \beta_6 (AUDITFO \times TAXAGGR) + \beta_7 TAXAGGR + \\ & \beta_8 PAPERFILING + \beta_9 PETTYCASH + \beta_{10} EARNMGT + \beta_{11} NEWFIRM + \beta_{12} ROA + \\ & \beta_{13} LEVERAGE + \beta_{14} LNSALES + \beta_{15} INVMILLS + \sum_{k=16}^{24} \beta_k \, INDUSTRY_{17-k} \end{aligned}$$

[18] Based on Hanlon et al. (2014), tax aggressiveness could also be positively associated to having a voluntary audit.

[19] None of the control variables considered in related prior studies (Mills, 1998 and Cho et al. 2006) are relevant to our small private company context. These include the firm's listing status, foreign source taxable income, net plant property and equipment measuring intangible assets such as patents, software and R&D.

Table 3 shows the variables in the analysis. In the regression model (2), *TAXADJ* is the dependent variable and is coded 1 if the tax authority has made an adjustment to the taxable income reported for fiscal year 2010, and 0 otherwise.

Test variables

Our test variables are *AUDITUN, AUDITQU,* and *AUDITFO* which denote voluntary audit with an unqualified opinion, voluntary audit with a qualified opinion, and a forthcoming voluntary audit (announced, but not yet completed) of the financial statements of the firm for fiscal year 2010, respectively.

We test H1 that a tax return accompanied by an unqualified audit report is less likely to be tax-adjusted with *AUDITUN*. This indicator variable is coded 1 if the company has a voluntary audit with unqualified audit opinion, and 0 otherwise. We expect a negative sign for its coefficient (b_1). Correspondingly, *AUDITQU* is an indicator coded 1 if the auditor's opinion is qualified, and 0 otherwise. Our H1 suggests a positive coefficient for it (b_2). We test our H3 that a forthcoming audit has an impact on the likelihood of tax adjustments with *AUDITFO*. It is an indicator variable coded 1 if the company announces a forthcoming voluntary audit in its tax return, and 0 otherwise. We do not predict the sign of its coefficient (b_3).

To test whether a voluntary audit that has already taken place moderates or intensifies the effects of tax aggressiveness, we use the interaction variables *AUDITUN*TAXAGGR* and *AUDITQU*TAXAGGR*. H2 suggests that the coefficient of the former interaction (b_4) will be negative, whereas it predicts that the coefficient of the latter interaction (b_5) will be positive. Finally, to see whether a forthcoming voluntary audit modifies or intensifies the relationship

between tax aggressiveness and tax adjustments, we use the interaction variable *AUDITFO*TAXAGGR*. Based on H3, we do not predict the sign of its coefficient (b_6).

Control variables

Our primary control variable is *TAXAGGR* representing the company's tax aggressiveness for which we expect a positive coefficient (b_7). Since there is no universal gauge of tax aggressiveness,[20] we use tax return data confidentially obtained from the tax authority to create the following measure that captures tax aggressiveness of small companies in our institutional setting without bias and noise.

$$TAXAGGR = \frac{Non-taxable\ revenues\ -\ Non-tax\ deductible\ expenses}{Total\ revenues} \quad (3)$$

where *Non-taxable revenues* and *Non-tax deductible expenses* are as claimed by the firm in its tax return submitted in 2011 for fiscal year 2010.[21]

Unlike prior studies that measure the tax aggressiveness of large multinationals from publicly available data, our measure is based on proprietary data and provides a direct measure of tax aggressiveness in small private companies. In essence, our measure describes the book-tax difference that the company reports in its tax return to the tax authority. The idea behind our

[20] For a summary of different measures of tax avoidance or tax aggressiveness, see Hanlon and Heitzman (2010: 137-144).

[21] For details of our measure of tax aggressiveness, see Appendix 1.

measure is that a tax aggressive company trying to minimize its tax burden seeks ways to maximize non-taxable revenues and minimize non-tax deductible expenses in its tax return. To account for size differences, we use total revenue (the sum of net sales and other revenue) instead of total assets as the size deflator. We do this for two reasons: (1) taxation is based on the company's revenues (and expenses), not on its assets, and (2) in the case of small private companies, total revenue is likely to be a more valid indicator of the company's size and level of activity. For example, it is not uncommon that very small private companies with assets are relatively inactive and, therefore, generate little taxable income; others may be dormant with no taxable revenue.

We augment our logit model (2) with a number of controls. First, *PAPERFILING* is a binary variable coded 1 if the company has chosen to file its tax return in traditional paper format, and 0 if it has chosen the digital filing option. Our expectation is that paper tax returns are more prone to calculation errors and hence tax adjustments compared with digital tax returns where the calculations are performed by the software. In addition, most small private companies outsource financial statement preparation and filing to external professional accountants. Therefore, the likelihood of using digital tax filing can be assumed to increase with the size of client base and technological competence of the accountant. Small private companies submitting their tax returns in paper format are less likely to be experienced in accounting and less likely to use professional accountants, thus increasing the probability of adjustments by the tax authority due to increased proclivity for errors. Therefore, we expect a positive sign for the coefficient (b_8).

Second, *PETTYCASH* is an indicator variable coded 1 if the firm has petty cash on hand (rather than cash in bank), and 0 otherwise. Very high petty cash balances may indicate weaknesses in the internal control and administration of the company. They may also signal a heightened risk of

fraud or misappropriation of the company's assets. We expect a positive sign for the coefficient (b_9).

Third, if tax adjustments are a proxy for lack of financial statement credibility, it is reasonable to expect that tax adjustment is correlated with other quality measures, such as earnings management. We control for its effect with *EARNMGT* which measures abnormal working capital accruals as defined by DeFond and Park (2001).[22] We expect a positive sign on the coefficient (b_{10}).

Fourth, it can be assumed that apart from serial entrepreneurs, the directors of newly established companies are likely to be less experienced in preparing financial statements and tax returns than directors of older companies. To control for the potential effect of firm age, we add *NEWFIRM*, which is an indicator variable coded 1 if the company was established after 2009, and 0 otherwise. We predict a positive sign on its coefficient (b_{11}).

Fifth, we control for firm performance using *ROA* which is the return on assets, defined as the sum of earnings before interest, taxes and salaries divided by total assets,[23] and financial leverage with

[22] For measuring earnings management, we employ the DeFond and Park (2001) model for its parsimony (no parameter estimation required) and focus on working capital accruals. The latter are likely to be more relevant than non-current accruals for earnings management in small private companies. However, we also employ the modified Jones model (Dechow et al., 1995) and the Kothari et al. (2005) model as robustness checks on the sensitivity of our findings to the choice of earnings management model.

[23] For measuring *ROA*, we compute the nominator before salaries to account for the possibility a director of a small company may pay dividends to him/herself through an abnormally large salary or pay his/her salary through abnormally large dividends, depending on his/her position in personal taxation.

LEVERAGE which is defined as total liabilities divided by total assets.[24] Following prior studies, which suggest that earnings quality increases with firm performance and decreases with financial leverage (see Dechow et al. 2010), and assuming that tax adjustments made by the tax authority reflect earnings quality, we expect the likelihood of the adjustments to be negatively related to *ROA* and positively related to *LEVERAGE*. This implies a negative sign for the coefficient (b_{12}) and a positive sign for the coefficient (b_{13}) for these variables, respectively.

Sixth, although company size is likely to capture aspects of agency relationships,[25] it may also have an impact on the likelihood of tax adjustments. The rationale for this is that, all things being equal, the tax authority is likely to allocate its resources to audits of larger rather than smaller companies because of the potential for larger tax collections from larger companies. Size is also an indicator of the company's complexity, potentially giving rise to adjustments by tax authority. To measure company size we use *LNSALES*, which is the natural logarithm of net sales for the fiscal year. We predict its coefficient (b_{14}) to be positive.

Seventh, to control for potential endogeneity arising from the possibility that firm tax aggressiveness and the choice of voluntary audit (but not the audit opinion) is jointly determined by the management of the firm, we include *INVMILLS* (the inverse Mills ratio) as a control variable (see Lennox et al., 2012). This ratio is obtained from our first stage probit model for voluntary audit choice (equation 1).

[24] Due to extreme values of *LEVERAGE*, we winsorize it at the 95 percent fractiles of the distribution.

[25] For the relation between organizational structure and the demand for auditing in the small private companies, see Abdel-Khalik (1993). For the importance of agency relationships in small company context, see Collis (2012), Niemi et al. (2012) and Ojala et al. (2016).

5. Results

Table 4 presents descriptive statistics for the independent variables used to test our hypotheses. The table reports the *p*-values from the *t*-tests for differences between companies in the full sample that were subject to tax adjustments and those that were not (column 1 versus column 2), as well as for differences between companies in the full sample that were subject to tax adjustments and their PSM (propensity score matched) pairs that were not (column 1 versus column 3).

Consistent with H1, the *t*-tests indicate a significant difference in the likelihood of the company having an unqualified audit opinion (*AUDITUN*) between the subsequently tax-adjusted and non-adjusted companies. For example, while the proportion of companies with an unqualified audit opinion is >0.222 among the total sample of non-adjusted companies, the corresponding proportion is <0.222 among the tax-adjusted companies.[26] The difference is significant (p=0.001). The differences in the likelihoods of companies having a qualified audit opinion (*AUDITQU*) and companies announcing a forthcoming audit (*AUDITFO*) remain insignificant between tax-adjusted and non-adjusted companies, irrespective of whether the full or the PSM sample is analysed[27].

In addition, the *t*-tests for our measure of tax aggressiveness suggest that companies subjected to tax adjustments are, on average, significantly more tax aggressive than those not subjected to adjustments (see the mean values for *TAXAGGR* in columns 1 and 2). The difference is highly

[26] To preserve confidentiality, we are unable to report these means precisely (see the legend in Table 4).

[27] The comparisons of variables other than *AUDITUN*, *AUDITQU* and *AUDITFO* between tax-adjusted and non-adjusted companies in our PSM sample could be expected to show insignificant differences since none of them was used as a criterion variable in the propensity score matching of non-tax adjusted companies with their tax adjusted counterparts.

significant (p<0.001) in the full and PSM sample (column 1 versus column 2 and column 1 versus column 3).

In our full sample, Table 4 also shows significant differences between the tax-adjusted and non-adjusted firms (column 1 versus column 2) in terms of their tendency to file their tax returns in paper format rather than digital filing (*PAPERFILING*) and in terms of being a newly established company (*NEWFIRM*). Consistent with our expectation, the means of both these variables are larger in tax-adjusted companies than in non-adjusted companies. In the matched-paired sample, the statistically significant differences of these variables disappear. If we use non-parametric Kolmogorov-Smirnov tests (see Armstrong et al., 2010) rather than parametric t-tests in the comparisons reported in Table 4, the results and conclusions remain qualitatively unchanged.

Tables 5A and 5B show correlation matrices for the variables estimated from the full and matched-paired samples respectively. These tables present Pearson correlations below the diagonal and Spearman correlations above the diagonal. From Table 5A (the full sample) we can see that a tax adjustment by the tax authority (*TAXADJ*) has a significant Pearson correlation with the following variables: *AUDITUN* (p=0.004), *AUDITQU* (p=0.020), *TAXAGGR* (p<0.001), *PAPERFILING* (p=0.001), and *NEWFIRM* (p=0.005) and all have expected sign. The Spearman correlations yield similar results. The corresponding results for correlations estimated from the matched-paired sample reported in Table 5B show that an unqualified opinion from a voluntary audit (*AUDITUN*) is negatively correlated with adjustments by the tax authority (*TAXADJ*). However, corresponding correlations with *AUDITQU* and *AUDITFO* are insignificant.

The results from estimating our first stage probit model for voluntary audit choice (equation 1) are shown in Appendices 2A and 2B. For 9 of the 14 independent variables included in the model, the

estimated coefficients are significant at 10% level or better, and show the expected signs (Appendix 2). A noteworthy exception is *TAXAGGR*, for which the estimated coefficient (0.001) is far from significant (p=0.973). This result is consistent with the view that the choice of voluntary audit and tax aggressiveness are not jointly determined by the company. Despite this finding, we include *INVMILL* (the inverse Mills ratio) obtained from this first stage probit model in our second stage logit model to control for the potential effect of endogeneity. Regarding the overall fit of our audit choice model, the concordance index of 0.794 shows that the model has a fairly good explanatory power for voluntary audit choice in our full sample of nearly 25,000 observations.

Our main test results from estimating the second stage binary logit model (equation 2) are reported in Tables 6A and 6B for the full and matched-paired (PSM) samples respectively. Table 6A (the full sample with 24,802 observations) shows that, after controlling for other relevant factors, the effect of a voluntary audit accompanied by an unqualified audit opinion (*AUDITUN*) has a significant negative effect on the likelihood of the tax authority adjusting the taxable income reported in the tax return (see the negative coefficient -0.524 with p=0.007 in Table 6A). This result is in line with H1. In addition, the significant negative regression coefficient[28] of the interaction variable *AUDITUN*TAXAGGR* (-1.636 with p=0.017) is consistent with H2, suggesting that an unqualified audit opinion from a voluntary audit moderates the positive impact of tax aggressiveness on the likelihood of tax adjustments. In contrast, we do not find statistically significant evidence for our hypotheses that a voluntary audit accompanied by a qualified audit opinion would increase the likelihood of tax authority's adjustment either directly (H1) or

[28] Mean marginal effect -0.036 with p=0.002.

indirectly (H2). This is the consequence of the coefficients estimated for *AUDITQU* and *AUDITQU*TAXAGGR* being insignificant when the control variables are included in the model.

With regard to a forthcoming audit announced in the company's tax return (H3), the results shown in Table 6A suggest that it has a significant indirect effect as it moderates the positive impact of tax aggressiveness on the likelihood of tax adjustments (see the negative coefficient -2.788 with $p<0.001$ estimated for interaction *AUDITFO*TAXAGGR*[29]). This supports the notion that for tax aggressive companies (with high *TAXAGGR)*, a forthcoming voluntary audit is seen as a positive rather than a negative signal by the tax authority, thereby reducing the likelihood of attracting adjustments. However, we do not find evidence of a forthcoming voluntary audit having any direct effect, as the coefficient of *AUDITFO* in Table 6A is not significant.

The results in Table 6A show that six of the nine control variables (ignoring industry fixed effects) have a significant influence on the likelihood of adjustments by the tax authority. These are *TAXAGGR*, *PAPERFILING*, *PETTYCASH*, *NEWFIRM*, *ROA*, and *LNSALES*. The coefficients estimated for these variables have the expected positive sign, apart from ROA which has the expected negative sign. It is notable that the coefficient of *INVMILLS* (0.022 with $p=0.930$) which controls for the potential effect of endogeneity, is far from significant. This suggests that our results are not biased by tax aggressiveness and the choice of voluntary audit being jointly determined by the company.

Finally, the overall statistics reported in Table 6A for the second stage logit regression with a significant Wald Chi-Square of 430.4 and a pseudo R^2 of 0.163 indicate that our model is able to

[29] Mean marginal effect -0.027 with $p=0.043$.

explain tax authority's behaviour to some extent. This is also supported by the concordance index of 0.818, which indicates that the model predicts the tax authority's responses (adjustment versus no adjustment) to taxable income reported by the companies correctly in approximately four out of five cases.

The main findings from the matched-paired sample with 2 $n^{tax\text{-}adjusted}$ observations[30] in Table 6B are consistent with those from the full sample in Table 6A. A voluntary audit with an unqualified audit opinion (*AUDITUN*) has a significant negative effect (p=0.004 and p=0.006) on the likelihood of triggering attention from the tax authority. In addition, the negative coefficient[31] (-12.600) of the interaction *AUDITUN*TAXAGGR* (p=0.003) when the control variables are included, indicates the moderating effect of a voluntary audit with an unqualified opinion. Once again, these results are in line with H1 and H2. With regard to qualified audit opinion and the announcement of a forthcoming audit, the results from the matched-paired sample shown in Table 6B are insignificant[32].

Table 6B also shows that the coefficients of six of the nine control variables are insignificant. This is expected because all control variables were used as criteria in the propensity score matching of non-tax adjusted companies with their adjusted counterparts. Overall, the insignificance of most control variables in Table 6B thus suggests that the matching procedure has been effective.

[30] 2 $n^{tax\text{-}adjusted}$ refers to the number of observations in the matched-paired sample where each tax-adjusted observation is matched with a non-tax adjusted observation.

[31] Mean marginal effect -0.217 with p=0.028.

[32] However, the mean marginal effect -0.217 is not significant (p=0.195).

Finally, it can be seen that the overall fit of the model in terms of the pseudo R^2 (0.470) is higher than when estimated from our full sample. This is also reflected in the concordance index of 0.870 which indicates that the model fit, in terms of its ability to predict the observations in our PSM sample, is higher than in the full sample (0.818).

Robustness checks

We perform several additional tests to check the sensitivity of our main results. First, instead of using our proprietary tax return data for measuring tax aggressiveness, we compute the traditional book-tax difference from the sample companies' publicly available financial statement data. We calculate the book-tax difference as pre-tax book income less taxable income, estimated by grossing up the tax expense in the income statement with the statutory tax rate (26%) for the year.[33] Following prior studies, we use total assets as the size deflator. Our expectation is that when the book-tax difference is computed from income statement data instead of tax return data, the variable will include more noise as a measure of tax aggressiveness, thereby affecting our results.

Second, we exclude all companies with a non-calendar fiscal year-end from the sample. The purpose of this test is to show any effect on our findings due to the year-end rush that both financial statement auditors and tax authorities experience soon after 31 December. This is due to the fact that the majority of companies use the calendar year as their financial reporting year, which could have an adverse effect on the quality of the auditor's and tax authority's work, and thus affect our results.

[33] For a review of the different measures of tax aggressiveness (tax avoidance), see Hanlon and Heitzman, 2010.

Third, we check whether our main results are affected by the inclusion of companies making a loss in the sample. It is reasonable to suspect that unprofitable companies are less motivated to show tax aggressiveness with the aim of avoiding taxes. This is because usually a loss-making company does not have to pay income tax for the year in question (assuming that its final taxable income is also negative). However, under the loss carry-forward system (where 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: first, because the tax effect is not immediate and second, because the tax savings are conditional on the company being profitable in subsequent years. Overall, we have sufficient grounds to expect that when loss-making companies are included in the sample, they are likely to detract from the significance of our main results.

For each of these tests, we re-estimate our logit model (with all control variables) from our full sample. The number of observations available in model estimations varies across the tests, as non-calendar year companies are excluded in the second test and loss-making companies included in the third test. The results of these three logit regressions are shown in Table 7.

The robustness test shown in column 1 of Table 7 highlight the importance of the availability of our confidential tax return data for our main findings. This is indicated by the fact that when our tax aggressiveness measure is replaced with the book-tax difference computed from publicly available income statement data as explained above, it has a dramatic deteriorating effect on the overall model fit (the pseudo R^2 falls from 0.163 in Table 6A to only 0.023 in column 1 of Table 7). In line with this, the coefficient of *TAXAGGR* (with p=0.999) is no longer significant, nor is the coefficient estimated for its interaction with *AUDITUN*. Nevertheless, the coefficient of *AUDITUN* is significant (-0.505 with p=0.003). Unlike in Table 6A, however, the *AUDITQU* now

has a significant positive coefficient (with p=0.041) which is consistent with H1. In conclusion, the results indicate the significance of our proprietary data for the main findings documented in this study on the relationships between voluntary audit, tax aggressiveness and the credibility of financial reporting from the tax authority's perspective.

Column 2 in Table 7 suggests that, in terms of pseudo R^2 (0.177), the overall model fit is not affected very much by excluding (approximately 10,000) companies with non-calendar fiscal years from the sample. While the negative coefficient of *AUDITUN* is still significant (p=0.031), the coefficient of its interaction with *TAXAGGR* is not (p=0.149). In contrast, the interaction *AUDITFO*TAXAGGR* still has a significant negative coefficient (p<0.001), as was the case in Table 6A. Finally, excluding companies with non-calendar fiscal years does not detract from the significance of the effect of tax aggressiveness to any material extent (see the coefficient 6.222 with p<0.001). Overall, it can be concluded that the year-end rush effect that both financial statement auditors and tax authorities experience does not provide grounds to change our conclusions concerning the effects of voluntary audits and firm tax aggressiveness on the likelihood of tax authority's adjustments.

When loss-making companies are included in the sample (see column 3 in Table 7), we find that, in addition to tax aggressiveness, only the interaction effect of voluntary audit with an unqualified audit opinion is significant (with p=0.067), while the main effect is not. Nevertheless, the low pseudo R^2 (0.036) is consistent with our expectation that including loss-making companies in the sample introduces a lot of noise in the data, thereby deteriorating significantly the overall fit of the model and reducing the reliability of the results.

In addition to the robustness tests discussed above, we re-estimate our main logit model with all control variables (equation 2) from our full sample using the method suggested by Firth (1993). The purpose of this additional test is to control for the possibility that a separation would be present in our data which might cause problems in fitting the model. [34] The (untabulated) results from this Firth logit estimation were close to those reported in Table 6A, with only minor differences in relevant statistics. For example, the Wald chi-square of the estimated model was 433.7 with $p<0.001$ and the pseudo R^2 had the value of 0.166, which are almost the same as in the original estimation reported in Table 6A (430.4 with $p<0.001$ and 0.163, respectively.) Also, the estimated regression coefficients of the model were virtually the same with almost identical significance level as those shown in Table 6A. Thus, it can be concluded that our results are insensitive to whether the original maximum likelihood estimation or the Firth logit estimation controlling for potential separation in the data is used. Following Lo (2014), we complement our logit model with a linear probability model (untabulated). We do so to examine potential issues with the inference. Again, we find no indication of data separation. The signs and statistical significance of the hypothesis variables remain similar to the logit model.

Finally, we also checked the robustness of our findings with regard to our definition of earnings management. Instead of using the model suggested Defond and Park (2001) for measuring abnormal current accruals, we estimated the residuals for total accruals using the modified Jones model as suggested by Dechow et al., (1995) and Kothari et al. (2005). The results (not tabulated)

[34] Firth logit (see Heinze, 2002) is based on a penalized likelihood method that is appropriate in samples where a separation may occur. This may be the case when the dependent (response) variable may have low response prevalence and/or when the model includes several categorical interaction variables, thereby leading to some combination of predictors having the same event status.

showed that our findings and conclusions are insensitive to this choice of measuring earnings management.

6. Conclusions

Using a large proprietary data set from the confidential records of the Finnish tax authority for the fiscal year 2011, we examine the importance of voluntary audit (for small company audit-exempt financial statements) and the audit opinion as determinants of the tax authority's adjustments to the taxable income reported by around 25,000 small private companies in their tax returns. We contribute to the literature by providing evidence on both the direct and indirect effects of external audit as follows.

First, after controlling for tax aggressiveness and other relevant factors, we find that having a voluntary audit with an unqualified audit opinion decreases the likelihood of tax adjustments (a direct effect). At the same time, it moderates the otherwise significant positive effect of tax aggressiveness (an indirect effect) on the likelihood of the tax authority making adjustments. This study is the first to provide such evidence, as prior studies examining adjustments made by tax authorities in other jurisdictions have not considered the effects of audit or audit opinions. Thus, our paper develops a new perspective on the importance of voluntary audit in small private companies. However, we do not find statistically significant support for our hypothesis that having a voluntary audit with a qualified audit opinion increases the likelihood of the tax authority not accepting taxable income as reported. The main results of our study are qualitatively insensitive to whether the full sample is used or a balanced sample based on propensity score pairing of tax-adjusted companies with their non-adjusted counterparts. Finally, robustness tests suggest that, with some exceptions, the results are qualitatively unaffected by the use of different size deflators for tax aggressiveness or excluding companies with non-calendar fiscal year-ends.

Second, the proprietary tax return data available for this study allows us to measure tax aggressiveness directly using the book-tax difference reported in the companies' tax returns. Thus, we are able to avoid the noise inherent in book-tax differences measured with publicly available data, such as loss carry-forwards and other adjustments to the final taxable income for the period. We contribute to the emerging literature on the role of tax authorities in monitoring financial reporting quality by documenting that tax aggressiveness, when measured directly from the tax return, has a significant positive impact on the likelihood of the tax authority's response, and voluntary audit with an unqualified audit opinion mitigates the likelihood of that response. Our robustness tests confirm that our results are indeed sensitive to measuring tax aggressiveness directly from confidential tax return data rather than publicly available financial statements.

Finally, this paper contributes to the literature by documenting for the first time the positive effects of some context-specific factors on the likelihood of the tax authority making tax adjustments, such as filing the tax return in paper format rather than online, and whether there is cash on hand rather than in bank. The use of such variables is new to the literature and may be useful to future studies examining the financial reporting quality of small companies.

We use a two-stage model to control for the effects of potential endogeneity arising from the possibility that firm tax aggressiveness and the choice of voluntary audit (but not the audit opinion) is jointly determined by the management of the firm. The results of our first stage regression model shows that in our small private company setting, the choice of voluntary audit and the level of tax aggressiveness are not jointly determined. Therefore, we can be confident that the relationship between tax authority's behaviour and audit opinion is not driven by a spurious correlation attributable to endogeneity.

The findings of this study have implications that will be of interest not only to creditors and the accountancy profession but especially the owner-managers of small private companies. For example, the empirical results reported in this paper suggest that the likelihood of the tax authority making tax adjustment for a non-tax aggressive company is only 1.11%.[35] In contrast, if the company shows a high level of tax aggressiveness in its tax return by claiming e.g. that 90% of its total revenues are non-taxable dividend income from domestic companies while all its expenses are tax deductible, the likelihood of tax adjustment increases to 15.08%.[36] However, by opting for a voluntary audit, and assuming that the audit opinion is unqualified (which has the probability of 98% for tax aggressive companies in our data), the company can decrease the likelihood of tax adjustment to 2.49%.[37] The decrease of 12.59 percentage points (15.08%-2.49%) reflects the probability of receiving economic benefits from voluntary audit in the form of tax savings. If the company considers this likelihood of tax savings to be large enough, it may conclude that a voluntary audit is worth the money and therefore opts for it.

Our study of the economic implications of voluntary audit on taxation can be extended to other countries with voluntary audit of small companies. Research extensions to other countries may shed light on whether different (higher) thresholds for voluntary audit have differing effects on tax authorities' reactions. The results of this study also contribute to the debate on the benefit of voluntary audit in small private companies and should be of interest to tax authorities and policy makers in other jurisdictions.

---

[35] See Table 6A. For simplicity, we apply here the estimated logit model without control variables. When *AUDITUN* = *AUDITQU* = *AUDITFO* = 0 and *TAXAGGR* = 0, the model yields the following likelihood for tax adjustment: $Prob(TAXADJ=1) = 1/(1+e^{-(-4.492)}) = 0.0111$.

[36] $Prob(TAXADJ=1) = 1/(1+e^{-(-4.492+3.071*0.9)}) = 0.1508$.

[37] $Prob(TAXADJ=1) = 1/(1+e^{-(-4.492+3.071*0.9-0.398-1.712*0.9)}) = 0.0249$.

Appendix 1. Book-tax difference based on the tax return submitted to the Finnish tax authority

The calculation below derives from the basic structure of the tax return form used in Finland by all companies subject to income tax.

A. Net income, as per income statement for the year
+ Tax expense, as per income statement for the year
B. Net income before taxes, as per income statement for the year
+ Non-tax deductible expenses in the income statement, as claimed in the tax return (1)
- Non-taxable revenues in the income statement, as claimed in the tax return (2)
C. Taxable net income, as reported by the firm in the tax return
+/- Adjustments made by the tax authority to non-tax deductible expenses and non-taxable revenues reported in the tax return
-/+ Other adjustments made by the tax authority (3)
D. Final taxable income for the year
x Statutory tax rate
E. Final income tax

We define our measure of company's tax aggressiveness as the book-tax difference (B – C) reported by the firm in the tax return:

B - C

= B - (B + Non-tax deductible expenses in the income statement, as claimed in the tax return - Non-taxable revenues in the income statement, as claimed in the tax return)

= Non-taxable revenues in the income statement, as claimed in the tax return - Non-tax deductible expenses in the income statement, as claimed in the tax return

To account for size differences, we use company's total revenues (net sales + other revenues) as the size deflator.

Legend:

(1) Mandatory reserves for future expenditure, depreciation of shares in fixed assets, losses from mergers, entertainment expenses, fines and penalties paid, etc.

(2) Dividend income from domestic companies, gains from disposals of shares in fixed assets (under certain conditions), reversals of tax deductible write-downs and reserves, etc.

(3) For example, carry-forwards of losses confirmed in previous years, deducted by the tax authority *ex office*.

Appendix 2. Estimation results of the probit model for voluntary audit choice (equation 1): Full sample (n=24,802)

Dependent variable: Prob(*VOLAUDIT* = 1)

Independ. variables:	Exp. sign	Coefficient	Chi-square	*p*-value	
INTERCEPT	+/-	-2.700	957.56	<.001	****
LNASSETS	+	0.053	80.77	<.001	****
LNSALES	+	0.058	61.55	<.001	****
ASSETTURN	-	-0.001	0.06	0.804	
LEVERAGE	+	0.025	3.11	0.078	*
CURRENTRATIO	+	0.004	2.77	0.096	*
ROA	-	-0.062	32.24	<.001	****
NEWISSUE	+	-0.044	0.72	0.397	
RECASSETS	+	0.000	0.00	0.951	
INVASSETS	+	-0.113	5.46	0.020	**
NEWFIRM	+	0.376	23.63	<.001	****
STICKYNESS	+	1.909	5541.66	<.001	****
GROWTH	+	0.000	0.03	0.863	
GROUPCO	+	0.662	87.69	<.001	****
TAXAGGR	+/-	0.001	0.00	0.973	
INDUSTRY FIXED EFFECTS		Included			
Wald Chi-Square		6,033.0		<.001	****
-2Loglikelihood		25,261.4			
Pseudo R^2		0.399			
Concordance index		0.794			

The independent variables in this probit regression are the following: *LNASSETS* is logarithm of total assets; *LNSALES* is logarithm of net sales; *ASSETTURN* is net sales divided by total assets; *LEVERAGE* is total liabilities divided by total assets; *CURRENTRATIO* is current ratio; *ROA* is return on assets; *NEWISSUE* is a binary variable coded 1 if there has been a share-issue or the amount of long-term debt has increased 5% or more, and 0 otherwise; *RECASSETS* is accounts receivable divided by total assets; *INVASSETS* is inventories divided by total assets; *NEWFIRM* is a binary variable which is 1 if the firm has been established after 2009, and 0 otherwise; *STICKYNESS* is a binary variable coded 1 if the firm has opted for voluntary audit in year *t-2*, and 0 otherwise; *GROWTH* is net sales in year *t-1* divided by net sales in year *t-2*; *GROUPCO* is a binary variable coded 1 if the firm is a parent company or a subsidiary, and 0 otherwise; *TAXAGGR* is as defined in equation 3. Statistical (two-tail) significance levels (*p*-values) better than 0.001, 0.010, 0.050, and 0.100 are indicated by ****, ***, **, and *, respectively.

References

Abadie, A., and G. Imbens. 2006. Large Sample Properties of Matching Estimators for Average Treatment Effects. *Econometrica* 74(1): 235–267.

Abdel-Khalik, A. R. 1993. Why Do Private Companies Demand Auditing? A Case for Organizational Loss of Control. *Journal of Accounting, Auditing & Finance*, 8(1): 31-52.

Ai, C. and E.C. Norton. 2003. Interaction terms in logit and probit models. *Economics letters* 80(1): 123-129.

Armstrong, C.S., Jagolinzer, A.D. and D.F. Larcker. 2010. Chief executive officer equity incentives and accounting irregularities. *Journal of Accounting Research* 48(2): 225-271.

Atwood, T.J., Drake, M.S. and L.A. Myers. 2010. Book-tax conformity, earnings persistence and the association between earnings and future cash flows. *Journal of Accounting and Economics* 50(1): 111-125.

Beck, P.J. and P. Lisowsky. 2014. Tax uncertainty and voluntary real-time tax audits. *The Accounting review* 89(3): 867-901.

Caramanis, C. and C. Lennox. 2008. Audit effort and earnings management. *Journal of Accounting and Economics* 45(1):116-138.

Chaney, P.K., Jeter, D.C. and L. Shivakumar. 2004. Self-selection of auditors and audit pricing in private firms. *The Accounting Review* 79(1): 51-72.

Chen, C.J.P., Shimin, C. and X. Su. 2001. Profitability regulation, earnings management, and modified audit opinions: Evidence from China. *Auditing: A Journal of Practice & Theory* 20(2): 9-30.

Cho, J. Wong, J. and N. Wong. 2006. Book-tax differences and Inland Revenue audit adjustments in New Zealand. *Journal of Business Finance & Accounting* 33(9) & (10): 1650–1667.

Collis, J. 2012. Determinants of voluntary audit and voluntary full accounts in micro- and non-micro-companies in the UK. *Accounting and Business Research* 42 (4): 1-28.

Dechow, P., Sloan, R. and A. Sweeney. 1995. Detecting earnings management. *The Accounting Review* 70: 193–225.

Dechow, P., Ge, W. and C. Schrand. 2010. Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics* 50(2): 344-401.

Dedman, E. and A. Kausar. 2012. The impact of voluntary audit on credit ratings: evidence from UK private firms. *Accounting and Business Research* 42(4): 397-418.

Dedman, E., Kausar. A. and C. Lennox. 2014. The demand for audit in private firms: Recent large-sample evidence from the UK, *European Accounting Review* 23(1): 1-23.

DeFond, M.L. and C.W. Park. 2001. The reversal of abnormal accruals and the market valuation of earnings surprises. *The Accounting Review* 76(3): 375-404.

Desai, M., Dyck, I. and L. Zingales. 2007. Theft and taxes. *Journal of Financial Economics* 84: 591-623.

Eberhartinger, E., 1999. The impact of tax rules on financial reporting in Germany, France, and the UK. *The International Journal of Accounting* 34(1): 93-119.

EC. 2013a. Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, amending Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC.

EC. 2013b. A Recovery on the Horizon? Annual Report on European SMEs 2012/2013. Available at: http://ec.europa.eu/growth/smes/business-friendly-environment/performance-review/files/supporting-documents/2013/annual-report-smes-2013_en.pdf (Accessed March 21, 2016).

EC. 2016. Entrepreneurship and Small and medium-sized enterprises (SMEs). Available at: http://ec.europa.eu/growth/smes/index_en.htm (Accessed March 31, 2016).

Eierle, B., Ojala, H and E. Penttinen. 2014. XBRL to enhance external financial reporting: Should we implement or not? Case company X, *Journal of Accounting Education*, Special Issue on AIS Education 32(2): 160-170.

The Federation of Finnish Enterprises. 2015. *The small and medium-sized enterprise sector in a nutshell*. https://www.yrittajat.fi/sites/default/files/sy_yrittajyystilastot_2015_eng.pdf (Accessed on August 28, 2016).

Firth, D. 1993. Bias reduction of maximum likelihood estimates. *Biometrika* 80: 27–38

Fortin, S. and J.A. Pittman. 2007. The role of auditor choice in debt pricing in private firms. *Contemporary Accounting Research* 24(3): 859-96.

Francis, J.R. and J. Krihnan. 1999. Accounting accruals and auditor reporting conservatism. *Contemporary Accounting Research* 16(1): 135-165.

Graham, J. and L. Mills. 2008. Using tax return data to simulate corporate marginal tax rates. *Journal of Accounting and Economics* 46(2–3): 366–388.

Hanlon, M. and S. Heitzman. 2010. A review of tax research. *Journal of Accounting and Economics* 50: 127-178.

Hanlon, M., Hoopes, J.L. and N. Shroff. 2014. The effect of tax authority monitoring and enforcement on financial reporting quality. *The Journal of the American Taxation Association* 36(2): 137-170.

Heckman, J. J. 1979. Sample Selection as a Specification Error. *Econometrica* 47(1): 153–161.

Heinze G. and M. Schemper. 2002. A solution to the problem of separation in logistic regression. *Statistics in Medicine* 21: 2409–2419

Hoopes, J.L., Mescall, D. and J.A. Pittman. 2012. Do IRS audits deter corporate tax avoidance? *The Accounting Review* 87(5): 1603-1639.

Höglund, H. 2014. The impact of audit exemption on micro-firm earnings quality. Paper presented at the 37th Congress of the European Accounting Association. Tallinn, Estonia.

International Accounting Standards Board (IASB). 2014. *Presentation of Financial Statements,* International Accounting Standard 1 (Revised). London, UK: IFRS Foundation.

International Auditing and Assurance Standards Board (IAASB). 2015. *Forming an Opinion and Reporting on Financial Statements*, International Standard on Auditing (ISA) 700 (Revised). New York: IAASB.

Jensen, M. and W. Meckling. 1976. Theory of the firm: Managerial behavior, agency costs, and capital structure. *Journal of Financial Economics* 3: 1-27.

Jones, J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29(2): 193-228.

Kasanen, E., Kinnunen, J. and J. Niskanen. 1996. Dividend-based earnings management: Empirical evidence from Finland. *Journal of Accounting and Economics* 22: 283-312.

Khurana, I.K. and W.J. Moser. 2009. Institutional ownership and tax aggressiveness. Unpublished working paper (SSRN id=1464106).

Kim, J.-B., Chung, R and M. Firth. 2003. Auditor conservatism, asymmetric monitoring, and earnings management. *Contemporary Accounting Research* 20(2): 323-59.

Kothari, S.P., Leone, A.J. and C.E. Wasley. 2005. Performance matched discretionary accrual measures. *Journal of accounting and economics* 39(1): 163-197.

Larcker, D.F. and T.O. Rusticus. 2010. On the use of instrumental variables in accounting research. *Journal of Accounting and Economics* 49(3): 186-205.

Lennox, C.S., Francis, J.R. and Z. Wang. 2012. Selection models in accounting research. *The Accounting Review* 87(2): 589-616.

Lennox, C., Lisowsky, P. and J. Pittman. 2013. Tax Aggressiveness and Accounting Fraud. *Journal of Accounting Research* 51(4):739-778.

Lennox, C. and J. Pittman. 2011. Voluntary audits versus mandatory audits. *The Accounting Review* 86(5): 1655-1678.

Lisowsky, P. 2010. Seeking shelter: Empirically modeling tax shelters using financial statement information. *The Accounting Review* 85(5): 1693-1720.

Lo, A.K. 2014. Do Declines in Bank Health Affect Borrowers' Voluntary Disclosures? Evidence from International Propagation of Banking Shocks. *Journal of Accounting Research* 52(2): 541-581.

Mills, L.F. 1998. Book-tax differences and Internal Revenue Service adjustment. *Journal of Accounting Research* 36(2): 343-356.

Niemi, L., Kinnunen, J., Ojala, H. and P. Troberg. 2012. Drivers of voluntary audit in Finland: To be or not to be audited? *Accounting and Business Research* 42(2): 169-196.

Ojala, H., Collis, J., Kinnunen, J., Niemi, L. and P. Troberg. 2016. The Demand for Voluntary Audit in Micro-Companies: Evidence from Finland. *The International Journal of Auditing* 20: 267–277 .

Plesko, G.A., 2004. Corporate tax avoidance and the properties of corporate earnings. *National Tax Journal* 57(3): 729-737.

Scott, W.R. 2009. *Financial Accounting Theory*. 5th Edition. Pearson Prentice Hall. Toronto, Ontario.

Titman, S. and B. Trueman. 1986. Information quality and the valuation of new issues. *Journal of Accounting and Economics* 8, 159–172.

Tsipouridou, M. and C. Spathis. 2012. Earnings management and the role of auditors in an unusual IFRS context: The case of Greece. *Journal of International Accounting, Auditing and Taxation* 21: 62-78.

Figure 1. Summary of the hypothesized effects of voluntary audit on attracting tax adjustments

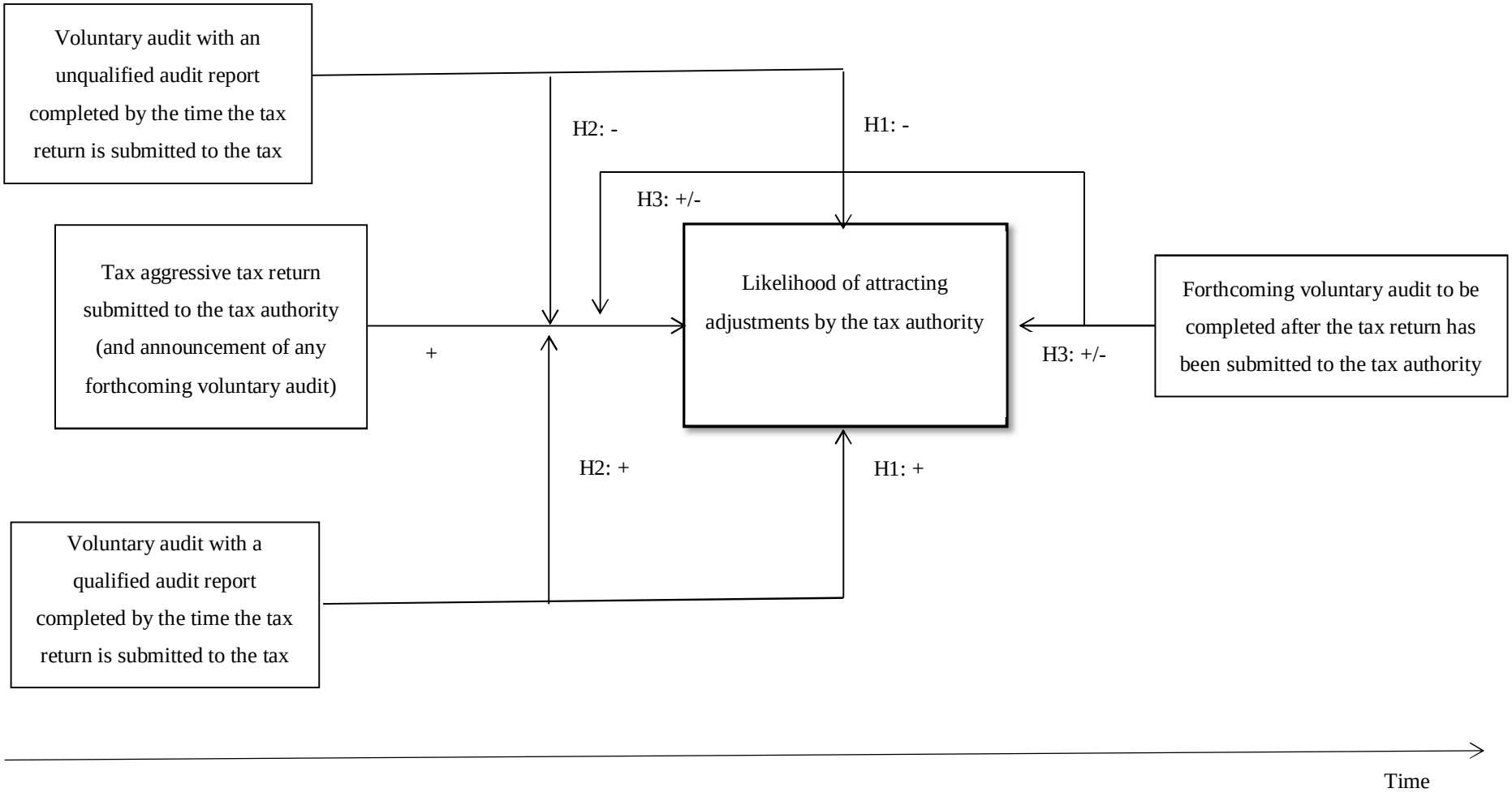

Table 1. Audit exemption thresholds in Finland and EU size thresholds

	Finnish maxima for audit exemption	EU maxima for defining a small company
Turnover	€0.2m	€8.0m
Balance sheet total	€0.1m	€4.0m
Average employees	3	50

Table 2. Sample companies

	Number of companies
Initial data from the tax authority	100,803
Companies with mandatory auditing removed	56,969
Companies with missing data for variables used in hypothesis testing removed	1,548
Companies with negative net income for the sample year removed	17,484
Final sample	24,802
of which: Companies with tax adjustments by the tax authority	$n^{tax\text{-}adjusted}$
Companies with no adjustments by the tax authority	24,802 - $n^{tax\text{-}adjusted}$

Our data, confidentially obtained from the Finnish Tax Administration, contained all Finnish limited liability companies that had a sales revenue not exceeding €10 million in 2011. The number of tax-adjusted firms is shown as $n^{tax\text{-}adjusted}$ in this table to preserve the confidentiality of the data, as agreed with the Finnish Tax Administration.

Table 3. Variables in the main logit model (equation 2)

Variable	Definition
TAXADJ	Binary variable coded 1 if the tax authority has made an adjustment to the taxable income reported by the firm in its tax return filed in 2011 for fiscal year 2010, and 0 otherwise.
AUDITUN	Binary variable coded 1 if the firm has had a voluntary audit accompanied by an unqualified audit opinion in 2011 for fiscal year 2010, and 0 otherwise.
AUDITQU	Binary variable coded 1 if the firm has had a voluntary audit accompanied by a qualified audit opinion in 2011 for fiscal year 2010, and 0 otherwise.
AUDITFO	Binary variable coded 1 if the firm informs of its forthcoming voluntary audit in its tax return in 2011 for fiscal year 2010, and 0 otherwise.
TAXAGGR	Measure of tax aggressiveness defined as (non-taxable revenues - non-tax deductible expenses as reported in the tax return)/ total revenues in 2010.
PAPERFILING	Binary variable coded 1 if the firm has opted for the submission of its tax return for 2010 in a paper format (instead of an electronic format) and 0 otherwise.
PETTYCASH	Binary variable coded 1 if the firm has cash on hand at the end of 2010 (rather than cash in bank), and 0 otherwise.
EARNMGT	Earnings management in 2010 measured by the Defond-Park (2001) model.
NEWFIRM	Binary variable coded 1 if the firm has been established after 2009, and 0 otherwise.
ROA	Return on assets defined by the sum of earnings before interest and taxes and salaries, divided by the total assets in 2010.
LEVERAGE	Total liabilities of the firm divided by its total assets in 2010.
LNSALES	Natural logarithm of sales revenue in 2010.
INVMILLS	Inverse Mills ratio from the first stage probit model for voluntary audit choice for fiscal year 2010 (equation 1).

Table 4. Descriptive statistics of the variables in the main logit model (equation 2)

	All firms			(1) Tax-adjusted firms			(2) Non tax-adjusted firms			(3) PSM non tax-adjusted firms			*t*-tests of subsample differences			
	n = 24,802			$n_1 = n^{tax\text{-}adjusted}$			$n_2 = 24{,}802 - n^{tax\text{-}adjusted}$			$n_3 = n^{tax\text{-}adjusted}$			*p*-values			
Variable	Mean	Med	Std.Dev.	Mean	Med	Std.Dev.	Mean	Med	Std.Dev.	Mean	Med	Std.Dev.	(1) versus (2)		(1) versus (3)	
AUDITUN	0.222	0.000	0.415	<0.222	0.000	0.364	>0.222	0.000	0.416	<0.222	0.000	0.364	0.001	***	<.001	****
AUDITQU	0.005	0.000	0.074	>0.005	0.000	0.121	<0.005	0.000	0.073	>0.005	0.000	0.121	0.153		0.101	
AUDITFO	0.213	0.000	0.409	>0.213	0.000	0.426	<0.213	0.000	0.409	>0.213	0.000	0.426	0.278		0.191	
TAXAGGR	0.008	0.000	0.209	>0.008	0.080	1.236	<0.008	0.000	0.146	>0.008	0.080	1.236	<.001	****	<.001	****
PAPERF.	0.406	0.000	0.491	>0.406	0.000	0.501	<0.406	0.000	0.491	>0.406	0.000	0.501	0.001	***	0.282	
PETTYC.	0.297	0.000	0.457	>0.297	0.000	0.471	<0.297	0.000	0.457	>0.297	0.000	0.471	0.165		0.183	
EARNMGT	0.497	0.000	0.500	>0.497	1.000	0.499	<0.497	0.000	0.500	>0.497	1.000	0.499	0.158		0.356	
NEWFIRM	0.036	0.000	0.187	>0.036	0.000	0.247	<0.036	0.000	0.186	>0.036	0.000	0.247	0.032	**	0.875	
ROA	0.754	0.415	1.017	<0.754	0.344	0.991	>0.754	0.416	1.018	<0.754	0.344	0.991	0.116		0.827	
LEVERAGE	0.571	0.391	0.691	<0.571	0.397	0.640	>0.571	0.391	0.692	<0.571	0.397	0.640	0.319		0.233	
LNSALES	10.350	10.71	1.375	<10.35	10.54	1.440	<10.35	10.71	1.374	<10.35	10.540	1.440	0.129		0.742	
INVMILLS	0.440	0.596	0.271	0.443	0.603	0.443	0.440	0.596	0.271	0.442	0.595	0.274	0.918		0.415	

For variable definitions, see Table 3. The last two columns show the *p*-values for the *t*-tests between the following samples: tax-adjusted (1) versus full sample of non-adjusted firms (2) and tax-adjusted (1) versus PSM-matched sample of non-adjusted firms (3). Before performing the *t*-tests, we examine the equality of variances and apply either Satterthwaite (unequal variances) or pooled (equal variances) t-tests. The number of tax-adjusted firms is shown as $n^{tax\text{-}adjusted}$ in this table to preserve the confidentiality of the data, as agreed with the Finnish Tax Administration. For the same reason, we are unable to report the precise mean values for the tax-adjusted and non tax-adjusted firms in columns (1), (2) and (3). Statistical (two-tailed) significance levels (*p*-values) better than 0.001, 0.010, 0.050, and 0.100 are indicated by ****, ***, **, and * respectively.

Table 5A. Correlation matrix of the variables in the main logit model (equation 2): Full sample (n = 24,802)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. TAXADJ	1.000	-0.018	0.015	0.007	0.169	0.022	0.009	0.009	0.018	-0.011	-0.008	-0.007	0.001
		0.004	0.020	0.278	<0.001	0.001	0.165	0.158	0.005	0.089	0.200	0.281	0.918
2. AUDITUN	-0.018	1.000	-0.040	-0.278	0.003	0.051	-0.014	0.009	0.005	-0.064	-0.093	0.034	0.346
	0.004		<0.001	<0.001	0.591	<0.001	0.028	0.137	0.430	<0.001	<0.001	<0.001	<0.001
3. AUDITQU	0.015	-0.040	1.000	-0.039	-0.002	0.008	-0.003	-0.003	0.015	0.022	0.049	0.014	0.044
	0.020	<0.001		<.001	0.786	0.236	0.651	0.650	0.021	0.001	<0.001	0.024	<.001
4. AUDITFO	0.007	-0.278	-0.039	1.000	0.001	-0.068	-0.011	-0.004	0.020	-0.026	0.058	0.045	0.307
	0.278	<0.001	<0.001		0.871	<0.001	0.076	0.486	0.001	<0.001	<0.001	<0.001	<0.001
5. TAXAGGR	0.207	0.043	-0.007	-0.021	1.000	0.096	0.016	0.027	-0.023	-0.211	-0.095	-0.271	0.008
	<0.001	<0.001	0.257	0.001		<0.001	0.014	<0.001	0.000	<0.001	<0.001	<0.001	0.207
6. PAPERFILING	0.022	0.051	0.008	-0.068	-0.007	1.000	0.068	0.023	-0.020	-0.103	-0.090	-0.121	-0.002
	0.001	<0.001	0.236	<0.001	0.244		<0.001	0.000	0.002	<0.001	<0.001	<0.001	0.778
7. PETTYCASH	0.009	-0.014	-0.003	-0.011	-0.007	0.068	1.000	-0.005	0.004	0.007	0.028	0.052	-0.008
	0.165	0.028	0.651	0.076	0.241	<0.001		0.391	0.518	0.266	<0.001	<0.001	0.185
8.EARNMGT	0.009	0.009	-0.003	-0.004	0.002	0.023	-0.005	1.000	0.195	-0.036	0.037	0.005	0.008
	0.158	0.137	0.650	0.486	0.801	0.000	0.391		<0.001	<0.001	<0.001	0.453	0.218
9. NEWFIRM	0.018	0.005	0.015	0.020	-0.002	-0.020	0.004	0.195	1.000	0.052	0.071	0.122	0.054
	0.005	0.430	0.021	0.001	0.713	0.002	0.518	<0.001		<0.001	<0.001	<0.001	<0.001
10. ROA	-0.010	-0.057	0.029	-0.017	-0.008	-0.067	-0.007	-0.045	0.037	1.000	0.143	0.482	-0.098
	0.116	<0.001	<0.001	0.009	0.186	<0.001	0.274	<0.001	<0.001		<0.001	<0.001	<0.001
11. LEVERAGE	-0.006	-0.083	0.076	0.054	-0.011	-0.053	0.019	0.017	0.028	0.255	1.000	0.191	-0.023
	0.319	<0.001	<0.001	<0.001	0.073	<0.001	0.003	0.008	<0.001	<0.001		<0.001	<0.001
12. LNSALES	-0.010	0.032	0.016	0.043	-0.060	-0.125	0.043	-0.001	0.148	0.264	0.025	1.000	0.122
	0.129	<0.001	0.010	<0.001	<0.001	<0.001	<0.001	0.896	<0.001	<0.001	0.000		<0.001
13. INVMILLS	0.001	0.346	0.044	0.307	0.008	-0.002	-0.008	0.008	0.054	-0.098	-0.023	0.122	1.000
	0.918	<0.001	<0.001	<0.001	0.207	0.778	0.185	0.218	<0.001	<0.001	0.000	<0.001	

For variable definitions, see Table 3. Pearson (Spearman) correlations are shown below (above) the diagonal.

Table 5B. Correlation matrix of the variables in the main logit model (equation 2): PSM sample ($n_1 + n_3 = 2\ n^{tax\text{-}adjusted}$)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. TAXADJ	1.000	-0.147	0.063	0.05	0.689	-0.041	0.051	0.036	0.006	-0.005	0.049	0.024	0.014
		<0.001	0.101	0.191	<0.001	0.282	0.183	0.356	0.875	0.904	0.205	0.535	0.714
2. AUDITUN	-0.147	1.000	-0.050	-0.277	-0.060	0.093	-0.025	0.028	-0.035	-0.061	-0.126	-0.036	0.270
	<0.001		0.195	<0.001	0.121	0.016	0.515	0.469	0.370	0.113	0.001	0.350	<0.001
3. AUDITQU	0.063	-0.050	1.000	-0.050	0.024	0.060	-0.029	0.091	0.040	0.075	0.031	0.006	0.027
	0.101	0.195		0.197	0.541	0.121	0.453	0.018	0.300	0.053	0.420	0.875	0.487
4. AUDITFO	0.050	-0.277	-0.050	1.000	0.052	-0.119	-0.023	-0.004	-0.034	0.024	0.065	0.119	0.322
	0.191	<0.001	0.197		0.174	0.002	0.555	0.912	0.382	0.528	0.091	0.002	<0.001
5. TAXAGGR	0.211	-0.010	-0.013	0.007	1.000	-0.035	0.057	0.044	-0.010	-0.112	-0.029	-0.183	-0.004
	<0.001	0.786	0.730	0.860		0.360	0.136	0.251	0.798	0.004	0.450	<0.001	0.912
6. PAPERFILING	-0.041	0.093	0.060	-0.119	-0.053	1.000	0.028	0.070	-0.052	-0.023	-0.100	-0.116	-0.075
	0.282	0.016	0.121	0.002	0.172		0.473	0.070	0.179	0.547	0.009	0.002	0.052
7. PETTYCASH	0.051	-0.025	-0.029	-0.023	-0.004	0.028	1.000	0.021	0.010	0.079	0.046	0.127	0.004
	0.183	0.515	0.453	0.555	0.923	0.473		0.582	0.793	0.040	0.232	0.001	0.920
8. EARNMGT	0.036	0.028	0.091	-0.004	0.025	0.070	0.021	1.000	0.252	-0.060	0.072	-0.031	0.014
	0.356	0.469	0.018	0.912	0.523	0.070	0.582		<0.001	0.121	0.061	0.416	0.710
9. NEWFIRM	0.006	-0.035	0.040	-0.034	-0.016	-0.052	0.010	0.252	1.000	0.010	0.103	0.082	-0.090
	0.875	0.370	0.300	0.382	0.678	0.179	0.793	<0.001		0.789	0.008	0.034	0.019
10. ROA	0.008	-0.042	0.037	0.018	0.019	0.005	0.061	-0.057	0.034	1.000	0.070	0.519	-0.060
	0.827	0.274	0.338	0.633	0.630	0.899	0.112	0.141	0.384		0.070	<0.001	0.120
11. LEVERAGE	0.046	-0.114	0.021	0.083	-0.006	-0.042	0.052	0.053	0.051	0.170	1.000	0.278	0.012
	0.233	0.003	0.580	0.031	0.877	0.277	0.174	0.173	0.189	<0.001		<0.001	0.756
12. LNSALES	0.013	-0.018	0.016	0.118	-0.216	-0.099	0.128	-0.027	0.066	0.305	0.103	1.000	0.290
	0.742	0.637	0.676	0.002	<0.001	0.010	0.001	0.488	0.089	<0.001	0.008		<.001
13. INVMILLS	-0.031	0.308	0.037	0.292	0.054	-0.035	-0.010	0.078	0.043	-0.049	-0.073	0.103	1.000
	0.415	<0.001	0.336	<0.001	0.161	0.362	0.789	0.042	0.260	0.199	0.057	0.007	

For variable definitions, see Table 3. Pearson (Spearman) correlations are shown below (above) the diagonal. The number of tax-adjusted firms is shown as $n^{tax\text{-}adjusted}$ in this table to preserve the confidentiality of the data, as agreed with the Finnish Tax Administration.

Table 6A. Estimation results of the main logit model (equation 2): Full sample (n = 24,802)

Dependent variable: Prob (*TAXADJ* = 1)

Independent variables:	Exp. Sign	Coeff.	*p*-value		Coeff.	*p*-value		Mean marginal effect	*p*-value	
INTERCEPT	+/-	-4.492	<0.001	****	<0.001	<0.001	***			
Test variables:										
AUDITUN	-	-0.398	0.024	**	-0.524	0.007	***			
AUDITQU	+	0.977	0.062		0.822	0.129				
AUDITFO	+/-	0.143	0.331		0.124	0.452				
*AUDITUN*TAXAGGR*	-	-1.712	0.010	**	-1.636	0.017	**	-0.036	0.002	***
*AUDITQU*TAXAGGR*	+	7.467	0.187		6.956	0.183		0.254	0.166	
*AUDITFO*TAXAGGR*	+/-	-2.624	<0.001	****	-2.788	<0.001	****	-0.027	0.043	**
Control variables:										
TAXAGGR	+	3.071	<0.001	****	6.545	<0.001	****			
PAPERFILING	+				0.535	<0.001	****			
PETTYCASH	+				0.219	0.083	*			
EARNMGT	+				0.067	0.583				
NEWFIRM	+				0.472	0.063	*			
ROA	-				-0.139	0.055	*			
LEVERAGE	+				0.029	0.761				
LNSALES	+				0.247	<0.001	****			
INVMILLS	+/-				0.022	0.930				
INDUSTRY FIXED EFFECTS					Incl.	Incl.				
Wald Chi-Square		376.9	<0.001	****	430.4	<0.001	****			
-2Loglikelihood		3,112.1			3,026.8					
Pseudo R^2		0.138			0.163					
Concordance index		0.809			0.818					

See Table 3 for definitions of the variables. Statistical (two-tail) significance levels (*p*-values) better than 0.001, 0.010, 0.050, and 0.100 are indicated by ****, ***, **, and * respectively.

Table 6B. Estimation results of the main logit model (equation 2): PSM sample ($n_1 + n_3 = 2\ n^{tax\text{-}adjusted}$)

Dependent variable: Prob (*TAXADJ* = 1)

Independent variables	Exp. sign	Coeff.	*p*-value		Coeff.	*p*-value		Mean marginal effect	*p*-value
INTERCEPT	+/-	-0.533	<0.001	****	-4.663	<0.001	****		
Test variables:									
AUDITUN	-	-0.747	0.004	***	-0.817	0.006	***		
AUDITQU	+	1.207	0.334		1.026	0.434			
AUDITFO	+/-	-0.037	0.882		-0.149	0.606			
*AUDITUN*TAXAGGR*	-	-9.202	0.022	***	-12.600	0.003	***	-0.217	0.028 **
*AUDITQU*TAXAGGR*	+	157.9	0.675		108.700	0.664		13.040	0.643
*AUDITFO*TAXAGGR*	+/-	0.270	0.966		-4.464	0.472		-0.660	0.603
Control variables:									
TAXAGGR	+	19.369	<0.001	****	23.392	<0.001	****		
PAPERFILING	+				0.074	0.711			
PETTYCASH	+				0.195	0.360			
EARNMGT	+				0.120	0.560			
NEWFIRM	+				-0.107	0.799			
ROA	-				-0.141	0.222			
LEVERAGE	+				0.286	0.081	*		
LNSALES	+				0.416	<0.001	****		
INVMILLS	+/-				0.131	0.757			
INDUSTRY FIXED EFFECTS						Incl.			
Wald Chi-Square		74.6	<0.001	****	98.9	<0.001	****		
-2Loglikelihood		688.5			642.8				
Pseudo R^2		0.410			0.470				
Concordance index		0.865			0.870				

See Table 3 for definitions of the variables. Statistical (two-tailed) significance levels (*p*-values) better than 0.001, 0.010, 0.050, and 0.100 are indicated by ****, ***, **, and * respectively. The number of tax-adjusted firms is shown as $n^{tax\text{-}adjusted}$ in this table to preserve the confidentiality of the data, as agreed with the Finnish Tax Administration.

Table 7. Estimation results of the main logit model (equation 2): Robustness tests for full sample (n = 24,802)

Dependent variable: Prob(*TAXADJ*=1)

		(1) *TAXAGGR* measured with book-tax difference from income statements [a)]			(2) Companies with non-calendar fiscal year excluded from the sample			(3) Loss-making companies included in the sample		
Independent variables:	Exp. sign	Coeff.	*p*-value		Coeff.	*p*-value		Coeff.	*p*-value	
INTERCEPT	+/-	-3.894	<0.001	****	-6.730	<0.001	****	-5.163	<0.001	****
Test Variables:										
AUDITUN	-	-0.505	0.003	***	-0.598	0.031	**	-0.168	0.183	
AUDITQU	+	0.998	0.041	**	0.771	0.341		0.400	0.318	
AUDITFO	+/-	0.041	0.782		-0.002	0.993		0.139	0.219	
*AUDITUN*TAXAGGR*	-	0.007	0.662		-1.224	0.149		-0.041	0.067	*
*AUDITQU*TAXAGGR*	+	-0.163	0.722		3.948	0.555		1.206	0.237	
*AUDITFO*TAXAGGR*	+/-	-0.050	0.569		-3.394	<0.001	****	-0.025	0.306	
Control variables:										
TAXAGGR	+	<.001	0.999		6.222	<0.001	****	0.110	<0.001	****
Other control variables			Included			Included			Included	
Wald Chi-Square		73.1	<0.001	****	262.4	<0.001	****	177.2	<0.001	****
-2Loglikelihood		3,498.8			1,706.9			5,949.3		
Pseudo R^2		0.023			0.177			0.036		
N		24,802			14,739			42,447		

[a)] *TAXAGGR* is the book-tax difference measured as follows: (Net income + tax expense – Tax expense/Statutory tax rate)/Total assets. The figures are taken from the company's publicly available income statement. For definitions of other variables, see Table 3. Statistical (two-tailed) significance levels (*p*-values) better than 0.001, 0.010, 0.050, and 0.100 are indicated by ****, ***, **, and * respectively.