1. Introduction

Tax reporting and financial statement preparation present considerable challenges for very small companies (VSCs) in Finland, particularly due to the dual obligations of accurate tax declarations and compliance with accounting standards. These firms, which are typically managed and owned by the same individuals, often lack the internal expertise necessary to navigate complex financial and tax reporting environments (Ojala et al., 2020). Consequently, they frequently outsource accounting and tax functions to external professionals to fulfil statutory requirements.

The stochastic model of tax evasion developed by Allingham and Sandmo (1972) and subsequently refined by Chen and Chu (2005) offers a useful theoretical lens through which to assess the behaviour of small business owners under conditions of uncertainty. These models posit that the decision to comply with tax obligations is influenced by a trade-off between the probability of detection, the severity of sanctions, and the taxpayer's risk preferences. In the Finnish context, where many VSCs are closely held and owner-managed, such models help to illuminate how control over financial reporting and bounded rationality may contribute to discrepancies between reported and final tax assessment.

A further dimension of complexity in reconciling financial statement tax expenses with final tax assessments lies in the role of cognitive biases and noise. The behavioural accounting literature identifies biases, such as overconfidence, anchoring, and confirmation bias, contributing to systematic errors in estimating tax liabilities (Bazerman & Moore, 2012; Libby & Rennekamp, 2012). Noise, referring to random variability in human judgment, exacerbates these discrepancies and undermines consistency in tax reporting (Kahneman, Sibony, & Sunstein, 2021). These issues are especially pronounced in very small companies (VSCs) due to typically weak internal control systems and the reliance on a limited number of individuals for key financial decisions (Hope et al., 2017; Minnis & Shroff, 2017). Such inconsistencies can lead to significant differences between the tax expenses recognized in financial statements and taxes ultimately determined by tax authorities.

Voluntary audits serve as an important governance mechanism for VSCs and can reduce these tax discrepancies. Empirical evidence suggests that the presence of an audit reduces the likelihood of upward tax return adjustments by tax authorities. Ojala, Kinnunen, Niemi, Troberg and Collis (2020) found that the absence of financial statement audits in small private companies is associated with a higher likelihood of tax return adjustments. Dong, Tylaite, and Wilson (2023) further confirm that voluntary audits effectively constrain corporate tax avoidance, thereby narrowing the gap between financial and tax reporting. These findings support the hypothesis that auditing is vital in enhancing transparency and compliance in firms where ownership and management are closely aligned.

In Finland, audit requirements are waived for companies that meet the specified thresholds in terms of turnover, balance sheet total, and number of employees, as defined in the Finnish Auditing Act (1141/2015). Nevertheless, many small firms voluntarily choose to be audited to mitigate risks related to tax compliance, financial credibility, and legal uncertainty (Ojala, Collis, Kinnunen, Niemi & Troberg, 2016; Collis, 2010). This decision often reflects the preferences of owner-managers for external validation and structured oversight of their financial practices, particularly given their limited expertise in accounting and taxation (Hope, Langli, & Thomas., 2017; Niem, Kinnunen, Ojala & Troberg, 2012). Voluntary audits may thus function as a substitute for weak internal controls and help small firms signal trustworthiness to external stakeholders, including tax authorities, creditors, and business partners.

The Finnish VSC sector provides a valuable context for studying the interplay between tax compliance, financial reporting, and auditing. The application of stochastic compliance models, insights from behavioural accounting, and empirical audit research highlights the multifaceted challenges faced by these entities. Future research could benefit from a deeper analysis of the role of voluntary audits and the behavioural characteristics of owner-managers in reducing discrepancies between reported and final tax assessment.

The primary aim of this study is to investigate whether micro-enterprises exempt from the statutory audit requirement exhibit lower accuracy in their corporate tax reporting compared to similar firms that have voluntarily appointed an auditor. By focusing on firms that operate below the audit threshold, this study aims to shed light on the role of voluntary audits in enhancing the reliability of tax disclosures. Specifically, we investigate whether the presence of a voluntary auditor is associated with a closer alignment between the taxes reported in financial statements and the final tax assessments. This approach enables us to evaluate the monitoring

function of voluntary audits in contexts where formal oversight mechanisms are absent or limited.

This study contributes to the literature on tax compliance and private firm auditing by introducing a novel empirical finding: the discrepancy between reported tax expenses and final tax assessments as a measure of tax reporting accuracy. While prior research has focused mainly on tax aggressiveness or earnings management as proxies for reporting quality (e.g., Dong et al., 2023; Downing & Langli, 2019), this study shifts attention to a more granular and administratively relevant outcome that reflects the precision of tax estimates in small firms. By doing so, it bridges the gap between behavioural insights on bounded rationality and institutional perspectives on audit effectiveness.

Moreover, the study extends existing voluntary audit literature by demonstrating that audit engagement is associated not only with improved transparency but also with a measurable reduction in tax-related errors. This complements previous findings that audits serve as a substitute for internal controls in small, owner-managed firms (Niemi et al., 2012; Collis, 2010), and it highlights the informational and corrective roles of audits in contexts where managerial expertise is limited, and regulatory oversight is minimal.

Following the introduction, the article is structured as follows. The second section develops a conceptual framework grounded in the Finnish tax and audit obligations. The third section reviews prior literature relevant to the topic. The fourth section presents the sample and outlines the empirical tests conducted. Finally, the fifth section concludes the article by discussing the key findings.

2. Institutional Settings for Audit and Tax Declaration in Finland

The regulatory framework for audit and tax reporting in Finland provides a structured yet research-friendly environment for analysing compliance behaviour among very small companies. According to the Finnish Accounting Act (1336/1997), all limited liability companies are required to prepare annual financial statements, irrespective of their size. These financial statements must include a balance sheet, an income statement, and supplementary notes and be prepared following the Finnish Accounting act and ordinance.

The Auditing Act (1141/2015) defines audit requirements in Finland. A statutory audit becomes mandatory for a limited liability company if, for two consecutive financial years, at least two of

the following thresholds are exceeded: (1) revenue exceeds EUR 200,000, (2) the balance sheet total exceeds EUR 100,000, or (3) the company has more than three employees. These national thresholds are significantly lower than the maximum limits allowed by the European Union, which currently stand at EUR 15 million in revenue, EUR 7.5 million in balance sheet total, and 50 employees. This divergence indicates a stricter approach in Finland toward audit requirements for smaller entities, which enhances the transparency and availability of financial data.

In terms of taxation, Finnish corporate tax declarations are primarily based on the results of statutory bookkeeping. The tax base is derived by adjusting the accounting profit for tax-exempt income and non-deductible expenses, as outlined in the Finnish Business Income Tax Act (360/1968). Given that the foundation of tax reporting lies in financial accounting, which must take into account the amount of income taxes payable for the financial period, and considering the relative simplicity of operations in many very small companies, tax discrepancies between reported and final tax assessment should be limited. This makes the Finnish setting particularly suitable for empirical research on tax compliance and audit effectiveness.

Although Finnish accounting legislation allows for the recognition of deferred tax assets and liabilities arising from temporary differences and tax loss carry forwards, small and micro-entities rarely apply deferred tax accounting in practice. Instead, tax expense recognition is confined to the actual or estimated taxes payable for the period, consistent with the cash basis of taxation. This deviation from accrual-based tax recognition is generally justified by the simplified accounting requirements applicable to small entities and the immateriality of temporary differences, leading to a de facto exclusion of deferred tax disclosures in their financial reporting (Nobes & Parker, 2020).

In instances where previously estimated tax provisions deviate from the final tax assessment, Finnish companies typically recognize the difference in the income statement of the subsequent financial year. Rather than restating prior-period financial statements, the adjustment is accounted for prospectively, in line with the prudence principle and prevailing national accounting practice. This treatment is facilitated by the structural delay in receiving the final tax decision. It is particularly common among smaller entities that do not apply IAS 8-style retrospective error correction unless the error is deemed material.

Furthermore, Finland's institutional infrastructure supports comprehensive access to financial and tax-related data. All limited liability companies are required to submit their official financial statements to the Finnish Trade Register, maintained by the Finnish Patent and Registration Office. These documents are publicly accessible, allowing researchers to obtain reliable and standardized financial information. Additionally, certain income taxation details concerning entities are public in Finland (The Act on the Publicity of Tax Information 1346/1999, Section 5(2)). Public information about an entity includes, among other things, the total amount of tax assessed to the entity. The Finnish Tax Administration publishes this data. This public tax information includes any changes made by the tax authority to the entity's taxation after the tax return was filed, as part of the so-called *risk-based tax return control*. These interventions are limited to corrections and adjustments that can be made within a limited time frame and are primarily based on the information provided in the tax return. The entity has four months to file a tax return from the end of the month in which the financial year ends (Tax Administration decision on filing a tax return and real estate information report, 11.12.2024, Section 11). The taxation of an entity shall be completed no later than ten months after the end of the last calendar month of the financial period (Act on Assessment Procedure, 1558/1995, Section 49(5)). Thus, the tax return control period is very short. Tax return control does not include adjustments resulting from full-scale tax audits or cases requiring extensive investigation, which fall under separate procedural frameworks.

These institutional characteristics—mandatory financial statement submission, relatively low audit thresholds, public availability of financial and tax data, and a tax system closely tied to accounting results—collectively provide a robust and transparent setting for investigating the determinants and consequences of financial reporting and tax compliance in very small firms. They enable researchers to focus on discrepancies between the income tax expense reported in financial statements and the final tax assessment, which we refer to as a tax reporting deviation. This tax reporting deviation can be conceptualized as a form of accrual difference, reflecting a misalignment in timing, estimation, or recognition between accounting-based tax and final tax assessment. Such deviations may arise from two primary sources: intentional managerial biases, such as strategic under- or overreporting of tax liabilities, and unintentional but systematic errors related to estimation uncertainty, limited accounting or tax expertise, or weaknesses in internal processes. Our analysis concentrates on the nature and magnitude of these deviations, with a particular interest in whether the presence of a voluntary audit is associated with reduced deviations and, by extension, improved accuracy in tax reporting.

3. Prior literature

Recent research has examined the relationship between voluntary audits and corporate tax aggressiveness, yielding mixed but informative findings. Dong et al. (2023) find that voluntary audits are negatively associated with aggressive tax strategies, suggesting that the presence of an auditor, even in the absence of a statutory requirement, can constrain managerial discretion in tax reporting. Their findings support the monitoring hypothesis, which posits that external assurance mechanisms enhance the credibility of financial and tax disclosures by imposing discipline on preparers. Similarly, Ojala et al. (2020) report that Finnish private firms with voluntary audits exhibit less tax aggressiveness, particularly in settings characterized by weaker internal controls or low external visibility, implying that audits act as a substitute for other governance mechanisms.

Downing and Langli (2019) further contribute to the literature by highlighting how audit quality and incentives may influence the degree to which voluntary audits constrain tax aggressiveness. In the Norwegian context, they find that private firms with voluntary audits report less aggressive tax positions, especially when the auditors involved have more substantial reputational incentives. These findings highlight the significance of institutional context and auditor incentives in determining the effectiveness of voluntary audits as a governance tool. Collectively, these studies suggest that voluntary audits can serve as a deterrent to tax avoidance behaviour, although the strength of this effect may depend on firm- and auditor-specific factors.

The link between tax filings and financial statements is particularly significant in countries where financial and tax accounting are closely aligned, such as Germany, Belgium, and France (Nobes & Schwenke, 2006; Van Tendeloo & Vanstraelen, 2008; Downing & Langli, 2019). In these contexts, audits can serve as an indirect verification tool for tax authorities. Even in low-alignment countries like the UK and the Netherlands, auditors still review tax-related elements such as tax expenses and deferred taxes, which require scrutiny of taxable income and temporary differences. Therefore, audits act as a form of third-party assurance of the accuracy of firms' tax reports (Downing & Langli, 2019).

Audit exemptions may undermine compliance in two primary ways. First, without the expectation of an audit, firms may have less incentive to maintain well-documented and organized accounting systems, which are essential for facilitating efficient audits. Audited firms are motivated to ensure that they have effective internal controls and documentation to avoid

additional audit costs or adverse audit opinions (ISA 705). Second, auditors often provide valuable guidance on accounting and tax matters, especially to small firms that lack in-house expertise (Gooderham et al., 2004; Barbera & Hasso, 2013; Downing & Langli, 2019). Without an auditor, firms opting out of audits may lose access to this crucial advice, potentially leading to reduced compliance with regulatory requirements.

Differences between accounting profit and the tax expense reported in the financial statements, compared to the final tax assessment, may arise from various factors. Ojala et al. (2020) categorize these discrepancies into two main types: systematic, intentional biases and unintentional differences caused by random variation, referred to as noise. This classification provides a framework for distinguishing between deliberate attempts to manipulate reported taxes and incidental, non-purposeful deviations resulting from estimation uncertainty or administrative errors.

Specifically, Ojala et al. (2020) test bias and noise distinction by using a stochastic model. Bias is the intentional part, where firms underreport taxable income on purpose, and is modelled as a fixed, nonnegative value BIAS. Noise refers to unintentional mistakes and is modelled as a random variable $NOISE = N(0, \sigma^2)$ with zero mean and constant variance. The model defines "true" taxable income as being the sum of taxable net income reported in tax return, BIAS, and NOISE. Ojala et al. use this setup to model the probability that a tax authority will adjust reported income using confidential tax return data from approximately 19,500 small private companies in Finland. They show that voluntary audits reduce both bias and noise: audits discourage intentional misreporting and help detect random errors, which lowers the likelihood of adjustment.

A further distinction made by Ojala et al. (2020) is the likelihood that systematic biases are more easily detected by external actors, such as auditors and tax authorities, compared to unintentional errors. This is because auditors and tax inspectors can apply their professional judgment and experience to identify patterns of non-compliance or inconsistencies that suggest intentional misreporting. In contrast, random noise lacks systematic patterns and may, therefore, go unnoticed or be more challenging to detect and correct through external oversight.

This approach differs from the model proposed by Chen and Chun (2005), who extended the foundational framework of Allingham and Sandmo (1972) on tax compliance. Chen and Chun incorporated the corporate perspective into the model, suggesting that firms, like individuals,

may underreport income to avoid taxation, especially when the perceived risk of detection is low. Their model emphasizes the strategic behaviour of taxpayers in response to enforcement mechanisms and perceived tax audit probabilities.

Although auditing is voluntary for micro and small companies in many countries, including Finland, provided they fall below specific statutory thresholds (Niemi et al., 2012), a considerable number of these firms nonetheless choose to appoint an auditor. This phenomenon has attracted growing interest in both audit research and corporate governance literature. The key question is why firms voluntarily engage in a potentially costly assurance process in the absence of a legal requirement (Collis, 2010; Dedman, Kausar, & Lennoz, 2014; Hope et al., 2012).

One of the most commonly cited explanations relates to the expectations of external stakeholders, particularly creditors and authorities. Studies have shown that banks often require audited financial statements as a prerequisite for lending or as part of risk management processes (Blackwell, Noland & Winters, 1998; Minnis, 2011). An audited financial statement serves as a signal that the firm's financial information has been verified by an independent expert, thereby reducing information asymmetry and uncertainty. Using an auditor may lower the firm's cost of capital or improve access to financing, particularly for companies with limited credit history.

A second important motivation concerns the pursuit of legitimacy. Voluntary auditing can be viewed as part of a broader strategy for managing legitimacy (Suchman, 1995; Deegan, 2002). An audit enhances the firm's credibility in the eyes of public authorities, such as the tax administration. For example, in Finland, corporate tax return must provide information on whether an audit has been conducted and whether the auditor’s report includes any disapproving statements or remarks as referred to in Chapter 3, Section 5 of the Auditing Act, or information on whether an auditor has not been appointed based on the voluntary provision in Chapter 2, Section 2 of the Auditing Act (Decision of the Finnish Tax Administration on the obligation to report and keep records, 30 December 2016, Section 18, Point 17). Voluntary audit may reduce the likelihood of a tax audit or mitigate the scrutiny applied to reporting decisions (Hope et al., 2012). This proactive behaviour can be particularly relevant for microenterprises, where ownership and management overlap and where the transparency of accounting and taxation may be perceived as weaker.

A third perspective involves internal control and management support. Although small businesses typically lack formal governance structures, auditing has been found to support owners and managers by providing an independent evaluation of the firm's financial condition (Collis, 2010). Especially when there are multiple owners, or when business operations become more complex, an audit may function as a governance tool that helps prevent fraud or accounting errors.

In addition, industry-specific practices and institutional norms may influence the decision to appoint an auditor. In some sectors, audited financial statements may be a prerequisite for participating in public procurement processes or for establishing trust with business partners. In such cases, the decision may not be based solely on the firm's internal evaluation but rather on institutional expectations and prevailing business conventions (DiMaggio & Powell, 1983).

Empirical evidence supports these perspectives. For instance, Collis (2012) found that British small companies frequently choose voluntary audits in response to expectations from lenders or the tax authority. Similarly, Hope et al. (2012) showed that the use of audits is more common among privately held firms where ownership and management are separated or where accurate tax reporting is a primary concern for external monitors.

Voluntary audits may also serve as a substitute for internal expertise in micro-enterprises where the management or owners lack sufficient knowledge in complex accounting and tax matters. Many micro-entrepreneurs lack formal training in financial reporting and taxation and may feel uncertain about issues such as financial statement preparation, revenue recognition, or the application of tax rules (Collis, 2012; Niemi et al., 2012). In such cases, appointing an auditor reflects the need for independent expertise that adds value through both assurance and informal guidance. Although auditors are not advisors per se, the interaction involved in the audit process often facilitates informal control and learning (Sundgren & Svanström, 2013).

Prior studies have shown that, especially in owner-managed small firms, auditors are perceived as a valuable resource that reduces information uncertainty, supports decision-making, and ensures legal compliance (Dedman et al., 2014). In this sense, voluntary auditing is not merely a control mechanism aimed at external audiences. However, it may also represent an internally motivated decision to strengthen the quality of financial reporting and enhance managerial confidence. This perspective is particularly relevant in contexts where accounting functions are outsourced or performed by a single bookkeeper, and the firm lacks internal expertise to assess

the quality of reporting. In such cases, the auditor may also be an indirect guarantor of accounting quality (Svanström, 2013).

Building on this prior literature, our study investigates a more granular dimension of tax reporting quality: the degree of alignment between companies' reported taxes and the final tax assessments. Specifically, we examine whether voluntary audits are associated with a smaller discrepancy between reported taxes and final tax assessment. This serves as a signal of more accurate and compliant tax reporting. It adopts a dual-error framework, distinguishing between deliberate misreporting (bias) and unintentional inaccuracies (noise). This perspective highlights the importance of understanding the motivations driving tax reporting and the capabilities of institutions, such as auditors and tax authorities, to identify and address various reporting errors. By focusing on this novel outcome variable, we aim to contribute to the literature by offering evidence on whether voluntary audits enhance the transparency and accuracy of corporate tax disclosures in a low-enforcement environment.

RQ: *What kind of relationship exists between voluntary audit and income tax accuracy?*

4. Sample

Our sample consists of Finnish companies that are subject to voluntary auditing. According to the Finnish Auditing Act (1141/2015), Section 2 on Audit Obligation: "Unless otherwise provided in any other act, there is no obligation to appoint an auditor for a corporation where no more than one of the following conditions were met in both the last complete financial year and the financial year immediately preceding it:

1. The balance sheet total exceeds EUR 100,000;
2. The net sales or comparable revenue exceed EUR 200,000;
3. The average number of employees exceeds three."

Due to the unreliability of employment data in our sources, we limit our analysis to the first two criteria: balance sheet total and revenue.

To better support our research question, which examines the relationship between voluntary audits and accrual errors, we further exclude firm-year observations where either the balance sheet total or revenue exceeds EUR 500,000. This restriction helps ensure the sample consists of genuinely small firms, which are the most relevant for studying voluntary audit behaviour. It

also reduces the influence of firms with unusual financial structures or reporting practices that may not reflect the characteristics of typical small businesses, thereby improving the comparability and reliability of the analysis.

We also omit companies operating in the finance and insurance sector, as classified by the NACE Rev. 2 section. Information on industry classification is obtained from Orbis.

Financial statement data are obtained from Suomen Asiakastieto Oy, which maintains a company financial database based on official filings in Finland. The data on audit status also come from Suomen Asiakastieto Oy. Corporate income tax data are collected from the Finnish Tax Administration's open dataset on corporate taxation. The data covers fiscal years 2014 to 2021.

Variables and Summary Statistics

To model accrual error, we first construct a binary variable that captures discrepancies between the taxes reported in accounting records and the final tax assessment for a given fiscal year. Specifically, we define the dependent variable $D_{i,t}$ which takes the value 1 if there is a discrepancy between these two figures, and 0 otherwise.

To ensure that the observed discrepancy is not solely due to measurement differences between data sources and that it carries economic significance, we apply both an absolute and a relative threshold. The discrepancy can be in either direction (positive or negative). The relative difference is defined as:

$$\frac{\text{Taxes reported in accounting} - \text{Final tax assessment}}{\text{Final taxable income}}$$

In our main regressions, we set the threshold for at an absolute difference greater than 250 euros and a relative difference greater than 2 percent, also in absolute value. In the appendix, we report results using alternative thresholds, ranging from 1 to 3 percent and from 100 to 1000 euros for robustness checks.

As explanatory variables, we include a dummy variable $V_{i,t}$ that equals 1 if the firm has undergone a voluntary audit and 0 otherwise. We also control for firm size $ln(rev)_{i,t}$ (natural logarithm of revenue), investment activity proxied by $invest_{i,t}$ which is calculated as the

change in tangible assets from year t-1 to t, scaled by total assets at t−1, a loan dummy $d_{loan\ i,t}$ equal to 1 if the firm has loans from financial institutions, and an interaction term between the loan dummy and gearing $gearing_{i,t}$. Gearing is defined as the ratio of loans from financial institutions to total assets. Ratios outside the interval [0,1] are omitted. Additionally, we include year and industry fixed effects.

Figure 1

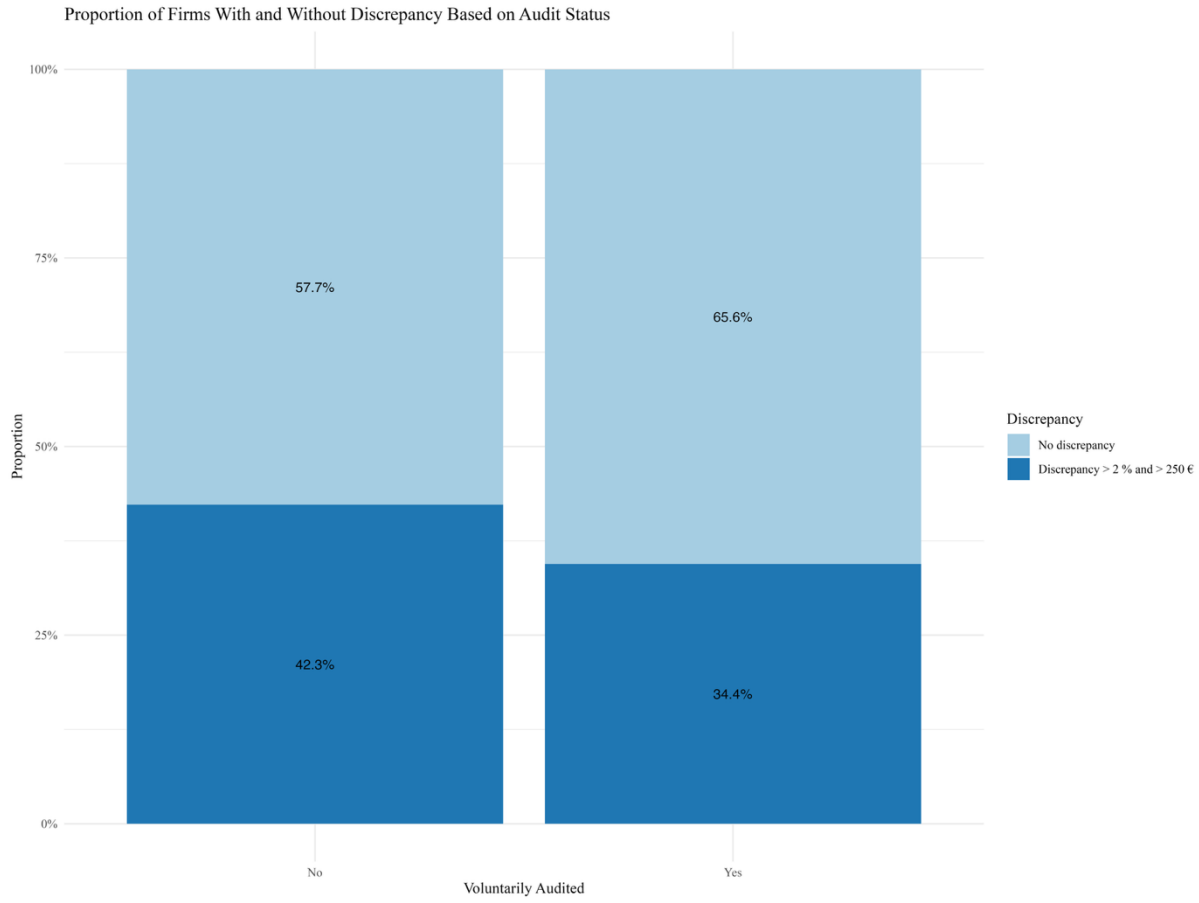

Figure 1 shows the proportion of firms with and without a discrepancy, grouped by voluntary audit status. Among voluntarily audited firms, the share with a discrepancy is around 7.9 percentage points lower than among non-audited firms. This suggests that discrepancies are less frequently observed among audited firms, indicating that auditing is associated with a lower likelihood of differences between accounting and tax records.

Figure 2 presents the proportion of firms with and without a discrepancy across NACE industry sections, separately for audited and non-audited firms. In nearly all industries, the share of firms with a discrepancy is lower among those that have undergone a voluntary audit. The only

exception is Section B (Mining and Quarrying), where the discrepancy rate is slightly higher for audited firms, but the difference is marginal and the number of observations in this category is small (354). Sections O, T, and U were omitted from this analysis due to very limited sample sizes. Overall, the pattern suggests that discrepancies are less common among audited firms across industries.

Figure 2

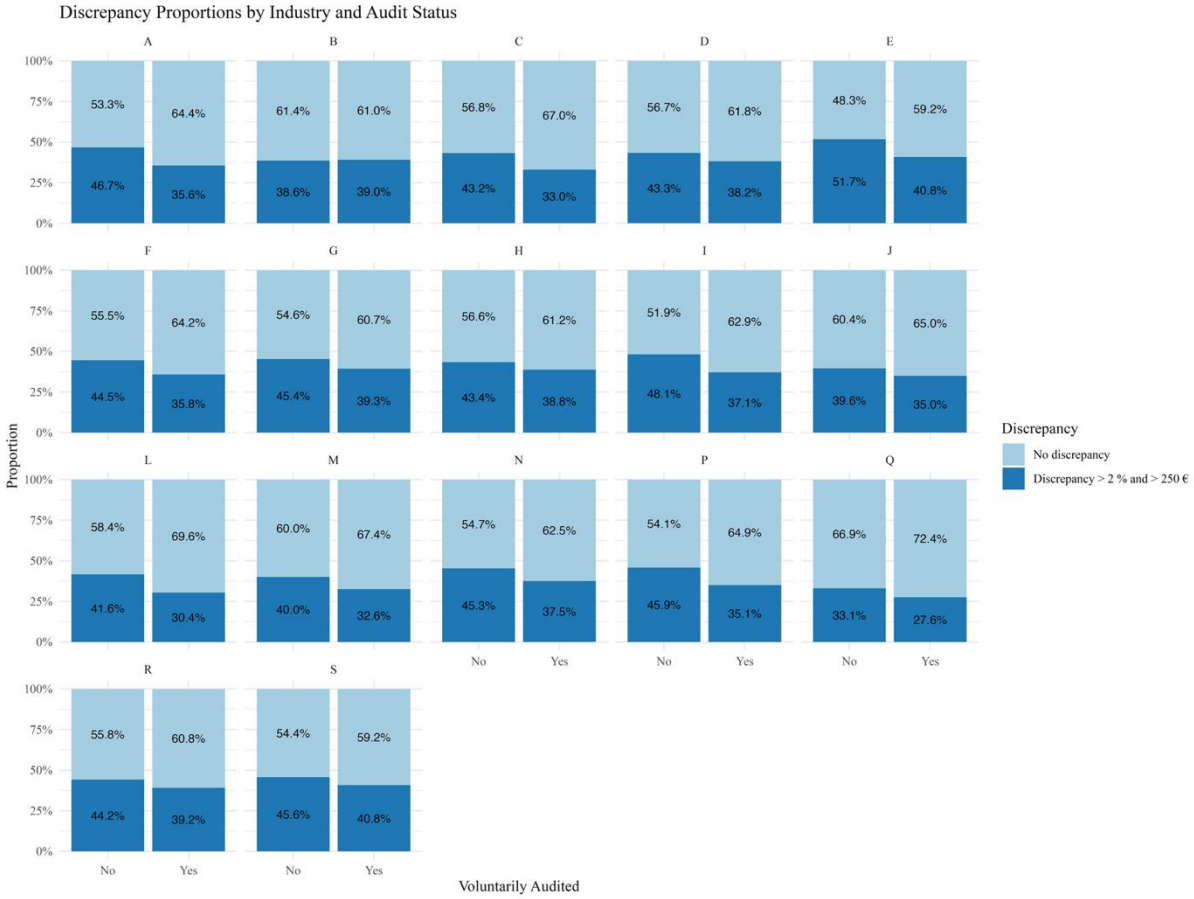

Table 1

Descriptive Statistics
Panel A shows the number of firm-year observations by year. Panel B shows the distribution by NACE industry. Panel C reports mean, median, and standard deviation of key variables. Panel D presents their pairwise correlation matrix.

Panel A: Observations per Year	
Year	N
2014	20,241
2015	21,443
2016	19,272
2017	19,268
2018	20,526
2019	21,923
2020	22,668
2021	14,926
Total:	**160,367**

Panel B: Observations per Industry			
Industry	N	Industry	N
A	2,587	L	17,979
B	354	M	39,163
C	8,797	N	8,147
D	300	O	35
E	589	P	2,679
F	22,943	Q	9,497
G	17,407	R	4,023
H	7,713	S	3,254
I	4,644	T	1

		J	10,247	U	8		

Panel C: Summary Statistics

	Mean	Median	Std. Dev
$V_{i,t}$	0.176	0.000	0.381
$\ln(rev)_{i,t}$	11.310	11.533	1.055
$invest_{i,t}$	0.052	0.000	2.077
$d_{loan\ i,t}$	0.240	0.000	0.427
$gearing_{i,t}$	0.067	0.000	0.159

Panel D: Correlation Matrix

	$V_{i,t}$	$\ln(rev)_{i,t}$	$invest_{i,t}$	$d_{loan\ i,t}$	$gearing_{i,t}$
$V_{i,t}$	1.000				
$\ln(rev)_{i,t}$	0.133	1.000			
$invest_{i,t}$	-0.006	0.002	1.000		
$d_{loan\ i,t}$	0.018	0.103	0.014	1.000	
$gearing_{i,t}$	-0.004	0.024	0.020	0.752	1.000

Table 1 provides descriptive information about the sample. Panel A shows the distribution of firm-year observations by year. The number of observations remains relatively stable between 2014 and 2020, with annual counts ranging from approximately 19,000 to 22,000. In 2021, the number drops to around 15,000. Panel B presents the distribution of observations by NACE Rev. 2 section. The largest industries in the sample are Section M (Professional, Scientific and Technical Activities), Section F (Construction), and Section L (Real Estate Activities), followed by G (Wholesale and Retail Trade) and Q (Human Health and Social Work Activities). Panel C provides information about the mean, median and standard deviation for each explanatory variable and Panel D shows the correlation matrix for these variables.

Model Specification

We estimate a series of binary outcome models using a generalized linear model (GLM) with a logit link function and binomial distribution, incorporating firm-level clustered standard errors and high-dimensional fixed effects. The expected value of the binary outcome variable $D_{i,t}$, conditional on the covariates and fixed effects, is modelled as (1):

$$\mathbb{E}[D_{i,t} \mid X_{i,t}, \alpha_i, \gamma_t] = \frac{1}{1 + e^{-(X'_{i,t}\beta + \alpha_i + \gamma_t)}} \quad (1)$$

where: $X_{i,t}$ is the matrix of explanatory variables, including the voluntary audit treatment variable, firm size, investment proxy, loan dummy and its interaction with gearing. β is the vector of coefficients, α_i captures industry-level unobserved heterogeneity (if included), γ_t captures year fixed effects (if included).

Estimation is conducted via maximum likelihood, and standard errors are clustered at the firm level to account for within-firm correlation. All coefficients are reported as odds ratios $e^{\widehat{\beta}_j}$. An odds ratio above (below) 1 indicates a positive (negative) association with the probability of $D_{i,t} = 1$ conditional on the included covariates and fixed effects.

Table 2 reports the results of different model specifications. We estimate six versions of the binary response model to examine the robustness of the results across alternative specifications. All models are estimated via maximum likelihood using a logit link function, and standard errors are clustered at the firm level (in parentheses). Reported coefficients are presented as odds ratios, with 95% confidence intervals shown in brackets.

Column (1) presents a baseline specification including only the treatment variable, with no fixed effects or additional controls. Column (2) extends this by adding year and industry fixed effects to control for time-specific shocks and sector-level heterogeneity. Column (3) builds on column (2) by introducing a control for firm size (natural logarithm of revenue). Column (4) adds year and industry fixed effects to the specification in column (3).

Table 2

Logistic regression results. The dependent variable is the discrepancy indicator $D_{i,t}$.

	(1)	(2)	(3)	(4)	(5)	(6)
$V_{i,t}$	0.717***	0.710***	0.664***	0.663***	0.776***	0.787***
	(0.011)	(0.011)	(0.015)	(0.015)	(0.012)	(0.012)
	[0.696, 0.739]	[0.689, 0.732]	[0.636, 0.693]	[0.635, 0.692]	[0.752, 0.800]	[0.763, 0.812]
$\ln(rev)_{i,t}$			0.985*	0.973***	0.799***	0.772***
			(0.008)	(0.008)	(0.005)	(0.005)
			[0.971, 1.001]	[0.958, 0.988]	[0.790, 0.808]	[0.762, 0.781]
$invest_{i,t}$					1.004	1.003
					(0.002)	(0.002)
					[0.999, 1.009]	[0.999, 1.008]
$d_{loan\ i,t}$					1.058***	1.022
					(0.022)	(0.021)
					[1.017, 1.102]	[0.981, 1.063]
$d_{loan\ i,t} \times gearing_{i,t}$					1.408***	1.549***
					(0.075)	(0.084)
					[1.268, 1.563]	[1.393, 1.722]
Year Fixed Effects		X		X		X
Industry Fixed Effects		X		X		X
N	160,367	160,366	160,367	160,366	160,367	160,366

* p < 0.1, ** p < 0.05, *** p < 0.01

Column (5) introduces a richer specification, which includes the treatment variable, firm size, investment activity proxy, a loan status indicator, and an interaction between loan status and gearing. Finally, column (6) adds year and industry fixed effects to the model in column (5), allowing the interaction effect to be interpreted net of temporal and sectoral heterogeneity.

Across all specifications, the odds ratio for the voluntary audit indicator is consistently below one and statistically significant at the one percent level. This indicates a robust negative association with the odds of a discrepancy. In column 1, the odds ratio is 0.717, which implies that the odds of a tax discrepancy are 28.3 percent lower for voluntarily audited firms compared to firms that are not voluntarily audited. This effect remains stable in magnitude and significance across all specifications. In column 2, which adds year and industry fixed effects, the odds ratio remains nearly unchanged at 0.710. The inclusion of firm size in column 3 slightly strengthens the estimated association, with an odds ratio of 0.664. Column 4 adds year and industry fixed effects to the same specification, and the odds ratio changes only by 0.001 to 0.663, confirming the robustness of the finding.

Columns 5 and 6 introduce additional financial variables. These include investment activity proxy, a dummy for having loans from financial institutions and an interaction term between this dummy and the firm's gearing ratio. The voluntary audit variable continues to show a strong negative association with the odds of a discrepancy in these specifications as well, with odds ratios of 0.776 in column 5 and 0.787 in column 6.

Firm size is included in columns 3 through 6 and is also negatively associated with the odds of discrepancies. In column 6, for example, the odds ratio is 0.772, which means that firms with higher revenue have lower odds of having a discrepancy.

The interaction between the loan dummy and gearing shows odds ratios of 1.408 in column 5 and 1.549 in column 6. These are both statistically significant. Because gearing ranges from zero to one, the odds ratio on the interaction term indicates how much the effect of having a loan increase with the level of gearing. For a firm that has a loan and is fully financed by debt, meaning gearing equals one, the odds of a discrepancy are approximately 41 to 55 percent higher than for a firm with a loan but effectively no gearing.

In contrast, the main effect of the loan dummy captures the effect of having a loan when gearing is equal to zero. This reflects firms that have loans but minimal financial leverage. The odds ratios for this effect are 1.058 in column 5 and 1.021 in column 6. The effect is statistically significant only in column 5 and becomes insignificant once fixed effects are added in column 6. This

suggests that most of the increased risk of discrepancies associated with loans arises in firms with higher levels of gearing.

The effect of investment activity proxied by $invest_{i,t}$ is not statistically significant in any specification.

In conclusion, the results show a consistent and economically meaningful association between voluntary audits and lower odds of tax discrepancies. This association holds across multiple model specifications, including those that account for firm size, financial structure, and unobserved heterogeneity across time and industry. The findings support the interpretation that voluntary auditing is associated with improved accuracy or compliance in the financial reporting of small firms.

We report results for column (6) specification with alternative thresholds for $D_{i,t}$ in Table 4 that can be found in the Appendix. $V_{i,t}$ remains significant at the 1 % level in all regressions, ranging from 0.633 to 0.856. Other explanatory variables do not show stable significance.

Mediation analysis

To deepen our understanding of the mechanism through which voluntary audits may reduce tax-reporting discrepancies, we examine whether discretionary accruals mediate this relationship. Specifically, we use the discretionary accruals measure $DACC_{i,t}$, adapted from DeFond and Park (2001), as the potential mediator. We define $DACC_{i,t}$ as (2):

$$\mathrm{DACC}_{i,t} = \frac{\mathrm{NWC}_{i,t} - \Delta\mathrm{Sales}_{i,t}^{\mathrm{cash}} \cdot \mathrm{NWC}_{i,t-1}}{\mathrm{Total\ Assets}_{i,t-1}} \qquad (2)$$

where $NWC_{i,t}$ is net working capital in year t for firm i, $\Delta Sales_{i,t}^{cash}$ represents the cash flow based change in sales between year t and t−1 for firm i, and $Total\ Assets_{t-1}$ total assets at t−1 for firm i are used to scale the accrual component.

We are interested in whether this discretionary accrual measure mediates the relationship between voluntary auditing and tax-reporting discrepancies. Evidence of mediation would support the interpretation that voluntary audits constrain earnings management. Conversely, if no significant mediation effect is found, it would suggest that audits primarily function to reduce noise in

financial reporting rather than bias, aligning with the argument by Ojala et al. (2020) that smaller firms may seek assurance to improve accuracy, not necessarily to limit opportunistic reporting.

To assess whether discretionary accruals explain part of the relationship between voluntary auditing and tax-reporting discrepancies, we conduct a causal mediation analysis. While the concept of mediation originates with Baron and Kenny (1986), we rely on the framework by Imai et al. (2010), which extends mediation analysis to nonlinear models.

We first estimate a linear regression model where discretionary accruals ($DACC_{i,t}$) are regressed on the voluntary audit indicator and relevant controls including firm size, proxy for investment activity, loan status, the interaction between loan status and gearing, and fixed effects for fiscal year and industry. We then estimate a logistic regression model for the discrepancy indicator using the same covariates, adding both the audit indicator and the mediator. These models are used to estimate the average direct effect (ADE), average causal mediation effect (ACME), and total effect. Effects are interpreted on the probability scale, and inference is conducted using the mediate() function from the R package mediation (Tingley et al., 2014) with nonparametric bootstrapping and a random subsample of 10,000 firm-year observations.

Table 3

Mediation analysis results using discretionary accruals variable $DACC_{i,t}$ as a mediator. Estimates are presented for the average causal mediation effect (ACME), average direct effect (ADE), total effect, and the proportion of the total effect mediated (Prop. Mediated), along with 95% confidence intervals and p-values.

Effect	Estimate	95 % CI Lower Bound	95 % CI Upper Bound	p-value
ACME	-0.001	-0.004	0.000	0.156
ADE	-0.067	-0.095	-0.041	0.000
Total Effect	-0.068	-0.096	-0.042	0.000
Prop. Mediated	0.016	-0.002	0.055	0.156

The mediation analysis results reported in Table 3 show that the average causal mediation effect (ACME) of discretionary accruals is statistically insignificant (ACME = −0.001, p-value = 0.156), suggesting that discretionary accruals do not explain the relationship between voluntary audits and tax-reporting discrepancies. In contrast, the average direct effect (ADE) remains significant

and negative (ADE = −0.067, p-value < 0.001), indicating that voluntary auditing is directly associated with a 6.7 percentage point reduction in the probability of a tax-reporting discrepancy, even after accounting for potential mediation via accrual discretion. The total effect is similar in magnitude and direction (−0.068, p-value < 0.001), and the proportion mediated is small and statistically indistinguishable from zero (1.6%, p-value = 0.156).

These results suggest that the observed tax-reporting discrepancy reduction linked to voluntary audits is not primarily driven by a reduction in opportunistic accrual behaviour. Instead, they are more consistent with the interpretation that audits function to reduce noise, that is, unintentional reporting errors or inconsistencies.

5. Conclusion

This study examined whether voluntary audits among Finnish micro-enterprises are associated with greater accuracy in corporate tax reporting. Specifically, we focused on the discrepancy between tax expense amounts reported in financial statements and the final tax assessment. By leveraging detailed firm-level data from both financial statements and tax records over the period 2014–2021, we found robust evidence that voluntary audits are significantly associated with a reduced likelihood of tax reporting discrepancies. This association remained consistent across multiple model specifications and robustness checks.

The results align with the theoretical expectations derived from the stochastic tax compliance models (Allingham & Sandmo, 1972; Chen & Chu, 2005) and behavioural theories of decision-making under uncertainty (Bazerman & Moore, 2012; Kahneman et al., 2021). Owner-managed firms, particularly those with limited financial expertise and weak internal controls, face both cognitive and structural challenges in producing accurate tax estimates. In such settings, the audit process may serve as a mechanism to mitigate both systematic biases and random noise in tax reporting. Our findings suggest that voluntary audits provide an additional layer of external discipline that improves the alignment between accounting-based tax estimates and final tax assessment.

From a policy perspective, our results contribute to the ongoing debate surrounding the implications of audit exemptions for small companies. While statutory audit thresholds aim to reduce the regulatory burden on micro-enterprises, our findings indicate that the absence of

formal audit requirements may come at the cost of diminished tax reporting quality. Voluntary audits, when adopted, appear to substitute for internal expertise and compensate for weak internal controls, thereby enhancing the quality of financial information used for taxation purposes.

Significantly, our study moves beyond binary categorisations of compliance versus non-compliance by conceptualising tax reporting discrepancies as a form of accrual error. This allows us to disentangle deliberate misstatements from unintentional inaccuracies and to interpret voluntary auditing not only as a signalling device but also as a corrective mechanism that reduces estimation errors. This perspective adds nuance to the literature on tax aggressiveness and voluntary assurance in the small-firm segment (e.g., Dong et al., 2023; Downing & Langli, 2019; Ojala et al., 2020).

There are several practical implications of these findings. First, voluntary audits may enhance the legitimacy of small firms in the eyes of external stakeholders, including tax authorities and financial institutions, by signalling more reliable tax behaviour. Second, for policymakers evaluating the role of audit thresholds, our results suggest that removing audits may increase the risk of tax discrepancies, particularly among firms that lack professional accounting capacity. Third, our study provides empirical support for viewing the audit function not merely as a compliance exercise, but as a governance tool that generates informational benefits even for the smallest entities.

Several limitations should be acknowledged. While our models control for firm size, industry, and financial structure, we cannot eliminate the possibility of unobserved heterogeneity, such as differences in managerial competence or risk preferences, that may jointly influence the decision to appoint an auditor and the accuracy of tax reporting. Furthermore, although our results suggest a strong association between voluntary auditing and lower tax discrepancies, causality cannot be definitively established due to the study's observational nature. Future research could employ natural experiments or instrumental variable approaches to better address concerns about endogeneity.

Additionally, our data does not distinguish between tax discrepancies arising from intentional underreporting and those due to estimation errors or administrative lags. While this limitation is partially addressed through the dual-error framework (bias vs. noise), a more fine-grained

decomposition of discrepancies, potentially using audit reports or tax authority enforcement outcomes, would deepen the analysis.

Looking ahead, future research could explore how specific auditor characteristics (e.g., audit firm size, specialization, or reputation) influence the effectiveness of voluntary audits in the micro-firm segment. It would also be valuable to investigate the role of tax consultants and bookkeepers as alternative or complementary sources of assurance for non-audited firms. Future research could also seek to study even more broadly, whether auditing can help reduce tax-reporting discrepancies. This research was partly based on public tax information, i.e. tax return submitted by the entity, on the basis of which the tax authority carries out mainly so-called risk-based tax return control, thus the study did not include the impact of tax audits. Furthermore, cross-country comparisons could reveal how institutional differences in audit regulation and tax enforcement shape the relationship between auditing and tax reporting quality in small enterprises.

In conclusion, our study provides strong empirical evidence that voluntary audits play a meaningful role in enhancing tax reporting accuracy in Finnish micro-enterprises. These findings contribute to a more comprehensive understanding of the governance function of auditing in the small-firm context and suggest that voluntary audits can serve as an effective substitute for formal oversight in environments where statutory audit requirements are relaxed or absent.

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Appendix

Table 4

Logistic regression results. The dependent variable is the discrepancy indicator $D_{i,t}$, defined using combinations of relative (1%, 2%, 3%) and absolute (€100, €250, €500, €1000) thresholds. Columns 1–4 apply a 1% relative threshold, Columns 5–8 apply 2%, and Columns 9–12 apply 3%, with each group increasing the absolute threshold from €100 to €1000.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$V_{i,t}$	0.856***	0.852***	0.698***	0.652***	0.796***	0.787***	0.665***	0.643***	0.763***	0.756***	0.645***	0.633***
	(0.013)	(0.012)	(0.015)	(0.018)	(0.013)	(0.012)	(0.015)	(0.018)	(0.013)	(0.013)	(0.015)	(0.018)
	[0.831, 0.882]	[0.829, 0.877]	[0.670, 0.728]	[0.618, 0.687]	[0.771, 0.821]	[0.763, 0.812]	[0.637, 0.695]	[0.609, 0.678]	[0.739, 0.789]	[0.732, 0.782]	[0.616, 0.675]	[0.599, 0.668]
$\ln(rev)_{i,t}$	0.722***	0.873***	1.021***	1.121***	0.661***	0.772***	0.967***	1.099***	0.662***	0.736***	0.932***	1.074***
	(0.005)	(0.005)	(0.008)	(0.012)	(0.005)	(0.005)	(0.008)	(0.011)	(0.005)	(0.005)	(0.008)	(0.011)
	[0.712, 0.732]	[0.863, 0.883]	[1.006, 1.038]	[1.098, 1.145]	[0.652, 0.670]	[0.762, 0.781]	[0.952, 0.982]	[1.077, 1.122]	[0.653, 0.671]	[0.727, 0.746]	[0.917, 0.947]	[1.053, 1.097]
$invest_{i,t}$	1.001	1.002	1.002	1.002	1.003	1.003	1.002	1.002	1.004	1.005*	1.002	1.002
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
	[0.996, 1.005]	[0.998, 1.006]	[0.997, 1.007]	[0.997, 1.007]	[0.997, 1.008]	[0.999, 1.008]	[0.997, 1.007]	[0.997, 1.007]	[0.998, 1.011]	[0.999, 1.010]	[0.997, 1.007]	[0.997, 1.007]
$d_{loan\ i,t}$	1.068***	1.068***	1.095***	1.078**	0.983	1.022	1.078***	1.078**	0.965	0.989	1.077***	1.077**
	(0.022)	(0.021)	(0.029)	(0.035)	(0.021)	(0.021)	(0.029)	(0.036)	(0.021)	(0.022)	(0.030)	(0.036)
	[1.025, 1.113]	[1.029, 1.110]	[1.040, 1.153]	[1.011, 1.150]	[0.944, 1.024]	[0.981, 1.063]	[1.022, 1.137]	[1.011, 1.151]	[0.925, 1.007]	[0.947, 1.032]	[1.019, 1.138]	[1.008, 1.151]
$d_{loan\ i,t} \times gearing_{i,t}$	1.559***	1.193***	1.112	1.085	1.954***	1.549***	1.261***	1.127	1.932***	1.698***	1.318***	1.174*
	(0.089)	(0.062)	(0.078)	(0.095)	(0.110)	(0.084)	(0.090)	(0.098)	(0.111)	(0.097)	(0.097)	(0.104)
	[1.395, 1.743]	[1.078, 1.321]	[0.970, 1.275]	[0.915, 1.287]	[1.750, 2.181]	[1.393, 1.722]	[1.096, 1.450]	[0.950, 1.338]	[1.726, 2.163]	[1.519, 1.898]	[1.142, 1.521]	[0.988, 1.396]
Year Fixed Effects	X	X	X	X	X	X	X	X	X	X	X	X
Industry Fixed Effects	X	X	X	X	X	X	X	X	X	X	X	X
N	160,366	160,366	160,366	160,366	160,366	160,366	160,366	160,366	160,366	160,366	160,366	160,366

* p < 0.1, ** p < 0.05, *** p < 0.01

Table 5: Broad Structure of NACE Rev. 2[1]

Section	Title	Divisions
A	Agriculture, forestry and fishing	01 – 03
B	Mining and quarrying	05 – 09
C	Manufacturing	10 – 33
D	Electricity, gas, steam and air conditioning supply	35
E	Water supply; sewerage, waste management and remediation activities	36 – 39
F	Construction	41 – 43
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	45 – 47
H	Transportation and storage	49 – 53
I	Accommodation and food service activities	55 – 56
J	Information and communication	58 – 63
K	Financial and insurance activities	64 – 66
L	Real estate activities	68
M	Professional, scientific and technical activities	69 – 75
N	Administrative and support service activities	77 – 82
O	Public administration and defence; compulsory social security	84
P	Education	85
Q	Human health and social work activities	86 – 88
R	Arts, entertainment and recreation	90 – 93
S	Other service activities	94 – 96
T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	97 – 98
U	Activities of extraterritorial organisations and bodies	99

[1] Reference: Eurostat. (2008). *NACE Rev. 2: Statistical classification of economic activities in the European Community.* Eurostat Methodologies and Working Papers.