Does Mandatory Auditing Reduce Fraud? Evidence from the Swedish Auditing Reform

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Abstract

Based on the argument by policymakers that mandatory auditing prevents fraud, we examine the association between auditing and suspected accounting fraud, tax fraud and other fraudulent behaviors in failing privately held micro firms. We do not find that auditing would unambiguously reduce fraud. However, our results show that auditor resignations are positively and significantly associated with accounting fraud, suggesting that auditors decide to resign if they suspect accounting fraud. Using data before and after the audit reform in 2010 when audits of micro firms became voluntary suggests that auditor resignations are more strongly associated with accounting fraud when auditing is voluntary than mandatory. With respect to auditing mandates, our results do not support the view that an audit mandate reduces fraud, or that it results in a setting where auditor resignations convey fraud risk to users of financials.

1. Introduction

Auditors are in several countries expected to report fraud to authorities (e.g., in France, Netherlands, Britain and Sweden). This reporting obligation has recently been extended in EU countries by the adoption of a new anti-money laundering (AML) package which requires auditors to report suspected money laundering. As such, the auditor is assigned a societal role of preventing white-collar crime which extends the traditional role of resolving agency conflicts and verifying whether financial statements are free from material errors. Along this line of reasoning, policymakers, practitioners and researchers suggest that a possible benefit of mandating auditing for private firms is white-collar crime prevention (e.g., Donovan et al., 2014; Swedish National Audit Office, 2017; Accountancy Europe, 2020; Breuer, 2021). However, to our knowledge there is no systematic empirical evidence supporting the notion that mandatory auditing can reduce white-collar crime.

Thus, we investigate whether auditing can reduce white-collar crimes focusing on accounting fraud, tax fraud and other general frauds using a sample of Swedish micro firms. The Swedish setting has arguably one of EU's most far-reaching regulations requiring auditors to report suspected economic crimes. Moreover, Swedish micro firms have since 2011 been exempt from mandatory audits, providing suitable empirical setting of audited and non-audited firms during the periods before and after the 2011 audit reform. ISA 240 highlights that the auditor should assess the risks of material misstatements of the financial statements due to fraud and modify the audit report. Swedish auditors have for several years been required by Swedish law to report to the authorities suspected tax crimes, money laundering and violations of the Penal Code, including fraud and other misconduct, embezzlement, bribery, fraudulent transfers

and other crimes that may harm creditors.[1] Hence, Sweden is a suitable setting to investigate if mandatory auditing can reduce white-collar crime.

We use a sample of more than 6,000 bankrupt Swedish micro firms, and study whether the firm's board-members (or the CEO if the firm has one[2]) are suspected or convicted of fraud prior to or after the bankruptcy filing.[3] We focus on micro firms because they are an important part of the economy across the world and exempt from mandatory auditing. Second, we focus on bankrupt firms because prior research demonstrates that small and mid-sized firms facing a potential insolvency are much more likely than solvent firms to act fraudulent (e.g., Thorburn, 2004; Francheschetti et al., 2013; Bisogno and de Luca, 2015; Box et al., 2020). Third, fraud committed by small-firm is typically detected by the bankruptcy trustee (Thorburn, 2004; Box et al., 2019). We retrieve data on individuals' record whether they have been suspected or convicted of economic crime from the Swedish National Council for Crime Prevention (Brå) and examine whether board-members are suspected of accounting fraud, tax fraud, embezzlement, and other kinds of fraud that harm creditors (e.g., fraudulent transfers) in years before and after the bankruptcy filing.

Our findings do not consistently support the prediction that auditing reduces accounting fraud, tax fraud, or other types of fraud. Consistent with prior lieterature, we find that auditor resignations are significantly associated with accounting fraud (e.g., Hassink et al., 2010; Ghosh and Tang, 2015; Lee and Ha, 2021). Thus, even if the auditor does not prevent fraud, it is possible that the auditor signals fraud to creditors and other stakeholders. This finding is more pronounced among audited micro firms in smaller cities compared to larger cities. A possible explanation for this finding is that the responsible auditor is more personally involved in the

[1] See Companies Act, Chapter 9, Sections 42 to 44.
[2]The appointment of a CEO is voluntary for private firms in Sweden (Companies Act Chapter 8 Section 27).
[3] The board should, based on regulations in the Companies Act, ensure that the firms' accounting, asset management and its financial conditions in general are controlled in a satisfactory manner, suggesting that board-members or the CEO (if the firm has one) typically are prosecuted for misconduct.

audit and in general has more information about entrepreneurs' businesses and personality characteristics in smaller communities. In contrast to the above findings, we do not find any consistent support for the prediction that auditor resignations would signal tax fraud or the other general types of fraud. Finally, using data on the periods before and after the Swedish audit reform of 2011 of exempting micro firms from mandatory audits, our analyses suggest that auditor resignations associated with accounting fraud is more pronounced when auditing is voluntary than mandatory.

This study contributes to literature in several ways. First, we contribute important insights for the debate on whether auditing reduces fraud in small private firms. Policymakers and prior research suggest that a possible benefit of auditing is fraud reduction (Swedish National Audit Office, 2017; Accountancy Europe, 2020). The inference from our regressions is that auditing does not provide significant fraud reduction.

We also contribute to the literature studying externalities and auditing regulation. Donovan et al. (2014) suggests that auditing research should test for externalities and efficiencies to understand whether auditors and their clients are choosing the efficient level of audit quality. The cost of fraud is partially borne by society, and therefore, fraud reduction is a reason why clients could choose to opt out of auditing at a market with voluntary auditing although auditing is socially optimal. Empirical studies examining auditing and externalities have mainly focused on either tax collection or competition. Downing and Langli (2019) and Dong et al. (2023) find that voluntary audit is associated with more tax avoidance, suggesting that audit mandates can be justified by potential for increased tax collection. Breuer (2021) investigates whether the implementation of mandatory audit in Europe is related to more effective resource allocation. While his results indicate positive effect on measures such as productivity levels and growth, they are not robust and have limited economic significance. Our findings cannot consistently support the assertion that mandating auditing will address the

externality of white-collar crime. Thus, our findings correspond with prior research suggesting that mandatory auditing is not net beneficial (e.g., Breuer, 2021; Breuer et al., 2023).

Third, this study contributes to the literature by providing findings on the benefits and costs of small private firm audits, which has mainly larger firms (e.g., Chow, 1982; Minnis, 2011; Kim et al., 2011; Dedman et al., 2014). Furthermore, we add inferences to the emerging literature on economic crime. For example, studies of the Italian setting find that firms controlled by criminals have more bank debt, lower cash holdings and are more likely to file for bankruptcy, as well as misuse firm resources through money laundry (Bianchi et al., 2022). We contribute to this strand of the literature, by showing that some characteristics of board-members make the firm more likely to be suspected of economic crime.

The paper is structured as follows. Section 2 introduces the Swedish institutional setting and Section 3 develops the hypothesis. Section 4 describes the data and the research design. Section 5 presents the empirical results, and Section 6 concludes the paper.

2. Institutional Setting

According to Swedish law, auditors are required to report their clients to the authorities when suspecting them of white-collar crime. While the shareholders of Swedish limited liability firms typically hold no liability, executives and board of directors may become personally liable for the firm's white-collar crime. For example, it is the responsibility of the board of directors to ensure that taxes and fees are paid as well as to make sure that the annual report is submitted to the Swedish Companies Registration Office.[4] If a board member or the managing director commits an offense on behalf of the firm, it may constitute a basis for personal liability and can

[4] Rules about personal liability are in §§ 12-14 of Chapter 59 of the Tax Procedure Act.

be banned from conducting business which can last for three to ten years.[5] Anyone who attempts to conceal who is exercising the actual management of the firm, may be convicted of an offense under the Companies Act. According to Chapter 8, Section 12 of the Companies Act, a person who does not intend to participate in the activities assigned to the board may not be appointed as a board member without acceptable reasons. If a person deliberately and without acceptable reasons has undertaken a position as a board member in a firm, despite not intending to participate in the activities assigned to a board member in a limited company, the person may be sentenced to imprisonment for up to one year, as stated in Chapter 30, Section 1 in the Companies Act.

If a firm insider intentionally or negligently fails to comply with the Accounting Act, for example, by not recording business transactions, withholding accounting information, or by providing incorrect information in the accounts, the individual can be convicted of accounting fraud.[6] A conviction of accounting fraud can lead to a prison sentence up to two years. A serious economic crime can lead to a prison sentence up to six years. When assessing whether the crime is serious, consideration should be given to whether the violation involved a large amount of money, whether forged documents were used, whether the act was part of a systematically conducted criminal activity, or if the act was otherwise of a particularly dangerous nature.

Conviction of tax fraud occurs if a person intentionally provides incorrect information to the Swedish Tax Agency, or if the person fails to submit a tax return, or any other required information to the Tax Agency.[7] To be classified as tax fraud, the actions must have posed a risk of tax evasion from the public or incorrectly credited or refunded to the individual or someone

[5] See Act (2014:886) on business ban.
[6] See Penal Code, Chapter 11 § 5.
[7] See 2-10 §§ in the Tax Crime Act.

else. Tax fraud can lead to a prison sentence up to two years. In 2023, there were 7,539 reported offenses against the tax fraud law and 16,628 accounting fraud cases.[8]

Other types of offenses involve money laundering[9], various types of fraud and other dishonesty, particularly against the welfare systems (Chapter 9 of the Penal Code), various types of embezzlement and other breaches of trust (Chapter 10 of the Penal Code), and various types of crimes against creditors (Chapter 11 of the Penal Code). Most offenses are discovered by either the bankruptcy trustee when the firm goes bankrupt, or through controls conducted by the Swedish Tax Agency. Thus, our empirical analyses focus on bankrupt firms.

While the regulatory impact on the demand for and the supply of audit services in the Swedish micro firm setting is quite similar the European setting, there are some peculiarities. The supply of audit services to micro firms in Sweden is offered by Big 6 audit firms as well as small local audit firms.[10] The demand for audit services, on the other hand, is to some extent determined by the cost-benefit of requiring higher quality and client competence (cf. Defond and Zhang, 2014). As noted by Langli and Svanström (2014) micro firms' demand for audit is different from large publicly listed firms due to different agent costs. Dong et al. (2023) show that the demand for higher quality audit in the Swedish micro firm setting can be related to capital structure. In other words, micro firms that have less external financing seem to be less likely to demand high quality audit.

[8] See http:// bra.se/statistik/statistik-om-brottstyper/bedragerier-och-ekobrott.html.
[5] See Act (2017:630) on measures against money laundering and financing of terrorism (Lag om åtgärder mot penningtvätt och finansiering av terrorism) and Act (2014:307) on penalties for money laundering offences. (Lag om straff för penningtvättbrott). If an action for example aims to conceal that money or other property derives from crime or criminal activity or promotes opportunities for someone to appropriate the property or its value, such a person may be charged with committing the crime money laundering. The penalty is imprisonment for a maximum of two years. If the crime is serious, the penalty is imprisonment for a maximum of six years.
[10] It should be noted that while the big 6 audit firms dominate the overall Swedish audit market, anecdotal evidence suggest that the larger audit firms have recently started to focus on larger firms and growth firms, by not accepting to audit micro firms anymore. Thus, the dynamic of the supply has been changing in recent years, but during the period of this study, big 6 firms are still relevant on the market. This strategic change is the response to the new EU regulation with regards to firms on unregulated markets.

Auditing was mandatory for all firms independent of their size until the end of 2010. Starting from 2011 auditing is mandatory only if a firm in two consecutive years exceed more than one of the following: revenues are larger than SEK 3 million, total assets are larger than SEK 1.5 million and the number of employees is more than 3 (1SEK=0.091EUR).[11]

3. Research Motivation and Hypotheses Development

Whether auditing reduces economic crime has been debated among researchers and legislators.[12] Requirements to detect and report fraud means that auditing benefits the broader economy and that the societal benefits exceed the firm-specific benefits. Because firms likely only pay for the private benefit of an audit, there is a potential market failure in which audit quality is underproduced relative to the theoretical social optimum (Francis, 2025).

Recent studies investigate how auditing regulation produce positive or negative externalities for third parties have mainly focused on two externalities: tax collection and competition (Downing and Langli, 2019; Breuer, 2021; Dong et al., 2023). The cost of failed tax collection is borne by society, and therefore not necessarily a factor that is considered by the firm when evaluating the benefits and costs of voluntarily using audits. In fact, if auditing correlates positively with tax collection, it may deter some firms from voluntarily hiring an auditor. Two recent studies suggest that audit mandate is beneficial as it improves tax collection. Based on a sample of Norwegian firms that qualify for voluntarily auditing in 2011, Downing and Langli (2019) finds that firms opting out of audits have lower tax and accounting regulation compliance than audited firms. In a related study on Swedish firms, Dong et al. (2023) finds support for the prediction that voluntary auditing results in more tax avoidance.

[11] Exchange rate 1st December 2025.

[1] See for example the Swedish National Audit Office (Riksrevisionen), Abolition of the audit duty for small limited companies - a reform that costs more than it tastes (Avskaffandet av revisionsplikten för små aktiebolag – en reform som kostar mer än den smakar (RiR 2017:35), pp. 10, and p. 36 and there indicated sources.

While auditing in the US is voluntary for all private firms, European countries have only exempt small private firms from mandatory auditing, but with a varying firm-size thresholds for what qualifies a private firm to be exempt. Some European countries like France, Ireland and Denmark have relaxed the threshold to permit voluntary audits for larger private firms, while other countries such as Italy, Romania and Estonia have set a stricter threshold so that only very small firms are permitted voluntary audits. These differences suggest that lawmakers in various countries have different views on the net benefits of regulation. Francis (2025) points out that it is difficult to measure if auditing is underregulated or overregulated relative to the theoretical socially optimum. However, the first step of establishing optimal auditing regulation is to analyze if costs and benefits are statistically and economically significant. It has been argued that fraud prevention is one possible and important benefit of mandatory auditing (Breuer, 2021). We are not aware of any prior studies examining the association between auditing and fraud in micro firms.

Whether auditing can prevent white-collar crime such as accounting fraud, tax evasion and money laundry is an empirical question. Prior research examining whether auditing may prevent fraud uses the relation between audit and non-audit fees to proxy for the risk of economic crimes. Consistent with the prediction that economic incentives impact auditors' decisions, Asare et al. (2019) finds that economically important misstatements are more likely to be waived if the auditor provides non-audit services to abnormally high fees. Prior research also examines how audit firm size, the use of forensic specialists, training, and leadership style correlate with fraud-detection procedures (Trompeter et al., 2013; Campa et al., 2023). However, most of the prior archival research focuses on public firms in the US (Campa et al., 2023).

We believe that prior findings on white collar crime based on publicly listed firms with mandatory audits may not apply to micro firms with voluntary audits. First, accounting fraud is

less sophisticated in micro-firms than in large firms. Common examples of violations in micro-firms are that firms omit transactions from the bookkeeping, erase verifications, misrepresent the financial position or net income, or neglect the book-keeping altogether. Second, micro-firms have, by definition, few employees and external managers, suggesting that the entrepreneur typically is involved in fraud. Third, entrepreneurs with small businesses have access to less expertise than large firms, suggesting that any attempt to conceal fraud will be less sophisticated, and that entrepreneurs sometimes even unintentionally are responsible for an error or fraud. While micro firms are significantly different from publicly listed firms, micro firms are important to understand because they are an important part of the economy across the world.

A rationale why obligating the auditor to report economic crime could reduce fraud is that the firm changes its behavior due to shifting incentives of the auditor from favoring the client to complying with the authorities. On the other hand, the auditor is hired and paid by the client, which should incentivize the auditor to align with cliental interests. This argument is more relevant for small private firms since they are typically managed by the owner. Any reporting of intentional or unintentional fraud by the auditor to the authorities does not favour the business relations with the entrepreneur. Research also suggests that auditors' commercial interests may conflict with professional obligations (e.g., Ciconte et al., 2017). If commercial interests dominate, auditors are unlikely to spend time and resources on fraud detection and reporting. Furthermore, Ronnen (1996) finds that mandatory auditing increases quality differences between auditors, suggesting that fraudulent entrepreneurs may hire an auditor that is unlikely to detect or report fraud.

However, fraud detection is not necessarily harmful for small private client firms since an employee can be the perpetrator. Thus, the detection by the auditor benefits an entrepreneur that is unaware of fraud. Furthermore, research suggests that some criminals commit crimes in

the heat of the moment, while others engage in meticulous planning (Baer, 2014). Auditors could have preventive role especially if the entrepreneur is about to unintentionally conduct fraud, because the auditor can then inform the entrepreneur about the consequences. If the entrepreneur, on the other hand, deliberately conducts fraud to extract funds from taxation authorities and other creditors, it is less likely to be detected by the auditor. Moreover, if fraud attempts are detected, the auditor is likely to have small possibilities to alter the intentions of the entrepreneur, and therefore, the only feasible response is to modify the audit report or resign.

Auditing standards point out that the auditor should consider resignation from the assignments under certain circumstances if financial statements are misstated as a result from fraud or suspected fraud.[13] The reporting of fraud is associated with costs in terms of time and risks, and therefore, a withdrawal from the assignment might be a good alternative for auditors that report, as well as do not report, suspected fraud to authorities. Consistent with this view, prior literature finds a positive association between fraud and auditor resignations (e.g., Hassink et al., 2010; Ghosh and Tang, 2015; Lee and Ha, 2021). Given these counterarguments, we express our hypotheses in the alternative (non-directional) form:

H_1: There is no association between the likelihood of fraud and auditing.

H_2: There is no association between auditor resignations and the likelihood of fraud.

4. Research Design

4.1. Data Sources and Sample Characteristics

To empirically investigate our hypotheses, we use a sample of bankrupt private micro firms. This is because prior research demonstrates that small and mid-sized firms facing

[13] See ISA 240 para. 59 (revised 2025).

insolvency are much more likely than solvent firms to act fraudulent (Thorburn, 2004; Francheschetti et al., 2013; Bisogno and de Luca, 2015; Box et al., 2020). Studies also indicate that small-firm fraud frequently is detected by the bankruptcy trustee (Thorburn, 2004; Box et al., 2019).[14] We focus on investigating whether a micro firm's board-members (and the CEO, if the firm has one[15]) are suspected or convicted of fraud prior to or after the bankruptcy filing.[16]

Our data come from the following sources. We obtain financial data, information about bankruptcy dates, whether a firm is audited or not, and data on whether a firm belongs to a corporate group from the Serrano database. The Swedish Companies Registration Office (SCRO) provides data on firms' board-members and CEOs and Statistics Sweden (SCB) provides data on individual level income and background variables (e.g., income, gender and age). The Swedish National Council for Crime Prevention (Brå) provides the individual level data on suspected and convicted crimes covering the period 2005 to 2020. Because the registration of suspected crimes and convictions may take place in a later year than the bankruptcy year, we test our hypotheses on samples with micro firms using financial data for the period 2011 to 2016. We merge the individual level and firm level data using the individuals' social security number and firms' organization number.[17]

Our main analyses are based on firms who meet the criteria for voluntary auditing. Starting from 2011, auditing is mandatory only if a firm in two consecutive years exceed more than one of the following: revenues are larger than SEK 3 million, total assets are larger than

[14] Gottschalk and Gunnesdal (2018) find that auditors detected only 5 % of the criminals in their sample with 405 white-collar crimes in Norway. In their study, journalists detected 25% of the crimes and 13% was detected by crime victims suffering a financial loss. However, the large crime amounts in their study indicates that the firms were much larger than in our study. Fraud in micro firms is unlikely to be detected by journalists.

[15] The appointment of a CEO is voluntary for private firms in Sweden (Companies Act Chapter 8 Section 27).

[16] The board should, based on regulations in the Companies Act, ensure that the firms' accounting, asset management and its financial conditions in general are controlled in a satisfactory manner, suggesting that board-members or the CEO (if the firm has one) typically are prosecuted for misconduct.

[17] All data used in the study are anonymized by Brå and SCB. The use of the social security number as the way to identify board-members means that foreign board-members without a Swedish social security number are dropped from the analyses.

SEK 1.5 million and the number of employees is more than 3 (1SEK=0.091EUR).[18] Before 2011, auditing was mandatory for all firms independent of their size until the end of 2010. In additional analyses we use control samples with firms before the audit reform in 2011 as well as firms mandated to be audited after the reform.[19]

To exclude firms likely used as a side-business, we drop firms with revenues below SEK 0.8 million (around EUR 70,000). We further drop firms that belong to a financial group, and firms that are municipal or state-owned. Moreover, we require that financial and individual level data should be available two years prior to bankruptcy filing.[20] These criteria result in a sample of 6,427 firms. Finally, we exclude 156 firms with missing explanatory variables, leaving 6,271 firms. Table 1 summarizes the number of audited and unaudited firms by year and industry.

[Insert Table 1 about here]

The firms in our sample have on average 1.55 board-members (including the managing director). Around sixty percent (3,875 / 6,271) of the firms have a board with just one board-member. About twenty five percent (1,720 / 6,271) of the firms have an appointed CEO, which is voluntary for private firms in Sweden. Only 5.3% (331 / 6,271) have a CEO that is not a board member. For brevity, we use the term board-members for board-members and the CEO in the text below.

4.2. Dependent Variables: Measurement of Fraud

[18] Exchange rate 1st December 2025.
[19] That is, firms whose size do not exceed more than one of the following: revenues > SEK 6 million; total assets > SEK 3 million and number of employees > 6.
[20] More exactly, we require that financial data between 1.5 years and 2.5 years before bankruptcy should be available. We use data two years prior to bankruptcy because financial statements are frequently not available one year prior to bankruptcy.

Prior studies include instances of actual and suspected legal infractions in their measurements (e.g., Pittman et al., 2023). Following this research, we base our measurements on suspected crimes in the main analyses, but in supplementary analyses we use convictions. Factors contributing to a discrepancy between suspected fraud and convictions for fraud are that evidence sometimes are insufficient, or that the prosecutor prioritizes cases with a reasonable high probability of conviction. A factor biasing our measures based on only suspected frauds downward is that all crimes are not observable. However, compared to studies of fraud in listed firms, this bias is likely to be smaller since prior research suggests that private firms use fraud methods that are easier to detect than public firms (Fleming et al., 2016).

We use the following three measures of fraud. First, we study if board-members are suspected of accounting fraud, which includes omission of transactions from the bookkeeping, erasing verifications, misrepresenting financial positions or the net income, delaying preparation of financial statements or that the firm has neglecting the bookkeeping altogether.[21] The reason for criminalizing accounting fraud is to protect third parties with an interest in assessing the profitability of the business (i.e., creditors, investors, employees, and society at large).[22] In our empirical analyses, $SACCFRAUD_{t+2}$ takes the value one if at least one of the board-members have been suspected of accounting fraud within a two-year period after the firm filed for bankruptcy, and $SACCFRAUD_{t-2}$ takes the value one if at least one of the board-

[21] The examples of accounting and tax fraud (discussed below) or from the website of the Swedish Economic Crime Authority's (SECA): https://www.ekobrottsmyndigheten.se/. SECA is the prosecutor of economic crime.

[22] For a criminal liability to arise, the statutory bookkeeping obligations must have been disregarded, and the disregard must have resulted in a material inability to assess the financial position and performance of the firm. Consequently, minor deficiencies are not considered as accounting fraud. However, intent is not required, as the obligation concerns the ability to assess the company's financial standing. This means that even a delayed submission of financial statements to SCRO may fall within the scope of an offense. Each financial year constitutes a separate offense.

members is suspected of accounting fraud within a two-year period before the bankruptcy filing.[23]

Our second measure focuses on tax fraud. Tax offences under Swedish law presuppose that a statement has been submitted in a form other than orally, for example, by email or in a tax return and that the statement is in some way incorrect or incomplete. Furthermore, the submission of such a statement must create a risk that tax will likely be evaded or improperly credited to the detriment of the public. This means that the risk is excluded if the incorrect statement does not affect the tax amount, or if the statement is relevant but will inevitably be detected during routine checks. It should be noted that actual tax fraud need not have occurred; it is sufficient that there existed a significant risk of the offence being completed. However, it is possible to avoid criminal liability by voluntarily correcting the error so that the tax can be assessed, credited, or refunded in the correct amount. The measures used in our study also addresses the offence of obstruction of tax control, which encompasses conduct that impedes the authority's supervisory activities, such as neglecting bookkeeping obligations or the duty to maintain accounting records. To measure tax fraud, we use the following variables. $STAXFRAUD_{t+2}$ takes the value one if at least one board-member is suspected of tax fraud within two years after the firm filed for bankruptcy, and $STAXFRAUD_{t-2}$ assume the value one if at least one board-member is suspected of tax fraud within two years before the bankruptcy filing.

Our third measure combines various kinds of suspected non-accounting fraud (e.g., use of fraudulent invoices, forgery or blackmailing and fraudulent transfers), embezzlement and money laundering. The offences under consideration can be classified into three categories. The

[23] The data from Brå includes date on suspected fraud for most board-members in our sample. Based on the observation that the median time between being suspected and the decision on whether the authorities will prosecute the board members is 354 days, we use the decision date less 354 days as the measure of the date the board member was suspected of fraud if it was missing.

first category involves acts resulting in a transfer of assets from the victim to the perpetrator.[24] Fraud presupposes that the offender, through deception, induces another person to act or refrain from acting in a manner that entails a benefit for the offender and a corresponding detriment to the deceived party. The harm need not necessarily affect the person who was misled; it may instead impact a party represented by that person. For example, a bank employee may be deceived, while the actual loss is borne by the bank. Fraud may also be assessed as minor or aggravated, depending on the extent of the damage, whether the offence was systematic, particularly dangerous, or of significant economic importance. The second category comprises offences of breach of trust.[25] This group includes embezzlement, misappropriation, and breach of trust, all of which substantially correspond to provisions found in other jurisdictions. The offenses in this category are characterized by the fact that the perpetrator has lawfully obtained possession of property in a position of trust. Furthermore, the act must have resulted in either a loss to the entitled party or a corresponding gain to the perpetrator. In the third category are offenses against creditors, which criminalize the debtor's conduct in certain situations preceding bankruptcy, even if the act was committed without intent.[26] Fraudulent bankruptcy arises when a debtor who is insolvent disposes of or destroys assets of significant value. It is not required that the debtor is already insolvent; it suffices that there is a manifest risk of insolvency. Obstruction of bankruptcy proceedings is likewise considered a criminal act when, during bankruptcy or enforcement proceedings, the debtor fails to disclose assets, fabricates liabilities, or provides false information that is not corrected. Swedish law also criminalizes acts by debtors who are insolvent, or where there is a manifest risk of insolvency, that result in a substantial deterioration of the debtor's financial position. However, prosecution may only be initiated if it is warranted in the public interest. It is also punishable for an insolvent person to

[24] Ch. 9 Penal Code.
[25] Ch. 10 Penal Code.
[26] Ch. 11 Penal Code.

grant preferential treatment to a particular creditor, thereby circumventing the statutory order of priority. $SOTHFRAUD_{t+2}$ takes the value one if at least one board-member is suspected of any of the crimes above two years after the bankruptcy filing, and $SOTHFRAUD_{t-2}$ takes the value one if at least one board-member is suspected of any of the crimes above two years before the bankruptcy filing. In our data, 62.24% of these cases are fraud and misconduct (violations of Ch. 9 in the Penal Code), 17.79% are embezzlement other kinds of dishonesty and bribery (violations of Ch. 10 in the Penal Code) and 14.31% are fraudulent transfers and other crimes that harm creditors (violations of Ch. 11 in the Penal Code). We use convictions of fraud instead of suspected frauds in supplementary analyses. Since the time between suspected fraud and conviction of fraud can be quite long, we measure convictions over a three-year period after bankruptcy.

4.3. Explanatory variable and empirical models

Prior research suggests that various demographic and personality characteristics (such as, self-control, narcissistic personality tendencies and psychopathy) correlate with fraud (e.g., Klenowski and Dodson, 2016).[27] This research suggests that personality characteristics are possible confounders in our study unless we adequately control for these characteristics. Afterall, the personality characteristics that prior studies have found to correlate with the propensity of committing crime, may correlate with the choice of opting out voluntary audits, making these personality characteristics potential confounders. To address this problem, we use cross-sectional regressions with controls for factors that correlate with the tendency to commit crimes and an instrumental-variable approach in our main analyses. Furthermore, in the

[27]For example, Alalehto (2003) finds that white collar offenders are described as extroverted (e.g., outgoing, controlling, calculating), less agreeable, and neurotic by colleagues. Other studies relate white-collar crimes to low self-control, narcissistic personality tendencies, psychopathy, high hedonism, agreeableness and conscientiousness (Blickle et al., 2006; Ragatz et al., 2012; Turner, 2014; Alalehto and Azarian, 2018; Push and Holtfreter, 2021).

additional analyses section we use difference-in-difference (DID) analysis to test hypothesis H1.

Equation (1) presents the instrumental variable (IV) regression that we use to study the association between auditing and suspected crimes among bankrupt firms that can opt out of auditing. We estimate the regression on a sample consisting of 3,448 unaudited and 2,823 audited firms.

$$\begin{aligned} NOAUD = \beta_0 &+ \beta_1 NOAUDMUNIC + \beta_2 NOAUDMUNIC * NOAUDMUNIC \\ &+ \beta_3 RESIGNED1 + \beta_4 RESIGNED2 + \beta_5 ENTR \\ &+ \beta_6 FRONTMEN + \beta_7 \text{NOINCOME} + \beta_8 CRIMTEND \\ &+ \beta_9 BSEATS + \beta_{10} FEMALE + \beta_{11} EDSEC \\ &+ \beta_{12} UNIV/COLL + \beta_{13} AGE + \beta_{14} LNBOARDSIZE \\ &+ \beta_{15} LNASSETS + \beta_{16} ROA + \beta_{17} LEV + \beta_{18} CATA \\ &+ \beta_{19} TANGTA + \beta_{20} LNFIRMAGE + \beta_{21-34} INDUSTRY \\ &+ \beta_{35-39} YEAR + \beta_{40-62} COUNTY + \varepsilon \end{aligned} \tag{1a}$$

$$\begin{aligned} DepVar = \beta_0 &+ \beta_1 NOAUD + \beta_2 RESIGNED1 + \beta_3 RESIGNED2 \\ &+ \beta_4 ENTR + \beta_5 FRONTMEN + \beta_6 \text{NOINCOME} \\ &+ \beta_7 CRIMTEND + \beta_8 BSEATS + \beta_9 FEMALE \\ &+ \beta_{10} EDSEC + \beta_{11} UNIV/COLL + \beta_{12} AGE \\ &+ \beta_{13} LNBOARDSIZE + \beta_{14} LNASSETS + \beta_{15} ROA + \beta_{16} LEV \\ &+ \beta_{17} CATA + \beta_{18} TANGTA + \beta_{19} LNFIRMAGE \\ &+ \beta_{20-33} INDUSTRY + \beta_{34-38} YEAR + \beta_{49-61} COUNTY + \varepsilon \end{aligned} \tag{1b}$$

We use the proportion of micro firms in a municipality that choose to opt out of auditing as the instrument (NOAUDMUNIC) in Eq. (1a). Based on the findings by Collis (2012) that a significant determinant of the demand for voluntary audits in micro firms is whether an external accountant gives advice on accounting or auditing regulations, we expect that the demand for voluntary audits depends on the local market. More specifically, we expect that entrepreneurs of micro firms are more likely to appoint and retain an auditor if a significant proportion of other firms in the same industry and municipality also hire an auditor. This argument comes from the idea of mimetic isomorphism that firms imitate industry peers in their accounting

choices (DiMaggio and Powell, 1983).[28] NOAUDMUNIC is measured by year and industry. We think this is a valid instrument since firms domiciled in the same municipality may follow industry peers in their auditing choice, but the proportion of unaudited firms in the industry and municipality is unlikely to directly influence the likelihood of fraud. The validity of instruments can only be tested in an overidentified model (Cameron and Trivedi, 2022). To have an over-identified model, so we can use the Hansen's test to receive an indication of the validity of the instrument, we use NOAUDMUNIC and the square of NOAUDMUNIC as instruments.

Test variables: Hypothesis 1 predicts that auditing is associated with fraud. To test this prediction, we use the indicator NOAUD that takes the value of one if the firm has enclosed an audit report with its financial statements in the Serrano database, and zero otherwise. Hypothesis 2 predicts an association between auditor resignations and fraud. Based on regulations in the Swedish Companies Act, the auditor should report to the SCRO if an assignment has ended prematurely. RESIGNED1 takes the value one if the auditor has resigned two to four years before bankruptcy, and RESIGNED2 takes the value one if the auditor has resigned less than two years before the bankruptcy filing. Because we use financial data two years before bankruptcy in the analyses, RESIGNED1 generally assumes one if the auditor has resigned within a two-year period before the financial year used in the analysis, and RESIGNED2 takes the value one if the auditor has resigned after the year included in the analysis but before the bankruptcy filing.[29]

Control variables: We include control variables at the board-member level and at the firm level. Firms operated by entrepreneurs prone towards illegal activities are likely to take actions that mitigate their legal responsibility. We use three variables to control for this trait of

[28] Examples of empirical studies supporting the idea of mimetic isomorphism are Aerts et al. (2016) and Depoers et al. (2020). The first study finds that firms imitate industry peers in their sustainability reporting, while the second one concludes that the industry practice influences firm's tax disclosures.

[29] The resignations include situations when the auditor or the firm notifies that the assignment is terminated. The regulation about premature terminations of auditor assignments are in Companies Act Chapter 9 Sections 22 and 23.

entrepreneurs. One possible action an entrepreneur can take is to stay out from the board. We control for this using ENTR an indicator variable taking the value one if at least one of the board-members is an entrepreneur and zero otherwise.[30] As a part of entrepreneurs' strategy to minimize the legal liability, they may employ "frontmen" board-members.[31] The Companies Act regulates that an individual cannot be appointed as a board-member if he or she, without acceptable reasons, does not intend to take part in activities that belong to the board.[32] Data from Brå includes information about whether board-members is suspected of a violation of this rule. We control for this using the variable FRONTMAN taking the value one if at least one of the board-members have been suspected of having used or acted as a frontman over the period 2010 to 2020.[33] Furthermore, we use an indicator taking the value one if board-members are not entrepreneurs and all board-members have zero in taxable income (NOINCOME). The rationale behind this variable is that individuals with no income have low costs associated with being convicted, and therefore, likely to accept joining boards even if that is associated with apparent legal risks (cf. Becker, 1968). Thus, this variable also proxy for whether the board-member could have acted as a frontman.

Research suggests that criminals do not specialize but are versatile, suggesting that they can easily move from non-white collar crime to white collar crime (Law and Mills, 2019). CRIMTEND is an indicator taking the value one if at least one of the board-members has been convicted for a non-white collar crime, and zero otherwise. This variable captures a wide range of crimes, including burglary, drug-crimes and unlawful threats (Appendix 2 includes a list with all crimes). CRIMTEND captures relatively serious crimes (e.g., assaults, thefts, unlawful

[30] We use data from Statistics Sweden (SCB) as the basis for the classification. The SCB data classifies an individual as an entrepreneur if their main source of income is a privately owned limited liability company.
[31] There are examples in Sweden when owners have selected board-members that are socially excluded, lack money (and therefore, are unable to pay tax debt) and previously punished. This has been done to reduce the owners' risk of prosecution when a firm has been plundered prior to bankruptcy (e.g., Korsell 2023, p. 83).
[32] Companies Act Ch. 8 Section 12. The penalties for violating this rule are fines or imprisonment in at most 2 years.
[33] Data from Brå includes suspects of being front-man only from 2010 onwards.

threats and drug offenses). Less serious crimes, such as traffic violations, are not included. Following prior research (Davidson et al., 2020; Pittman et al., 2023), we code CRIMTEND with one regardless of when during the period of 2002 to 2020 any of the board-members were convicted.[34]

Prior research suggests that board-members' prior bankruptcy experience is associated with risk-taking and higher cost of debt (Gopalan et al., 2021; Haw et al., 2021; Ivanova et al., 2024). Based on the Becker (1968) predicting that risk-taking individuals are more likely to commit crimes, we expect a positive association between BSEATS and the dependent variables. Following Ivanova et al. (2024), BSEATS takes the value one if board-members have been on the board in the current or previous year of another bankrupt firm.[35] Based on prior research concluding that most white-collar crimes are committed by men (Gottschalk, 2012; Alalehto, 2015), we expect a negative association between FEMALE and fraud. The variable takes the value one if at least one of the board-members is a female, otherwise zero.

We also include controls for education. UNIV/COLL takes the value one if the board-member with the highest education has a university or college degree, and EDSEC takes the value one if the board member has a secondary education. The above education variables take the value zero if the individual with the highest education has 9 years or less of schooling (EDU9). Prior research studying the association between white collar crimes and education provide mixed results (Klenowski and Dobson, 2016). Therefore, we do not predict the association between education and suspected crime. The final variable measured at the board level is the average age of the board-member (AGE).

[34] Note that our purpose is to capture personality characteristics of board-members that they were likely to have before as well as after the conviction. Our purpose is not to examine whether there is a causal relationship between CRIMTEND and our dependent variables.

[35] As for the firms in our sample, we require that the bankrupt firm had more than SEK 0.8 million in net sales and that its size is below the double thresholds for mandatory auditing.

We include the following control variables measured at the firm level. LNBOARDSIZE is the natural logarithm of the number of board-members, and we expect a positive association between board-size and the dependent variables. Further controls at the firm level are the natural logarithm of assets (LNASSETS), return on assets (ROA), total liabilities to assets (LEV), current assets to total assets (CATA), tangible assets to total assets (TANGTA) and natural logarithm of firm age (LNFIRMAGE). These firm-level variables are based on Downing and Langli's (2019) study on audit exceptions and compliance with tax and accounting regulations. We also include year, county and industry indicators in the regressions.

5. Empirical Results

5.1. Descriptive Statistics on Variables in the Models

Table 2 reports the univariate evidence, comparing averages of test and control variables. Columns 1 and 2 focus on samples of audited (NOAUD=0) and unaudited firms (NOAUD=1). A first observation is that the proportions of various types of suspected frauds within two years after the bankruptcy filing are higher than the proportions two years before the bankruptcy filing. For example, 23.3% (24.3%) of the audited (unaudited) micro firms are suspected of accounting fraud two years after the bankruptcy filing, while 9.4% (9.9%) of the audited (unaudited) firms are suspected of accounting fraud two years before the bankruptcy filing. This indicates that bankruptcy trustees likely detect and report a significant proportion of fraudulent bankrupt micro firms. However, Table 2 does not provide any evidence for this pattern for suspected tax fraud (STAXFRAUD) and suspected other frauds (SOUTHFRAUD).

While Table 2 reveals no significant differences in the proportions of firms suspected of accounting or tax fraud between audited and unaudited firms, the table shows that auditor resignations positively and significantly correlate with accounting and tax fraud. For example,

firms whose auditor has resigned within two years before the bankruptcy filing (RESIGNED2=1), 38.3% are suspected of accounting fraud. The corresponding percentage for firms whose auditors did not resign is 22.5%. Furthermore, Table 2 shows (column RESIGNED1=1) that 24.8% of the micro firms whose auditors resigned two to four years before bankruptcy are suspected of accounting fraud two years prior to the bankruptcy filing. The percentage for firms whose auditors do not resign (column RESIGNED1=0) is 9.3%. Using Pearson chi-square tests, the differences in these percentages are statistically significant at the 0.01 level. Overall, the univariate results suggest that auditing does not prevent accounting or tax fraud, but auditor resignations do correlate with a higher risk of fraud.

The patterns for the other kinds of fraud ($SOTHFRAUD_{t+2}$ and $SOTHFRAUD_{t-2}$ in the table) are somewhat different. For these variables, the proportion of firms with board members suspected is higher among unaudited firms than among audited firms. Consistent with the results for accounting and tax fraud, auditor resignations correlate positively with suspected fraud before the bankruptcy filing.

Table 2 also shows that unaudited firms are less likely to have entrepreneurs on the board and are more likely to have at least one board member as well as suspected of having used a "frontman" board member. As discussed in section 4.3, entrepreneurs who are more prone to commit illegal actions might try to reduce their legal liability by not being on the board, suggesting that entrepreneurs inclined to commit fraud are less likely to be board members. Furthermore, a significantly higher percentage of the unaudited firms have at least one board member that has been convicted of fraud (6.2% compared to 4.7%). Because research suggests criminals are versatile and easily move from non-white collar crime to white collar crime (Law and Mills, 2019), this evidence suggests that high disregard for laws correlates with opting out of auditing.

[Insert Tables 2 and 3 about here]

The Pearson correlation matrix in Table 3 shows that the various types of suspected crimes are positively correlated. The correlation between suspected accounting violations and tax crimes is 0.58. The correlations between $SACCFRAUD_{t+2}$ and $SOTHCFRAUD_{t+2}$ is 0.20, and the correlation between $STAXFRAUD_{t+2}$ and $SOTHCFRAUD_{t+2}$ is 0.21. With respect to the control variables, Table 3 shows that the average age of board members (AVAGE) and gender correlates negatively with fraud. Furthermore, measures aimed to capture board members' tendency to commit fraud (i.e., FRONTMAN, NOINCOME and CRIMTEND) correlate positively with fraud. These correlations in Table 3 show in conjunctions with the findings in Table 2 that the averages of FRONTMAN and CRIMTEND are higher in audited than unaudited micro firms, indicating that personality characteristics are possible confounders when examining the association between auditing and fraud.

5.2 Main tests of hypotheses

Panel A of Table 4 reports results with the fraud variables (i.e., SACCFRAUD, STAXFRAUD, SOTHFRAUD) taking the value of one if at least one board member is suspected of fraud within the two-year period after the bankruptcy filing, while Panel B reports results with the fraud variables taking the value of one if board members are suspected of fraud within the two-year period before bankruptcy. Columns 1, 4 and 7 in Panels A and B report estimations of Equation (1b) without board-level variables, and Columns 2, 5 and 8 include board-level variables. We estimate these six models with logit and tabulate average marginal effects. All logit models are significant at the 0.01 level and their Pseudo R-squared range between 0.03 and 0.26. Columns 3, 6 and 9 report estimates of Eq. (1b) using linear instrumental variable (IV) regressions. These regressions are also significant at the 0.01 level and have R-squared values between 0.01 and 0.17.

Appendix 3 reports the first stage of the IV regressions, specified in Eq. (1a). Appendix 3 shows that our instrument MUNICNOAUD and has a positive and significant coefficient and that the square of MUNICNOAUD has a significantly negative coefficient, indicating that our instruments for NOAUD are relevant. Furthermore, using Hansen's test of overidentifying restrictions, we cannot reject the null hypotheses that the instruments are valid at the 0.05 level (see Table 4).[36]

The inclusion of auditor resignations and the indicator for whether the firm is audited or not in the same regressions means that we control for possible auditor resignations within two years before the financial year with RESIGNED1 and auditor resignations between the year when we study whether the firm is audited or not and bankruptcy with RESIGNED2 in the models. Therefore, NOAUD measures the association between auditing and fraud if the auditor would not resign two years before the financial year studied, and the auditor will not resign in the period between the financial year and the bankruptcy filing.[37]

Overall, Table 4 provides little support for Hypothesis 1 predicting that auditing reduces fraud. While NOAUD has positively significant coefficients in the logit regressions in Panel B with $SACCFRAUD_{t-2}$ as the dependent variable, the coefficients are insignificant in the IV regressions and in the logit regressions in Panel B with $SACCFRAUD_{t+2}$ as the dependent variable. Furthermore, NOAUD has insignificant coefficients in all regressions with STAXFRAUD as the dependent variable. NOAUD is significantly positive in the logit

[36] An alternative to a linear IV regression is an endogenous probit model. With a few exceptions, the results are qualitatively and quantitatively similar to the ones in Table 4. As in Table 4, NOAUD is insignificant in all regressions with the endogenous probit model. However, RESIGN1 has positively significant coefficients in the regressions with $SACCFRAUD_{t+2}$, $STAXFRAUD_{t-2}$ and $SOTHFRAUD_{t-2}$ as the dependent variables. RESIGN1 is insignificant, or significant in the 0.10 level, in the corresponding linear IV regressions.

[37] We acknowledge we are slightly inexact here since we use financial data between 1.5 and 2.5 years before the bankruptcy filing in the analysis. Therefore, it is possible that RESIGNED1 assumes the value 1 although the auditor has resigned after the audit of the financial year included in our data, or that RESIGNED2 takes the value one if the auditor has resigned before the financial year in the data.

regressions with SOTHFRAUD as the dependent variable, but the result does not survive in the IV regressions.

Consistent with Hypothesis 2 the results show that auditor resignations correlate positively with accounting fraud. RESIGNED1 is positively significant coefficients in the regressions with the dependent variable $SACCFRAUD_{t-2}$, and RESIGNED2 is positively significant coefficients in the regressions with the dependent variable $SACCFRAUD_{t+2}$. These results suggest that auditor resignations two to four years before bankruptcy is positively associated with accounting fraud investigations zero to two years before the bankruptcy, and that auditor resignations zero to two years before bankruptcy is positively associated with accounting fraud investigations zero to two years after the bankruptcy filing. The average marginal effects of RESIGNED2 in the logit regressions in Panel A are 14.2% and 15.5% percent, while the average marginal effects of RESIGNED1 in Panel B are 8.8% and 10.3%. These results suggest that the accounting fraud risk is 9% to 15% higher if the auditor has resigned. Another way to conceptualize the economic significance of resignations is to look at the adjusted risk ratio (ARR), which is calculated as the probability of suspected accounting fraud in firms whose auditors have resigned divided by the probability in firms whose auditors have not resigned. ARR of RESIGNED2 is 1.81 (1.73) in Column 1 (Column 2) of Panel A, and ARR of RESIGNED1 is 1.33 (2.32) in Column 1 (Column 2) of Panel B. These ARRs suggest that the risk of accounting fraud is, depending on the model specification, 30% to 130% higher if the auditor has resigned. Overall, our finding suggest that accounting fraud risk is considerably higher if the auditor has resigned.[38]

[38] The coefficients if RESIGNED1 are based on events zero to two years before the financial year. This means that auditor resignations when auditing was mandatory influence the coefficient estimates for observations from 2011 and 2012 in the data. The association between auditing and fraud might be different when auditing is voluntary and mandatory. To analyze the possible impact of mandatory auditing on the coefficient estimates of RESIGNED1, we re-estimated the regressions in Table 4 on a sample with financial years from 2013 to 2016. Consistently with the results in Panel B of Table 4, these results show that RESIGNED1 is positively and significantly associated with $SACCFRAUD_{t-2}$.

Furthermore, the logit regressions in Panels A and B show that auditor resignations are positively and significantly associated with suspected tax fraud. However, these associations turn insignificant in the IV regressions. A final noteworthy finding related to Hypothesis 2 is that RESIGNED1 and RESIGNED2 are positively and significantly associated with $SOTHFRAUD_{t-2}$. However, also this result turns insignificant in the IV regressions. In conclusion, the findings in Table 4 provide strong support for the prediction that auditor resignations predict suspected accounting fraud. The table provides only partial support for an association between resignations and tax fraud, and for an association between resignations and other kinds of fraud.

[Insert Table 4 about here]

The following noteworthy observations can be made related to the control variables. First, consistent with the prediction that entrepreneurs stay away from the board and hire a frontman if they intend to undertake fraudulent actions, ENTR has a negatively significant coefficient in the regressions. The marginal effect of ENTR in the logit regression with $SACCFRAUD_{t+2}$ as the dependent variable in Column 2 is -0.055, suggesting that firms are more than 10 percent more likely to be suspected of accounting fraud if the entrepreneur is not a board member. Second, and consistent with the same prediction, FRONTMAN has positively significant coefficients in Panel B of Table 4. The marginal effect of FRONTMAN in Panel B is between 0.046 and 0.305, suggesting that if at least one board member is suspected being a frontman (or has used a frontman), the risk of fraud increases depending on the model specification, between 5% and 30%, respectively. Indeed, these estimates are imprecise since, as shown in Table 2, few board members are suspected of violating the frontman ban.

Furthermore, Table 4 reveals significant positive associations between NOINCOME and accounting fraud. As discussed in Section individuals with no income have low costs associated with being convicted, and therefore, likely to accept joining boards even if it is associated with

apparent legal risks. Moreover, CRIMTEND has significantly positive coefficients in the regressions in Panels A and B with SOTHFRAUD as the dependent variable, showing that firms with board members convicted of non-white collar crimes are more likely to be suspected of fraud. This result is consistent with the view that criminals are versatile and move from non-white collar crime to white collar crime (Law and Mills, 2019). Interestingly, most of the results show that boards with females are less likely to be suspected of fraud.

Overall, the results show that demographic characteristics, criminal background and variables aimed at capturing attempts to avoid legal liability associated with fraud (which may correlate with personality characteristics) are significant determinants of suspected fraud. Regarding the financial position of the firm, the results show that firms with a higher leverage two years before bankruptcy are more likely to be suspected of accounting or tax fraud after the bankruptcy filing. A high leverage accentuates the incentive to take actions that benefit owners at the expense of creditors (Jensen and Meckling, 1976). Our results indicate that such actions may be fraudulent, highlighting the benefits of incentivizing firms to go bankrupt in a relatively early phase of financial difficulties, for example, by penalizing delayed filings.

6. Additional analyses

6.1 Convicted fraud as the dependent variable

This section analyzes the associations between auditing, auditor resignations and fraud convictions. Because it may take long time between suspected fraud and conviction of fraud, we examine fraud convictions within one year after the bankruptcy filing.[39] Contrary to Hypothesis 1, Table 2 shows that a higher percentage of board members in audited firms than

[39] The data with convictions are based on another file from Brå than the data on suspects, which does not include the date of fraud was suspected.

in unaudited firms are convicted for accounting and tax fraud. However, consistent with Hypothesis 1, Table 2 shows that 1.2% of the board members of audited firms and 1.8% of the board members of unaudited firms are convicted for at least one of the kinds of fraud included in the "other" category. Furthermore, Table 2 shows that accounting and tax fraud convictions are much more common in firms whose auditors have resigned. This result is consistent with Hypothesis 2.

Columns 1, 3 and 5 in Table 5 use logit regressions to test Hypotheses 1 and 2 with convicted fraud as the dependent variable. As in the tables discussed above, the columns report average marginal effects. Columns 2, 4 and 6 report IV regression results.

[Insert Table 5 about here]

Consistent with the results with suspected fraud as the dependent variable in Table 4, Table 5 fails to find support for Hypothesis 1 when fraud is measured with accounting or tax fraud. Also consistent with the results using suspected fraud as the measure, $OTHFRAUD_{t+3}$ has a positively significant coefficient in the logit regression, while the association is insignificant in the IV regression. Furthermore, Table 5 shows strong positive associations between auditor resignations and accounting fraud. The average marginal effects of resignations are 0.107 and 0.123, suggesting that firms are more than 10% more likely to be convicted of accounting fraud if the auditor has resigned. ARRs of RESIGNED1 and RESIGNED2 are 1.68 and 1.82 respectively, suggesting that compared to firms whose auditors do not resign, firms whose auditors resign are around 70% to 80% more likely to be convicted of accounting fraud. A final observation that can be made from Table 5 is that auditor resignations are not significantly associated with tax and other fraud. Overall, results with convictions in Table 5 are consistent with the results based on suspected fraud in Table 4.

6.2 Association between auditing and fraud under mandatory and voluntary auditing

Auditing was mandatory for all firms in Sweden until the end of 2010. An alternative way to test Hypothesis 1 is to examine whether firms are more likely to be suspected of fraud under voluntary than mandatory auditing. Because the frequency of the various kinds of fraud may differ between the periods with mandatory and voluntary auditing, we use difference-in-difference analysis (DID) to test the hypothesis. The identification assumption in the DID analysis is that the treatment (i.e., unaudited) firms and the control (i.e., audited) firms have parallel trends in fraud. Following prior related studies (Kausar et al., 2016), we use a stacked DID with unaudited firms under voluntary auditing (years 2011 to 2016) matched with audited firms under mandatory auditing (years 2005 to 2010) in the treatment sample, and audited firms under voluntary auditing matched with audited firms under mandatory auditing in the control sample. We use one-to-one propensity score matching to identify the treatment and control samples. We use logit to estimate the propensity score and include the control variables in Eq. 2 below in the DID regression. The propensity score is based on a regression with all variables in Eq. 2 except NOAUD and year indicators. We ended up with a sample including 3,448 unaudited firms and 3,448 matched pairs in the treatment sample, and 2,823 audited firms and 2,823 matched pairs in the control sample. The sample includes 6,271 unique firms in the voluntary auditing period, and because the same firm is allowed to be the matched pair more than once, the sample includes 4,622 unique firms in the mandatory auditing period. We estimate the following regression:

$$\begin{aligned} DepVar = {} & \beta_0 + \beta_1 NOAUD + \beta_2 POSTMAND + \beta_3 NOAUD\#POSTMAND \\ & + \beta_4 RESIGNED1 + \beta_5 RESIGNED2 + \beta_5 ENTR \\ & + \beta_6 FRONTMEN + +\beta_7 \text{NOINCOME} + \beta_8 CRIMTEND \\ & + \beta_9 BSEATS + \beta_{10} FEMALE + \beta_{11} EDSEC \\ & + \beta_{12} UNIV/COLL + \beta_{13} AGE + \beta_{14} LNBOARDSIZE \\ & + \beta_{15} LNASSETS + \beta_{16} ROA + \beta_{17} LEV + \beta_{18} CATA \\ & + \beta_{19} TANGTA + \beta_{20} LNFIRMAGE + \beta_{21-34} INDUSTRY \\ & + \beta_{35-47} YEAR + \beta_{48-60} COUNTY + \varepsilon \end{aligned} \quad (2)$$

POSTMAND is an indicator taking zero in the 2005 to 2010 period, and one in the 2011 to 2016 period. The other variables in Equation (2) are defined in section 4.3. We estimate Eq. (2) with ordinary least squared (OLS). If there is a greater increase (or smaller decrease) in suspected fraud in audited firms than in unaudited firms, we expect a positive coefficient on the interaction NOAUD#POSTMAND. Table 6 reports the coefficient estimates, lower bounds and the upper bounds of the 95% confidence intervals. For brevity, we only tabulate the estimates related to NOAUD, POSTMAND and NOAUD#POSTMAND. The coefficient estimates of NOAUD#POSTMAND in the regressions with SACCFRAUD are insignificant, and the estimates with STAXFRAUD as the dependent variable provides inconsistent results. While it is difficult to set a level for when the impact of auditing on fraud is economically significant, the relatively small confidence intervals in the regressions with SACCFRAUD and STAXFRAUD indicates that the impact is likely to be also economically insignificant. Coefficient estimates in OLS regressions show the marginal effects. Thus, Column 1 in Table 6 suggests that there is only 5% chance that voluntary auditing increases accounting fraud with more than 3.8%. The upper bounds are lower in the other regressions in Table 6 with SACCFRAUD or STAXFRAUD as the dependent variables.

[Insert Table 6 about here]

However, the significantly positive coefficients of NOAUD#POSTMAND in the regressions with $SOTHFRAUD_{t-2}$ and $SOTHFRAUD_{t+2}$ as the dependent variables indicate that unaudited firms are more likely to be suspected of fraud (including misconduct, embezzlement, fraudulent transfers and other forms of crimes that harm creditors). This result is consistent with the logit regressions, but inconsistent with the IV regressions, in Table 4.

6.3. Information contents of auditor resignations under mandatory and voluntary auditing

Results discussed above show that auditor resignations predict accounting fraud, while they fail to provide consistent evidence of associations between resignations and tax or other types of fraud. This section investigates whether there is a stronger association between auditor resignation and accounting fraud under mandatory or voluntary auditing. Whether the association is stronger or weaker under mandatory or voluntary auditing is not ex ante obvious. A reason why the association could be stronger under mandatory auditing is that firms with managers inclined to commit fraud will opt out of auditing if it is voluntary. However, all entrepreneurs inclined to commit fraudulent actions are not necessarily opting out, since entrepreneurs may also attempt to build up an image of being trustworthy by hiring an auditor. Furthermore, other reasons for auditor resignation than accounting fraud (for example, that the firm is late with payments of audit fees) may at a greater extent obscure the association between auditor resignations and accounting fraud under mandatory auditing.

To get evidence on the strength of the association between resignations and fraud under mandatory and voluntary auditing, we compare the association between resignations and fraud for 6,032 failing firms from a period with mandatory auditing (years 2005 to 2010) with 6,271 failing firms from the period with voluntary auditing (years 2011 to 2016). The voluntary auditing sample includes the firms included in the main tests of our hypotheses in Section 5.2, that is, 2,823 audited and 3,448 unaudited firms (see Table 2).[40] An outright comparison of the association between resignations and fraud before and after the switch to voluntary auditing in micro firms might be affected by seasonal patterns or changes in practices by fraud investigators, and therefore, we use a control group with failing firms whose sizes are above the threshold for voluntary auditing, but yet smaller than the double threshold, and estimate a

[40] Different from Table 6, we include all firms that could opt out of auditing in the control group instead of firms that have actually opted out in the analyses in this section. The reason for this is that it is obviously not so relevant to study auditor resignations in firms that already have opted out of auditing.

DID regression.[41] The control sample includes 2,157 failing firms from 2011 to 2016 and 2,577 failing firms from 2005 to 2010.

Un-tabulated results show that auditor resignations are significantly more common just prior to bankruptcy under mandatory than voluntary auditing for the treatment sample. Under the mandatory auditing period, the auditor resigned less than two years before the bankruptcy filing in 21.39% (1,289 / 6,032) firms. The corresponding percentage is 8.79% (551 / 6,271) under voluntary auditing. The percentage of auditors that resigned two to four years before bankruptcy is 2.57% (155 / 6,032) under mandatory and 2.31% (145 / 6,271) under voluntary auditing. Contrary to the treatment sample, fewer auditors resigned less than two years before bankruptcy in the 2011 to 2016 period than in the 2005 to 2010 period (13.07% compared with 16.18%).

We estimate the following DID regression:

$$
\begin{aligned}
DepVar = {} & \beta_0 + \beta_1 VOLAUD + \beta_2 POSTMAND + \beta_3 RESIGNED1 \\
& + \beta_4 VOLAUD\#POSTMAND + \beta_5 VOLAUD\#RESIGNED1 \\
& + \beta_6 POSTMAND\#RESIGNED1 \\
& + +\beta_7 POSTMAND\#VOLAUD\#RESIGNED1 + \beta_8 RESIGNED2 \\
& + \beta_9 VOLAUD\#RESIGNED1 + \beta_{10} POSTMAND\#RESIGNED2 \\
& + +\beta_{11} POSTMAND\#VOLAUD\#RESIGNED2 \\
& + CONTROL\ VARIABLES \beta_{12} \text{NOINCOME} + \beta_{13} CRIMTEND \\
& + \beta_{14} BSEATS + \beta_{15} FEMALE + \beta_{16} EDSEC \\
& + \beta_{17} UNIV/COLL + \beta_{18} AGE + \beta_{19} LNBOARDSIZE \\
& + \beta_{20} LNASSETS + \beta_{21} ROA + \beta_{14} LEV + \beta_{22} CATA \\
& + \beta_{23} TANGTA + \beta_{24} LNFIRMAGE + \beta_{25-38} INDUSTRY \\
& + \beta_{39-49} YEAR + \beta_{50-68} COUNTY + \varepsilon
\end{aligned}
\tag{3}
$$

VOLAUD is an indicator variable that takes the value one if the firm's size is below the thresholds for voluntary auditing and zero otherwise. All other variables in Equation 3 are explained in Appendix 1.

[Insert Table 7 about here]

[41] That is, firms whose size do not exceed more than one of the following: revenues > SEK 6 million; total assets > SEK 3 million and number of employees > 6.

The main variables of interest are the POSTMAND#VOLAUD#RESIGNED interactions. Positive coefficients on these interactions suggest that the association between auditor resignations and suspected accounting fraud is stronger under the voluntary auditing regime in 2011 to 2015 than under the mandatory auditing regime in 2005 to 2010, while a negative association indicates the opposite. Column 1 of Table 7 reports results with $SACCFRAUD_{t+2}$ as the dependent variable, and it shows that POSTMAND#VOLAUD#RESIGNED2 has a significantly positive coefficient, suggesting that the association between an auditor resignation less than two years before bankruptcy and an initiation of an accounting fraud investigation is stronger when auditing is voluntary than mandatory. Furthermore, the significantly positive coefficients of POSTMAND#VOLAUD#RESIGNED1 and POSTMAND#VOLAUD#RESIGNED2 in Column 2 suggest that the association between auditor resignations two to four year before bankruptcy, as well as the association between auditor resignations less than two years before bankruptcy, are significantly stronger when auditing is voluntary.[42] As a robustness check, we estimated the regressions in Table 7 on a matched sample with 6,032 firms whose size is below the threshold for mandatory auditing in 2011 to 2016 and 6,032 matched pairs from the 2005 to 2010 period, and a control sample with 2,157 firms from 2011 to 2016 whose size is above the threshold for mandatory auditing and 2,157 matched pairs from 2011 to 2016. We used propensity score matching to identify the pairs.[43] Un-tabulated results show that the results are qualitatively and quantitatively similar to the ones in Table 7. In conclusion, the findings suggest that the association between auditor resignations and accounting fraud is stronger when auditing is voluntary than when auditing is mandatory.

[42] The coefficients if RESIGNED1 are based on events zero to two years before the financial year. This means that auditor resignations when auditing was mandatory influence the coefficient estimates for observations from 2011 and 2012 in the data. However, the results are qualitatively and quantitatively similar when we drop the years 2011 and 2012 from the regression in Column 2 of Table 7.

[43] The logit regression used to identify the matched pairs include all variables in Eq. 3, except the test variables NOAUD, RESIGNED1 RESIGNED2 and year indicators.

6.4. Associations in small and large cities

Prior research shows that there is considerable geographical variation in rates of financial misconduct within countries (Kedia and Rajgopal, 2011; Parsons et al., 2018). Around half (2,916 / 6,271) of the firms in our sample are located in large city areas (Stockholm, Gothenburg or the Malmo areas), while the other half are in smaller cities or municipalities. Our data shows that suspected accounting, tax and other kinds of fraud are significantly more common in the large city areas. For example, 28.22 % of the firms from large city areas are suspected of accounting fraud within two years after the bankruptcy while 20.06% of the firms from smaller cities are suspected. The corresponding percentages are 9.36% and 5.57% for suspected tax fraud, and 6.31% and 4.11% for suspected fraud in the other category.

Prior studies show that auditors' local knowledge and proximity to clients correlate positively with audit quality (Chan et al., 2021; Francis et al., 2022). Based on literature suggesting that there are informational advantages that dissipate with distance to the client (Jensen et al., 2015), this section investigates whether the associations between opting out of auditing, auditor resignations and fraud differ between geographical areas.[44] To examine these issues, we estimate logit and IV regressions in which we interact NOAUD, RESIGNED1 and RESIGNED2 with a LARGE CITIES indicator.

[Insert Table 8 about here]

A first observation that can be made from the logit regressions in Panel A of Table 8 is that suspected fraud are overall more common in large city areas. The average marginal effects reported in the panel suggest that suspected accounting fraud, tax fraud and other kinds of fraud within two years after the bankruptcy filing are between 4% and 10% more likely in large city areas than in smaller cities. Regarding the associations between whether a firm is audited or not

[44] Our data does not include information about the location of the audit office. Therefore, we are not able to have the geographical distance between the client-firm and the auditor as a variable in our analyses.

two years before bankruptcy, Panel A shows that the NOAUD#LARGE CITIES interactions have insignificant coefficients, suggesting that there are no statistically observable differences in the impact of auditing on fraud in large city areas and smaller cities.

However, the negatively significant coefficient on RESIGNED2#LARGE CITIES in Column 1 of Panel A shows that the association between auditor resignations within two years before the bankruptcy filing and accounting fraud suspected after the bankruptcy filing is much weaker in large city areas than in smaller cities. The average marginal effects of RESIGNED2 and RESIGNED2#LARGE CITIES are 0.200 and -0.108 respectively, suggesting that a resignation in a smaller city correlates with a 20% higher probability of suspected accounting fraud, while an auditor resignation in a large city area correlates with an around 10% increase in suspected accounting fraud.

Panel B reports IV regressions with interactions between RESIGNED1 and RESIGNED2 and a LARGE CITIES indicator. Furthermore, we instrument NOAUD and NOAUD# LARGE CITIES with MUNICNOAUD and its square as instrumental variables. The regressions include the same control variables as in Eq. 1a and 1b. Consistently with the results in Panel A, the IV regressions in Panel B of Table 7 show that RESIGNED2 has a significantly positive coefficient and that RESIGNED2#LARGE CITIES has a significantly negative coefficient. The finding that auditors resign more frequently if accounting fraud is suspected in smaller cities is consistent with the view that auditors in small cities have an informational advantage through the gathering of "soft" information because they are closer to the client firm (Jensen et al., 2015).

6.3. Auditing measure based on files from Swedish Companies Registration Office

In the main analysis, the coding of NOAUD is based on whether an audit report has been enclosed to the financial statements in the Serrano database or not. A limitation of this measure is that firms with an auditor might fail to enclose the audit report with their financial statements. Firms are expected to give notice to SCRO if they have changed their auditor. In this section we use files from SCRO as a measure of auditing. This measure classifies 65.62% (4,115 / 6,271) as audited while the measure used in the main analysis classifies 45.02% (2,823 / 6,271) firms as audited. We suspect that the reason for the considerable higher percentage audited with the measure from SCRO is that firms fail to notice SCRO when they opt out. However, to test the robustness of the results, Table 9 reports logit and IV regression results with NOAUD(SCRO) as the test variable.

[Insert Table 9 about here]

The results in Table 9 are qualitatively similar to the ones in Table 4. The coefficients of NOAUD(SCRO) are insignificant, the coefficient of RESIGNED2 is significant at the 0.01 level in the regressions with $SACCFRAUD_{t+2}$ as the dependent variable, and the coefficients of RESIGNED1 and RESIGNED2 are significant in the regressions with $SACCFRAUD_{t-2}$ as the dependent variable.

7. Conclusions

Policymakers' view on allowing voluntary auditing varies considerably across the world. Some suggest that it auditing can reduce the risk of accounting fraud, tax fraud, and economic crime in general (Accountancy Europe, 2020). Swedish legislation has for long required auditors to notice prosecutors if a firm is suspected of tax fraud, money laundering and violations of sections of the Penal Code about fraud, embezzlement and some other crimes that harm creditors. In this study we use the Swedish setting to explore if auditing reduces fraud.

Moreover, practitioners in Sweden argue that auditors have an alleviating influence on actions regarded as economic crime – whether they be intentional or unintentional (e.g., Andersson, 2005; Brännström, 2005). EU has also recently adopted an AML package requiring auditors to notice authorities if a client is suspected of tax fraud or money laundering.

We find no consistent support for the prediction that fraud would be less common in firms that have opted out of auditing than in audited firms. However, our results suggest that auditor resignations are positively and significantly associated with accounting fraud. This association is more pronounced in small cities where auditors are likely better informed about activities of entrepreneurs. Furthermore, using a difference-in-difference research design with firms before and after the year when audits of micro firms became voluntary, we find that auditor resignations are more strongly correlated with fraud under voluntary than mandatory auditing.

Our results should be of interest to standard setters and regulators. Because audit mandates impose costs on firms, mandatory must be motivated by significant benefits such as reduced economic crime that exceed the costs. Our research suggests that mandatory auditing does not result in significantly lower levels of accounting fraud, tax fraud or other kinds of fraud that are harmful for creditors. Furthermore, the generally insignificant associations between our measures of tax fraud and other kinds of fraud (including money laundering, embezzlement, fraudulent conveyances and other kinds of fraud that are harmful for creditors) and auditing indicates that legislation requiring auditors to detect and report fraud in micro firms might not be effective. A possible reason for this is that the interest of the auditor aligns with the entrepreneur who is paying for the audit service. Afterall, the owner of a small firm is unlikely to compensate the auditor for fraud-related work, suggesting that a resignation (as our results with accounting fraud suggests) is the only optimal solution if fraud is intentional.

A number of caveats related to this study should be considered. First, our sample only includes bankrupt micro-firms. We encourage future research to investigate the association

between fraud and auditing using samples with larger non-bankrupt private firms. Second, future studies should also investigate criminal individuals and organizations impact on the audit choice under different circumstances, whether they use some firms for economic crime, and others for legitimate business activities as a facade for them to be viewed as successful entrepreneurs. Future research should therefore focus on other externalities that may improve our understanding about the costs and benefits of auditing regulation, and, specifically, whether the implied benefit of firm opting out of auditing exceeds the costs, or vice versa.

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Appendix 1 Variable definitions

VARIABLE	DEFINITION
Dependent variables	
$SACCFRAUD_{t+2}$	An indicator variable taking the value one if at least one board-member is suspected of accounting fraud within two years *after* the bankruptcy filing, otherwise zero.
$SACCFRAUD_{t-2}$	An indicator variable taking the value one if at least one board-member is suspected of accounting fraud within two years *before* the bankruptcy filing, otherwise zero.
$STAXFRAUD_{t-2}$	An indicator variable taking the value one if at least one board-member is suspected of tax fraud within two years *after* the bankruptcy filing, otherwise zero.
$STAXFRAUD_{t-2}$	An indicator variable taking the value one if at least one board-member is suspected of tax fraud within two years *before* the bankruptcy filing, otherwise zero.
$SOTHFRAUD_{t+2}$	An indicator variable taking the value one if at least one board-member is suspected of embezzlement, fraud (other than accounting or tax) or money laundering within two years *after* the bankruptcy filing, otherwise zero.
$SOTHFRAUD_{t-2}$	An indicator variable taking the value one if at least one board-member is suspected of embezzlement, fraud (other than accounting or tax) or money laundering within two years *before* the bankruptcy filing, otherwise zero.
Test variables	
NOAUD	An indicator variable taking the value one if the firm does not have an auditor, otherwise zero. This variable is based Serrano.
RESIGNED1	An indicator taking the value one if the auditor has two to four years before the bankruptcy filing, otherwise zero.
RESIGNED2	An indicator taking the value one if the auditor has zero to two years before the bankruptcy filing, otherwise zero.
Control variables	
ENTR	An indicator variable taking the value one if at least one board-members is an entrepreneurs, otherwise zero.
FRONTMAN	An indicator variable taking the value one if at least one of the board-members have been suspected of having used (or acted as) a frontman over the 2010 to 2020 period, otherwise zero.
NOINCOME	An indicator variable taking the value one if board-members are not entrepreneurs and they all have zero in net taxable income, otherwise zero.
CRIMTEND	An indicator variable taking the value one if one or more of the board-members have been convicted of a non-white collar crime (e.g. burglary, drug-crime or unlawful threat) in the 2002 to 2020 period. Appendix 2 includes the list of crimes considered.
BSEATS	An indicator variable the value one if one or more of the board-members have been on the board of another firm that has gone bankrupt in the same or previous year. The variable is coded with one only if that firm is a small firm with more than SEK 0.8 million in net sales.

FEMALE	An indicator variable taking the value one if at least one board-member is female.
EDU9	An indicator variable taking the value one if the board-member with the highest education has nine years of schooling or less.
EDSEC	An indicator variable taking the value one if the board-member with the highest education has a secondary education.
UNIV/COLL	An indicator variable taking the value one if the board-member with the highest education has a college or university degree.
AGE	The average age of the board-members.
LNBOARDSIZE	The natural logarithm of the number of board members.
LNASSETS	The natural logarithm of total assets.
ROA	Net income to total assets.
LEV	Total liabilities to total assets.
CATA	Current assets to total assets.
TANGTA	Tangible assets to total assets.
LNFIRMAGE	The natural logarithm of the firm's age.
Variables used in additional analyses	
POSTMAND	An indicator variable taking the value one in years with voluntary auditing in micro firms (2011-) and zero in years with mandatory auditing (-2010).
VOLAUD	An indicator taking the value one if the firm's size is below the thresholds for mandatory auditing.
NOAUD(SCRO)	An indicator variable taking the value one if the firm does not have an auditor, otherwise zero. This variable is based on data from SCRO.
LARGE CITIES	An indicator taking the value one if the firm is located in one of the three largest cities in Sweden (Stockholm, Gothenburg or Malmo, or in the municipalities surrounding the cities. The indicator takes the value one if the firm is in small or mid-sized cities or municipalities.

Appendix 2 Definition of the variable CRIMTEND

Crime	Legislation
Violations of freedom and peace (e.g., kidnapping, trafficking, illegal threats, hacking)	Ch. 4 in Penal Code
Sexual offenses (e.g., pimping)	Ch. 6 in Penal Code
Theft and robbery	Ch. 8 in Penal Code
Crimes of public danger (e.g., general devastation)	Ch. 13 in Penal Code
Forgery crime (e.g., money counterfeiting)	Ch. 14 in Penal Code
Breach of public order	Ch. 16 in Penal Code
Threats or violence against officials	Ch. 17 in Penal Code
Drug crime	The narcotics penal code (1968:64).
Hunting crimes	The Hunting Law (1987:259)
Doping offences	Act on the prohibition of certain doping substances (1991:1969)
Weapons offenses	Arms Act (1996:67)
Excise control, alcohol	The Act (1998:506) on excise control of transport etc. of alcoholic products
Environmental crime	Environmental Code
Smuggling of narcotics, weapons and explosive items	Law (2000:1225) on punishment for smuggling
Human trafficking	Aliens Act (2005:716)
Social security contribution crimes	Contribution Offences Act (2007:612)
Illegal uses of flammable and explosive products	Act (2010:1011) on flammable and explosive goods
Illegal sale of alcohol	Alcohol Law (2010:622)
Illegal gambling activities	Gaming Act (2018:1138)
Illegal tobacco sales	Act (2018:2088) on tobacco and similar products

Appendix 3 Estimates of the first-stage regression in Eq. (1a)

	Coefficient	Z-value	
NOAUDMUNIC	0.828	4.59	***
NOAUDMUNIC#NOAUDMUNIC	-0.566	-2.54	**
RESIGNED1	-0.108	-2.66	***
RESIGNED2	-0.424	-28.62	***
ENTR	-0.034	-3.16	***
FRONTMAN	0.119	2.98	***
NOINCOME	0.035	1.77	*
CRIMTEND	0.026	1.21	
BSEATS	-0.004	-0.20	
FEMALE	0.008	0.72	
EDSEC	0.012	0.80	
UNIV/COLL	0.001	0.04	
AGE	-0.001	-1.12	
LNBSIZE	-0.021	-1.57	
LNASSETS	-0.069	-11.15	***
ROA	0.029	2.83	***
LEV	-0.041	-5.60	***
CATA	0.038	1.03	
TANGTA	0.126	3.20	***
LNFIRMAGE	-0.092	-15.59	***
Year FE	Yes		
Industry FE	Yes		
County FE	Yes		
Constant	1.819	17.18	***
Model F-value		105.40	***
R-squared		0.3594	

Notes: The table reports coefficient estimates and z-values for the first-stage regression in Eq. 1a. Z-values are based on robust standard errors clustered on firms. Variables are explained in Appendix 1.

Table 1 Financial year and industry distribution

Panel A: year distribution

Financial year	Audited	Unaudited	All firms	Percent unaudited
2011	954	146	1,100	13,27 %
2012	641	458	1,099	41.67 %
2013	418	535	953	56.14 %
2014	319	634	953	66.53 %
2015	245	749	994	75.35 %
2016	246	926	1,172	79.01 %
All years	2,823	3,448	6,271	54.98 %

Panel B: industry distribution

Industry	Audited	Unaudited	All firms
Agriculture, forestry and fishing	38	35	73
Manufacturing	175	149	324
Construction	563	816	1,379
Wholesale and retail trade	842	1,003	1,845
Transportation and storage	193	264	457
Accommodation and food service activities	223	297	520
Information and communication	104	117	221
Financing and insurance activities	14	12	26
Real estate activities	46	31	77
Professional, scientific and technical activities	275	254	529
Administrative and support service activities	167	182	349
Human health and social work activities	46	57	103
Mining and quarrying; electricity and water supply; waste management	15	11	26
Education; public administration and defence; compulsory social security	33	31	64
Other service activities	89	189	278
All industries	2,823	3,448	6,271

Table 2 Univariate evidence

	NOAUD = 0	NOAUD = 1	Chi-squared or t-value	RESIGNED1 = 0	RESIGNED1 = 1	Chi-squared or t-value	RESIGNED2 = 0	RESIGNED2 = 1	Chi-squared or t-value
Observations	2.567	3.057		5.488	136		4.124	500	
$SACCFRAUD_{t+2}$	0.233	0.243	0.85	0.237	0.297	2.75*	0.225	0.383	69.32***
$STAXFRAUD_{t+2}$	0.081	0.067	4.98**	0.072	0.110	2.99*	0.070	0.113	13.63***
$SOTHFRAUD_{t+2}$	0.045	0.056	3.80*	0.051	0.062	0.35	0.051	0.060	0.91
$SACCFRAUD_{t-2}$	0.094	0.099	0.57	0.093	0.248	39.10***	0.091	0.156	24.45***
$STAXFRAUD_{t-2}$	0.115	0.119	0.26	0.115	0.193	8.31***	0.113	0.160	10.64***
$SOTHFRAUD_{t-2}$	0.066	0.086	8.95***	0.076	0.138	7.75***	0.075	0.100	4.42**
$ACCFRAUD_{t+3}$	0.204	0.182	4.93**	0.189	0.324	16.76***	0.178	0.338	82.75***
$TAXFRAUD_{t+3}$	0.036	0.027	3.74*	0.030	0.069	7.07***	0.029	0.049	6.43**
$OTHFRAUD_{t+3}$	0.012	0.018	4.12**	0.015	0.034	3.72*	0.016	0.011	0.73
ENTR	0.494	0.455	9.67***	0.476	0.324	13.11***	0.482	0.370	25.34***
FRONTMAN	0.008	0.020	14.54***	0.014	0.041	7.49***	0.014	0.016	0.14
NOINCOME	0.082	0.092	1.99	0.086	0.152	7.70***	0.086	0.100	1.17
CRIMTEND	0.047	0.062	6.98***	0.055	0.083	2.17	0.055	0.060	0.26
BSEATS	0.091	0.113	8.66***	0.104	0.062	2.71*	0.104	0.093	0.74
FEMALE	0.294	0.323	5.89**	0.311	0.269	1.15	0.314	0.269	4.77**
EDU9	0.135	0.132	0.10	0.134	0.117	0.34	0.133	0.142	0.34
EDSEC	0.516	0.511	0.20	0.513	0.538	0.36	0.513	0.512	0.01
UNIV/COLL	0.349	0.357	0.49	0.353	0.345	0.05	0.354	0.347	0.11
AGE	47.320	45.148	7.75***	46.098	47.293	1.28	46.149	45.879	0.55
LNBSIZE	0.325	0.319	0.59	0.321	0.360	1.07	0.323	0.309	0.72
LNASSETS	13.697	13.444	11.06***	13.554	13.716	2.11**	13.545	13.693	3.63***
ROA	-0.169	-0.097	4.40***	-0.128	-0.190	1.14	-0.122	-0.213	3.20***
LEV	1.077	0.935	6.36***	0.993	1.237	3.27***	0.991	1.077	2.16**

CATA	0.759	0.752	0.98	0.755	0.756	0.03	0.756	0.739	1.46
TANGTA	0.185	0.202	2.69***	0.195	0.186	0.41	0.193	0.214	1.93*
LNFIRMAGE	7.635	7.146	19.68***	7.358	7.730	4.40***	7.347	7.573	5.04***
NOAUDMUNIC	0.168	0.285	36.99***	0.234	0.178	4.84***	0.237	0.188	8.05***

Notes: The significance levels are based on t-tests for the continuous variables and Pearson chi-square tests for the dichotomous variables. Variables are explained in Appendix 1. *** p<.01, ** p<.05, * p<.1

Table 3 Pairwise correlations

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	$SACCFRAUD_{t+2}$	1.00														
2	$STAXFRAUD_{t+2}$	**0.58**	1.00													
3	$SOTHFRAUD_{t+2}$	**0.20**	**0.21**	1.00												
4	$SACCFRAUD_{t-2}$	**0.02**	**0.03**	**0.03**	1.00											
5	$STAXFRAUD_{t-2}$	0.01	0.01	**0.03**	**0.54**	1.00										
6	$SOTHFRAUD_{t-2}$	0.01	**0.04**	**0.06**	**0.21**	**0.16**	1.00									
7	NOAUD	**0.02**	**-0.07**	0.01	**0.04**	**0.06**	**0.06**	1.00								
8	RESIGNED1	**0.02**	**0.03**	0.01	**0.07**	**0.04**	**0.03**	**-0.03**	1.00							
9	RESIGNED2	**0.09**	**0.08**	**0.04**	**0.07**	**0.04**	**0.05**	**-0.21**	**-0.07**	1.00						
10	ENTR	**-0.11**	**-0.08**	**-0.03**	**-0.10**	**-0.07**	**-0.07**	**-0.03**	**-0.05**	**-0.11**	1.00					
11	FRONTMAN	**0.03**	**0.04**	**0.04**	**0.10**	**0.09**	**0.09**	**0.06**	**0.02**	**0.02**	**-0.03**	1.00				
12	NOINCOME	**0.05**	**0.02**	0.01	**0.05**	0.01	**0.02**	0.01	**0.03**	**0.05**	**-0.29**	-0.01	1.00			
13	CRIMTEND	**0.04**	**0.04**	**0.12**	**0.05**	**0.05**	**0.15**	**0.04**	0.01	**0.02**	**-0.03**	**0.05**	0.01	1.00		
14	BSEATS	**0.04**	**0.04**	**0.03**	**0.08**	**0.37**	**0.04**	**0.08**	-0.01	-0.01	0.00	**0.06**	**-0.07**	**0.03**	1.00	
15	FEMALE	**-0.04**	**-0.02**	-0.01	**-0.03**	0.00	**-0.03**	**0.03**	0.00	-0.01	**-0.02**	0.00	**-0.06**	**-0.05**	**0.07**	1.00
16	EDU9	0.01	**0.02**	0.00	-0.01	**-0.05**	-0.01	**-0.02**	0.00	**0.03**	**-0.03**	-0.01	**0.09**	0.01	**-0.10**	**-0.10**
17	EDSEC	**-0.02**	**-0.02**	-0.01	**-0.02**	0.00	-0.01	**-0.02**	-0.01	-0.01	**0.04**	0.00	-0.01	0.00	**-0.09**	**-0.07**
18	UNIV/COLL	0.01	0.01	0.01	**0.04**	**0.03**	**0.02**	**0.03**	0.00	**-0.02**	**-0.03**	0.01	**-0.06**	-0.01	**0.17**	**0.15**
19	AGE	**-0.07**	**-0.06**	**-0.06**	0.01	**0.07**	**-0.06**	**-0.05**	**0.02**	**-0.04**	-0.01	**-0.02**	**0.13**	**-0.11**	**0.04**	**-0.03**
20	LNBSIZE	**0.02**	**0.03**	**0.07**	**0.07**	**0.16**	**0.09**	0.00	-0.01	**-0.02**	**0.08**	**0.04**	**-0.17**	**0.06**	**0.27**	**0.24**
21	LNASSETS	**-0.05**	0.00	**0.05**	0.00	-0.01	0.01	**-0.19**	0.00	0.00	**0.07**	**0.02**	**-0.03**	0.00	0.00	**-0.03**
22	ROA	-0.02	0.00	**0.03**	-0.01	-0.02	0.01	**0.06**	-0.01	**-0.04**	**0.03**	0.01	0.01	0.01	0.01	-0.02
23	LEV	**0.04**	**0.03**	**-0.03**	0.01	**0.03**	-0.01	**-0.08**	**0.04**	**0.03**	**-0.04**	-0.02	**0.05**	-0.02	-0.01	0.00
24	CATA	**-0.03**	**-0.03**	**-0.02**	-0.01	0.00	-0.02	-0.01	0.00	-0.02	**0.03**	**-0.05**	0.00	-0.01	-0.02	0.01
25	TANGTA	**0.03**	0.01	**0.03**	0.00	0.00	0.02	**0.03**	-0.01	0.02	**-0.03**	**0.04**	0.00	0.02	0.02	**-0.03**
26	LNFIRMAGE	**-0.06**	**-0.05**	**-0.04**	**-0.04**	**-0.09**	**-0.07**	**-0.21**	**0.03**	0.00	**0.07**	**-0.03**	**0.06**	**-0.05**	**-0.24**	**-0.09**
27	NOAUDMUNIC	0.01	**-0.10**	**-0.02**	**0.04**	**0.06**	**0.06**	**0.63**	**-0.03**	**-0.14**	**0.02**	**0.05**	-0.01	**0.04**	**0.07**	0.01

		16	17	18	19	20	21	22	23	24	25	26	27
16	EDU9	1,00											
17	EDSEC	**-0,43**	1,00										
18	UNIV/COLL	**-0,29**	**-0,74**	1,00									
19	AGE	**0,05**	**-0,06**	**0,03**	1,00								
20	LNBSIZE	**-0,22**	**-0,15**	**0,33**	**-0,04**	1,00							
21	LNASSETS	**-0,02**	**-0,03**	**0,05**	**0,02**	**0,09**	1,00						
22	ROA	**0,02**	-0,01	0,00	-0,02	**-0,03**	**0,34**	1,00					
23	LEV	-0,01	**0,04**	**-0,03**	**0,04**	-0,01	**-0,32**	**-0,57**	1,00				
24	CATA	0,00	0,00	0,00	**0,03**	**-0,04**	**-0,20**	0,02	0,00	1,00			
25	TANGTA	0,02	**0,04**	**-0,06**	**-0,03**	0,01	**0,15**	-0,01	0,01	**-0,85**	1,00		
26	LNFIRMAGE	**0,08**	**0,04**	**-0,10**	**0,37**	**-0,13**	**0,07**	-0,02	**0,05**	**0,10**	**-0,09**	**1,00**	
27	NOAUDMUNIC	**-0,02**	**-0,03**	**0,05**	-0,01	0,01	**-0,11**	0,02	**-0,04**	0,00	0,00	-0,09	1,00

Notes: Correlations significant at the 0.05 level are in bold. Variables are explained in Appendix 1.

Table 4 Association between auditing, auditor resignations and suspected fraud

Panel A: Suspected fraud after the bankruptcy date

	1		2		3		4		5		6		7		8		9	
			SACCFRAUD$_{t+2}$						STAXFRAUD$_{t+2}$						SOTHFRAUD$_{t+2}$			
NOAUD	0.024	*	0.018		0.173		0.014	*	0.011		0.076		0.017	**	0.015	**	-0.062	
	1.78		1.36		1.06		1.77		1.44		0.75		2.33		2.10		0.77	
RESIGNED1	0.071	**	0.054		0.077	*	0.015		0.009		0.023		0.009		0.005		-0.006	
	2.13		1.62		1.78		0.84		0.54		0.81		0.53		0.28		0.24	
RESIGNED2	0.155	***	0.142	***	0.227	***	0.026	**	0.022	**	0.057		0.014		0.011		-0.021	
	8.63		7.88		3.14		2.51		2.07		1.27		1.47		1.08		0.60	
ENTR			-0.062	***	-0.055	***			-0.021	***	-0.018	**			-0.002		-0.005	
			5.46		4.37				2.92		2.32				0.41		0.81	
FRONTMEN			0.031		0.023				0.064	***	0.108	**			0.016		0.041	
			0.75		0.41				3.41		2.36				0.91		1.21	
CRIMTEND			0.016		0.017				0.023	*	0.029	*			0.052	***	0.100	***
			0.73		0.64				1.95		1.66				6.07		5.00	
NOINCOME			0.050	***	0.048	**			0.007		0.003				0.008		0.010	
			2.62		2.09				0.62		0.20				0.76		0.92	
BSEATS			0.002		0.002				0.006		0.006				-0.004		-0.007	
			0.09		0.09				0.57		0.44				0.39		0.65	
FEMALE			-0.054	***	-0.051	***			-0.011		-0.011				-0.015	**	-0.013	**
			4.44		4.34				1.50		1.44				2.33		2.24	
EDSEC			-0.015		-0.017				-0.015		-0.016				-0.001		-0.000	
			0.90		1.00				1.51		1.51				0.07		0.01	
UNIV/COLL			0.000		-0.000				-0.014		-0.014				-0.008		-0.010	
			0.01		0.01				1.23		1.16				0.84		0.99	
AGE			-0.002	***	-0.002	***			-0.000		-0.000				-0.001	***	-0.001	***
			3.47		3.21				1.06		0.77				3.26		3.45	
LNBSIZE	0.025	**	0.045	***	0.047	***	0.023	***	0.026	***	0.029	***	0.021	***	0.026	***	0.027	***
	2.06		3.32		3.34		3.19		3.28		3.34		3.53		3.89		3.45	
LNASSETS	-0.019	***	-0.020	***	-0.010		0.011	***	0.011	***	0.016	**	0.009	**	0.009	**	0.005	
	2.93		3.03		0.75		2.62		2.63		1.97		2.51		2.54		0.71	

ROA	0.011		0.010		0.006		0.007		0.007		0.005		0.007		0.005		0.007			
	1.08		0.99		0.50		1.22		1.19		0.77		1.03		0.78		1.41			
LEV	0.019	***	0.017	**	0.025	**	0.016	***	0.015	***	0.020	***	-0.002		-0.002		-0.003			
	2.71		2.43		2.37		4.05		3.94		2.92		0.51		0.43		0.77			
CATA	-0.037		-0.030		-0.034		-0.011		-0.009		-0.015		0.013		0.012		0.016			
	0.97		0.80		0.86		0.51		0.43		0.55		0.68		0.62		0.86			
TANGTA	0.032		0.033		0.016		-0.005		-0.005		-0.020		0.031		0.027		0.038	*		
	0.79		0.81		0.35		0.20		0.23		0.66		1.56		1.34		1.65			
LNFIRMAGE	-0.018	***	-0.011	*	0.005		-0.013	***	-0.011	***	-0.004		-0.006	*	-0.002		-0.009			
	3.33		1.77		0.29		3.73		2.84		0.44		1.94		0.69		1.13			
Year FE	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes			
Industry FE	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes			
County FE	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes			
N	6,271		6,271		6,271		6,271		6,271		6,271		6,271		6,271		6,271			
Model chi-squared	224.83	***	306.48	***	332.39	***	209.47	***	269.41	***	221.24	***	93.74	***	207.35	***	130.51	***		
Pseudo R2 / R2	0.0334		0.0449		0.0265		0.0624		0.0726		0.0275		0.0373		0.0645		0.0102			
Hansen test of overidentifying restrictions																				
Chi-square					0.118						0.394						0.792			
(p-value)					0.731						0.530						0.374			

Panel B: Suspected fraud before the bankruptcy date

	1		2		3		4		5		6		7		8		9	
			SACCFRAUD$_{t-2}$						STAXFRAUD$_{t-2}$						SOTHFRAUD$_{t-2}$			
NOAUD	0.027	***	0.021	**	-0.024		0.010		0.009		-0.211	*	0.027	***	0.022	***	0.006	
	2.93		2.23		0.22		0.94		1.00		1.82		3.16		2.60		0.06	
RESIGNED1	0.103	***	0.088	***	0.129	***	0.065	***	0.060	***	0.051		0.052	***	0.041	**	0.049	
	5.90		5.14		3.50		2.86		3.11		1.42		3.01		2.32		1.60	
RESIGNED2	0.065	***	0.058	***	0.047		0.051	***	0.049	***	-0.043		0.037	***	0.031	***	0.023	
	5.36		4.88		0.96		3.78		4.09		0.84		3.19		2.62		0.53	
ENTR			-0.045	***	-0.041	***			-0.034	***	-0.041	***			-0.022	***	-0.021	***
			5.48		4.96				4.61		4.74				3.08		2.73	
FRONTMEN			0.134	***	0.305	***			0.089	***	0.206	***			0.046	**	0.096	**
			6.85		5.68				3.62		3.97				2.48		2.24	
CRIMTEND			0.021		0.028				0.019		0.020				0.079	***	0.150	***
			1.49		1.42				1.30		0.99				8.06		6.49	
NOINCOME			0.046	***	0.055	***			0.018		0.018				0.034	***	0.033	**
			3.85		3.15				1.32		1.14				3.02		2.33	
BSEATS			0.018		0.020				0.196	***	0.423	***			0.002		-0.002	
			1.60		1.34				25.60		20.95				0.16		0.16	
FEMALES			-0.041	***	-0.036	***			-0.031	***	-0.028	***			-0.044	***	-0.040	***
			4.58		4.35				3.78		3.23				5.53		5.65	
EDSEC			-0.005		-0.003				-0.001		0.008				-0.006		-0.005	
			0.39		0.24				0.11		0.77				0.56		0.49	
UNIV/COLL			-0.011		-0.009				-0.054	***	-0.052	***			-0.002		-0.002	
			0.80		0.73				3.68		4.10				0.20		0.20	
AGE			0.001	***	0.001	**			0.003	***	0.003	***			-0.001	**	-0.001	**
			2.62		2.28				8.16		7.11				2.25		2.47	
LNBSIZE	0.054	***	0.067	***	0.068	***	0.132	***	0.097	***	0.092	***	0.056	***	0.065	***	0.071	***
	6.85		7.53		6.40		16.81		11.48		8.95		7.86		8.33		7.31	
LNASSETS	0.008		0.008		0.006		-0.004		-0.000		-0.016	*	0.012	***	0.012	***	0.012	
	1.54		1.59		0.62		0.77		0.07		1.67		2.77		2.96		1.54	

ROA	-0.003		-0.005		-0.003		0.003		-0.003		0.002		-0.004		-0.006		-0.003		
	0.41		0.77		0.34		0.38		0.56		0.26		0.49		0.84		0.38		
LEV	0.008		0.005		0.005		0.011	**	0.007		-0.001		0.000		-0.001		0.000		
	1.44		0.97		0.64		2.18		1.54		0.17		0.07		0.14		0.07		
CATA	-0.003		0.007		0.009		0.027		0.025		0.035		0.028		0.036		0.036		
	0.10		0.29		0.31		0.92		1.01		1.24		1.11		1.46		1.49		
TANGTA	-0.003		-0.003		0.002		0.024		0.007		0.038		0.039		0.042		0.041		
	0.11		0.11		0.05		0.74		0.28		1.15		1.41		1.57		1.40		
LNFIRMAGE	-0.003		-0.007		-0.010		-0.016	***	-0.005		-0.026	**	-0.009	**	-0.006		-0.006		
	0.82		1.57		0.86		4.09		1.35		2.16		2.54		1.48		0.57		
Year FE	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		
Industry FE	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		
County FE	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		
N	6,271		6,271		6,271		6,271		6,271		6,271		6,271		6,271		6,271		
Model chi-squared	240.12	***	378.62	***	332.31	***	446.50	***	929.64	***	983.80	***	189.48	***	363.82	***	258.29	***	
Pseudo R2 / R2	0.0610		0.0992		0.0658		0.0907		0.2590		0.1676		0.0544		0.0962		0.0574		
Hansen test of overidentifying restrictions																			
Chi-square					0.015						0.008						0.699		
(p-value)					0.903						0.928						0.403		

Note: Columns 1,2, 4, 5, 7 and 8 in Panels A and B report average marginal effects and z-values from logit regression. Columns 3, 6 and 9 in Panels A and B report coefficients and z-values for estimations of Eq. 1b using linear instrumental variable regression. The logit regressions, and the first-stage IV regressions, include the variables in Eq. 1a. The significance levels are based on robust standard errors. The table reports Pseudo R-squared for logit regressions and R squared for the instrumental variable regressions. Variables are defined in Appendix 1. *** p<.01, ** p<.05, * p<.1

Table 5 Associations between auditing, auditor resignations and fraud convictions

	1		2		3		4		5		6	
Dependent variable	$ACCFRAUD_{t+3}$				$TAXFRAUD_{t+3}$				$OTHFRAUD_{t+3}$			
NOAUD	-0.019		0.078		-0.003		-0.021		0.009	**	-0.046	
	1.60		0.51		0.59		0.32		2.34		0.98	
RESIGNED1	0.107	***	0.141	***	0.018	*	0.027		0.010		0.008	
	3.80		3.30		1.65		1.13		1.28		0.48	
RESIGNED2	0.123	***	0.191	***	0.010		0.006		-0.004		-0.025	
	7.63		2.81		1.44		0.19		0.55		1.21	
Board-level control variables	Yes		Yes		Yes		Yes		Yes		Yes	
Firm-level control variables	Yes		Yes		Yes		Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes		Yes		Yes		Yes	
Year FE	Yes		Yes		Yes		Yes		Yes		Yes	
County FE	Yes		Yes		Yes		Yes		Yes		Yes	
N	6,271		6,271		6,271		6,271		6,271		6,271	
Model chi-squared	368,69	***	399.11	***	143.36	***	165.83	***	192.25	***	77.07	***
Pseudo R2 / R2	0.062		0.051		0.062		0.018		0.111		0.040	
Hansen test of overidentifying restrictions												
Chi-square			1.593				7.511				0.057	
(p-value)			0.207				0.006				0.812	

Notes: Columns 1, 3 and 5 report average marginal effects and z-values from logit regression. Columns 2, 4 and 6 report coefficients and z-values for estimations of Eq. 1b using linear instrumental variable regression. The logit regressions, and the first-stage IV regressions, include the variables in Eq. 1a. The significance levels are based on robust standard errors. The table reports Pseudo R-squared for logit regressions and R squared for the instrumental variable regressions. Variables are defined in Appendix 1. *** p<.01, ** p<.05, * p<.1

Table 6 Difference-in-difference analyses of the association between auditing and suspected fraud

	1 $SACCFRAUD_{t+2}$	2 $SACCFRAUD_{t-2}$	3 $STAXFRAUD_{t+2}$	4 $STAXFRAUD_{t-2}$	5 $SOTHFRAUD_{t+2}$	6 $SOTHFRAUD_{t-2}$
POSTMAND						
Coefficient	-0.013	0.011	-0.065 ***	0.020 ***	-0.012 **	0.015 **
Lower bound of 95% CI	-0.035	-0.003	-0.081	0.005	-0.024	0.003
Upper bound of 95% CI	0.009	0.026	-0.049	0.034	-0.001	0.027
T-value	1.17	1.52	7.92	2.71	2.15	2.44
NOAUD						
Coefficient	0.001	0.001	-0.000	0.002	-0.009 **	0.001
Lower bound of 95% CI	-0.014	-0.008	-0.012	-0.007	-0.017	-0.007
Upper bound of 95% CI	0.016	0.010	0.011	0.011	-0.001	0.008
T-value	0.13	0.18	0.07	0.47	2.30	0.14
POSTMAND # NOAUD						
Coefficient	0.012	0.015 *	-0.019 **	0.008	0.021 ***	0.022 ***
Lower bound of 95% CI	-0.013	-0.002	-0.037	-0.009	0.007	0.007
Upper bound of 95% CI	0.038	0.032	-0.001	0.025	0.034	0.037
T-value	0.94	1.72	2.03	0.97	2.99	2.87
Board-level control variables	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level control variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes
N	12,542	12,542	12,542	12,542	12,542	12,542
F statistic	12.65	9.87	13.40	25.59	5.11	8.97
R-squared	0.0478	0.0585	0.0614	0.1916	0.0348	0.0548

Notes: The table reports coefficient estimates, confidence intervals and t-values from OLS regressions. The regressions include the variables specified in Eq. 2. The significance levels are based on robust standard errors clustered on firms. Appendix 1 presents variable definitions. *** p<.01, ** p<.05, * p<.1

Table 7 Association between auditor resignations and suspected accounting fraud under mandatory and voluntary auditing

	1		2	
Dependent variable	$SACCVIOL_{t+2}$		$SACCVIOL_{t-2}$	
VOLAUD				
1	0.035	**	0.012	**
	29.70		36.76	
POSTMAND				
1	-0.035		0.034	*
	2.57		6.42	
RESIGNED1				
1	0.005		0.216	***
	1.62		81.58	
POSTMAND # RESIGNED1				
1 # 1	0.019		-0.134	**
	1.92		35.20	
VOLAUD # POSTMAND				
1 # 1	-0.016	**	-0.003	***
	25.03		110.36	
VOLAUD # RESIGNED1				
1 # 1	0.091	**	-0.146	**
	14.38		37.48	
VOLAUD # POSTMAND # RESIGNED1				
1 # 1 # 1	-0.062		0.206	***
	5.33		68.39	
RESIGNED2				
1	0.091	**	0.064	***
	55.20		73.84	
POSTMAND # RESIGNED2				
1 # 1	-0.004		-0.043	***
	1.26		102.86	
VOLAUD # RESIGNED2				
1 # 1	-0.026	***	-0.013	**
	168.13		17.20	
VOLAUD # POSTMAND # RESIGNED2				
1 # 1 # 1	0.087	***	0.053	***
	376.50		89.34	
Board-level control variables	Yes		Yes	
Firm-level control variables	Yes		Yes	
Industry FE	Yes		Yes	
Year FE	Yes		Yes	
County FE	Yes		Yes	
N	17,037		17,037	
R-squared	0.046		0.056	

Notes: The table reports coefficient estimates and t-values from OLS regressions. The significance levels are based on robust standard errors clustered on VOLAUD. Appendix 1 presents variable definitions. *** p<.01, ** p<.05, * p<.1

Table 8 Associations between auditing, auditor resignations and suspected fraud in large and small cities

Panel A: Logit results

	1		2		3		4		5		6	
Dependent variable	$SACCFRAUD_{t+2}$		$SACCFRAUD_{t-2}$		$STAXFRAUD_{t+2}$		$STAXFRAUD_{t-2}$		$SOTHFRAUD_{t+2}$		$SOTHFRAUD_{t-2}$	
NOAUD	0.036	**	0.038	***	0.018		0.007		0.019	**	0.029	
	2.02		2.89		1.62		0.61		1.97		2.45	
NOAUD#LARGE CITIES	-0.037		-0.031	*	-0.013		0.003		-0.009		-0.013	
	1.61		1.89		0.91		0.22		0.71		0.87	
LARGE CITIES	0.102	***	0.044	**	0.038	**	0.017		0.043	***	0.043	
	4.09		2.37		2.47		1.08		3.23		2.57	
RESIGNED1	0.098	**	0.103	***	0.018		0.076	***	0.017		0.060	
	2.02		4.07		0.69		2.59		0.64		2.14	
RESIGNED1#LARGE CITIES	-0.080		-0.025		-0.014		-0.025		-0.021		-0.027	
	1.21		0.75		0.42		0.66		0.59		0.75	
RESIGNED2	0.200	***	0.052	**	0.041	**	0.033	*	0.019		0.024	
	7.40		2.52		2.40		1.75		1.29		1.20	
RESIGNED2#LARGE CITIES	-0.108	***	0.006		-0.032		0.025		-0.017		0.007	
	2.97		0.23		1.49		1.00		0.84		0.29	
Board-level control variables	Yes		Yes		Yes		Yes		Yes		Yes	
Firm-level control variables	Yes		Yes		Yes		Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes		Yes		Yes		Yes	
Year FE	Yes		Yes		Yes		Yes		Yes		Yes	
County FE	Yes		Yes		Yes		Yes		Yes		Yes	
N	6,271		6,271		6,271		6,271		6,271		6,271	
Model chi-squared	316.64	***	387.03	***	282.30	***	942.24	***	221.40	***	357.28	***
Pseudo R-squared	0.048		0.101		0.075		0.260		0.070		0.096	

Panel B: Instrumental variable regressions

	1 SACCFRAUD$_{t+2}$		2 SACCFRAUD$_{t-2}$		3 STAXFRAUD$_{t+2}$		4 STAXFRAUD$_{t-2}$		5 SOTHFRAUD$_{t+2}$		6 SOTHFRAUD$_{t-2}$	
NOAUD	0.088		-0.055		0.054		-0.226	*	-0.077		-0.040	
	0.51		0.49		0.51		1.88		0.92		0.41	
NOAUD#LARGE CITIES	-0.045		-0.029		-0.034		0.025		-0.001		0.025	
	0.86		0.80		1.03		0.68		0.05		0.78	
LARGE CITIES	0.103	***	0.036		0.051	**	0.007		0.044	**	0.016	
	2.78		1.37		1.98		0.27		2.11		0.70	
RESIGNED1	0.104	*	0.116	**	0.022		0.061		0.003		0.044	
	1.83		2.35		0.67		1.20		0.11		1.06	
RESIGNED1#LARGE CITIES	-0.079		0.012		-0.010		-0.016		-0.020		0.001	
	1.03		0.17		0.20		0.24		0.46		0.02	
RESIGNED2	0.238	***	0.003		0.059		-0.078		-0.022		-0.011	
	2.91		0.06		1.22		1.41		0.56		0.24	
RESIGNED2#LARGE CITIES	-0.109	**	0.041		-0.039		0.064	*	-0.013		0.036	
	2.10		1.11		1.20		1.76		0.53		1.13	
Board-level control variables	Yes		Yes		Yes		Yes		Yes		Yes	
Firm-level control variables	Yes		Yes		Yes		Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes		Yes		Yes		Yes	
Year FE	Yes		Yes		Yes		Yes		Yes		Yes	
County FE	Yes		Yes		Yes		Yes		Yes		Yes	
N	6,271		6,271		6,271		6,271		6,271		6,271	
Model chi-squared	366.52	***	342.80	***	233.61	***	995.95	***	139.41	***	300.61	***
R-squared	0.049		0.057		0.038		0.166		0.004		0.054	
Hansen test of overidentifying restrictions												
Chi-square	1.09		0.41		0.38		0.70		2.47		0.71	
(p-value)	(0.580)		(0.816)		(0.827)		(0.706)		(0.291)		(0.703)	

Notes: Panel A reports average marginal effects and z-values from logit regression. Panel B reports coefficients and z-values for estimations of Eq. 4b using linear instrumental variable regression. The significance levels are based on robust standard errors. The table reports Pseudo R-squared for logit regressions and R squared for the instrumental variable regressions. Variables are defined in Appendix 1. *** p<.01, ** p<.05, * p<.1

Table 9 Associations between auditing, auditor resignations and suspected fraud using an alternative auditing measure

Panel A: Suspected fraud after the bankruptcy date

	1		2		3		4		5		6	
Dependent variable	$SACCFRAUD_{t+2}$				$STAXFRAUD_{t+2}$				$SOTHFRAUD_{t+2}$			
NOAUD(SCRO)	0.021		0.118		0.011		0.043		0.008		-0.034	
	1.43		0.95		1.20		0.57		1.00		0.57	
RESIGNED1	0.056	*	0.078	*	0.010		0.022		0.004		-0.005	
	1.68		1.74		0.59		0.75		0.24		0.22	
RESIGNED2	0.140	***	0.182	***	0.020	**	0.035		0.006		-0.003	
	7.99		4.91		1.98		1.54		0.67		0.19	
Board-level control variables	Yes		Yes		Yes		Yes		Yes		Yes	
Firm-level control variables	Yes		Yes		Yes		Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes		Yes		Yes		Yes	
Year FE	Yes		Yes		Yes		Yes		Yes		Yes	
County FE	Yes		Yes		Yes		Yes		Yes		Yes	
N	6,271		6,271		6,271		6,271		6,271		6,271	
Model chi-squared	307.47	***	345.12	***	272.70	***	224.85	***	208.47	***	135.91	***
Pseudo R2 / R2	0.045		0.043		0.073		0.036		0.064		0.025	
Hansen test of overidentifying restrictions												
Chi-square			0.351				0.644				1.137	
(p-value)			(0.554)				(0.422)				(0.286)	

Panel B: Suspected fraud before the bankruptcy date

	1		2		3		4		5		6	
			SACCFRAUD$_{t-2}$				STAXFRAUD$_{t-2}$				SOTHFRAUD$_{t-2}$	
NOAUD(SCRO)	0.011		-0.019		-0.015		-0.156	*	0.008		-0.012	
	1.05		0.24		1.52		1.87		0.82		0.16	
RESIGNED1	0.087	***	0.127	***	0.056	***	0.044		0.039	**	0.044	
	5.08		3.33		2.87		1.26		2.20		1.40	
RESIGNED2	0.052	***	0.053	**	0.041	***	0.009		0.023	**	0.017	
	4.56		2.10		3.55		0.38		2.04		0.80	
NOAUD(SCRO)												
Board-level control variables	Yes		Yes		Yes		Yes		Yes		Yes	
Firm-level control variables	Yes		Yes		Yes		Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes		Yes		Yes		Yes	
Year FE	Yes		Yes		Yes		Yes		Yes		Yes	
County FE	Yes		Yes		Yes		Yes		Yes		Yes	
N	6,271		6,271		6,271		6,271		6,271		6,271	
Model chi-squared	379.44	***	339.22	***	940.18	***	1043.97	***	359.97	***	299.58	***
Pseudo R2 / R2	0.098		0.068		0.259		0.219		0.094		0.057	
Hansen test of overidentifying restrictions												
Chi-square			0.002				0.150				0.610	
(p-value)			(0.961)				(0.698)				(0.435)	

Note: Columns 1, 3 and 5 in Panels A and B report average marginal effects and z-values from logit regression. Columns 2, 4 and 6 in Panels A and B report coefficients and z-values for estimations of Eq. 1b using linear instrumental variable regression. The logit regressions, and the first-stage IV regressions, include the variables in Eq. 1a. The significance levels are based on robust standard errors. The table reports Pseudo R-squared for logit regressions and R squared for the instrumental variable regressions. Variables are defined in Appendix 1. *** p<.01, ** p<.05, * p<.1