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Asymmetric Reactions of Abnormal Audit Fee Jump to Credit Rating Changes

Abstract: Considering the inherent stickiness of abnormal audit fees, our study contributes to the literature by decomposing abnormal audit fees into a jump component and long-run sticky component. We investigate whether and how changes in credit ratings asymmetrically affect the jump component of abnormal audit fees. We document a positive association between rating downgrades and the jump component. We find that heightened bankruptcy risk and misstatement risk are the mechanisms that drive this relationship. Further analysis shows that firms experiencing rating downgrades are more likely to receive a going concern opinion and experience longer audit report lags. Taken together, our findings provide direct evidence that credit ratings are significantly associated with abnormal audit fees, particularly with the jump component. Given the serial correlation of abnormal audit fees, our study sheds light on the importance of disaggregation of the abnormal audit fee residuals into the jump and long-run sticky components.

Keywords: credit ratings, abnormal audit fees, the jump component, audit outcomes

JEL Classification: M42, G10, G30, G34

1. INTRODUCTION

Although there is rich literature on abnormal audit fees (i.e., audit fee residuals), their determinants remain relatively unknown in the contemporary accounting and auditing literature. From an information environment change perspective, this study investigates whether credit rating changes can affect abnormal audit fee changes. To address this question, we firstly examine the association between abnormal audit fees and downgrades and upgrades. Given that the audit fee residuals are highly serially correlated (Doogar, Sivadasan, & Solomon, 2015), we disentangle the sticky long-run component from abnormal audit fees and focus on how the jump component reacts to changes in the information environment (using downgrades and upgrades as the proxy for changes in the information environment). We particularly investigate how downgrades affect abnormal audit fees. The reasoning is that downgrades may indicate high default risk and potential misstatement risk, which in turn raise the audit engagement risk and affect abnormal audit fees. This study explores the changes in credit ratings as an empirical setting to understand abnormal audit fees and their components.

Credit rating agencies play a critically important role as "financial gatekeepers" in capital markets by aggregating both objective and subjective factors on the credit standing of debt securities and providing participants with a reasoned and independent assessment of the creditworthiness of credit instruments (Securities and Exchange Commission (SEC) 2002). Credit ratings are a signal of a firm's overall information quality (Alissa, Bonsall IV, Koharki, & Penn, 2013) and reflect the rating agency's assessment of the firm's overall creditworthiness and its ability to meet financial obligations (Ashbaugh-Skaife, Collins, & LaFond, 2006; Standard & Poor (S&P), 2002). Bonsall IV, Koharki, and Watson (2017) document that credit rating agencies add value beyond that of other intermediaries because they consider firms' overall creditworthiness in their analyses. They further show that credit rating changes indicate the firms' inherent risks and uncertainties.[1] Funcke (2015) documents that credit rating agencies apply highly sophisticated and proprietary models and consider both quantitative and qualitative information with in-depth, expert analysis.

[1] Bonsall IV et al. (2017) document that rating agencies assign credit ratings when information uncertainty exists. This indicates that rating agencies take into account sufficient and appropriate information when performing their tasks. Otherwise, they will not assign new ratings and withdraw their existing ratings.

Gul and Goodwin (2010) document that, both as a monitor of corporate governance mechanisms, rating agencies and auditors use common information such as efficiency and effectiveness of internal control[2] and some industry-wide and macroeconomic information. In addition, social psychology literature indicates that shared working experience between different participants affects their interaction and information exchange (Alhababsah & Alhaj-Ismail, 2021; Gibbons, 2004). For example, Guan, Su, Wu, and Yang (2016) document that co-working relations affect audit fees. Alhababsah and Alhaj-Ismail (2021) show the significant impact of the shared working relationship between two bodies-engagement partners and audit committee on audit outcomes. Inspired by those findings and discussions, our study thus is motivated to examine whether the shared working experience of the clients between credit rating agencies and auditing firm affects audit pricing.

On the other hand, auditors and credit rating agencies may request different firm information (Dhaliwal, Hogan, Trezevant, & Wilkins, 2011). This is because auditors can obtain additional information from credit rating agencies. Credit ratings should be one of the most important information sources that auditors use to assess material misstatements (Funcke, 2015). Anecdotal evidence is, in KPMG's Audit Plan to Crown Resorts Limited, it clearly highlights the increased risk of indicators of impairment of intangible assets resulting from Moody's downgrade as a higher audit risk factor, increased risk of indicators of impairment of Property, Plant, and Equipment resulting from Moody's downgrade as a moderate audit risk factor, and risks (of capital management and covenants) associated with the Moody's Credit Rating downgrade as one of audit focus areas.[3] Given the comprehensiveness of information environment assessment by credit rating agencies, we predict that the changes in ratings may provide explanations for abnormal audit fees and their jumps.

However, there are concerns about credit rating agencies' allegedly inaccurate risk assessments and the creditworthiness of credit instruments (Gul & Goodwin, 2010). For example, Enron's collapse raised serious questions about the accuracy of risk assessments by credit rating

[2] This is an important factor to determine ratings (Moody's, 2004) and evaluating the quality and enforcement of internal control is a fundamental part of auditing (Gul & Goodwin, 2010; PCAOB, 2007).

[3] More details, see: https://www.rccol.vic.gov.au/sites/default/files/2021-10/Exhibit%20RC1385%20Crown%20Resorts%20Audit%20and%20Corporate%20Governance%20Committee%20Diligent%20Pack%2C%209%20December%202020%2C%20tendered%2026%20July%202021%20.pdf

agencies (Gul & Goodwin, 2010; Wyatt, 2002). Wyatt (2002) also documents that Moody's, S&P, and Fitch did little to warn investors regarding the creditworthiness of the credit instruments. Moreover, the independence of credit rating agencies has been questioned as a result of the higher fees paid for more favourable ratings based on the "issuer pays" model (Beales & Davies, 2007). The head of the French financial regulator, Mr Michel Prada, notes: "I do hope that it does not take another Enron for everyone to look at the issue of rating agencies".[4] Given the paradox regarding the importance of the information role played by credit rating agencies and criticisms of their assessment precision, whether and how credit rating changes impact the pricing of audit services are empirical questions.

Our study focuses on how auditors respond to changes in credit ratings, particularly, downgrades. Given the monitoring role of rating agencies in governance mechanisms, changes in credit ratings are considered to be a key driver of changes in corporate governance (Ashbaugh-Skaife et al., 2006). Downgrades in credit ratings thus indicate a weak governance system and weak information environment, which increases audit engagement risk. This is because downgrades indicate that firms have difficulties in meeting contractual obligations and face high default risk (Chen & Church, 1992). DeFond, Lim, and Zang (2016) document that low credit ratings negatively affect firms' credit terms and their financing ability, which will thus increase audit engagement risk. In addition, the rating-based performance pricing provisions render interest rates, debt repayment, and additional collateral demand sensitive to rating changes (Kraft, 2015; Nicholls, 2005). This may motivate firms to seek favorable ratings. The debt covenant hypothesis also indicates that financial ratio-based performance pricing in loan covenants motivates managers to increase earnings (Beatty & Weber, 2003). Auditors are more likely to charge higher audit fees for firms with poor earnings quality since poor earnings quality increases difficulties for auditors to detect material misstatements (DeFond et al., 2016). Collectively, we posit that downgrades are more likely to impose high engagement risk on auditors.

The Public Company Accounting Oversight Board (PCAOB) Auditing Standard No.5 (AS No.5) emphasizes a risk-based approach to determine the evidence necessary to support the auditor's opinion. The standard requires risk assessment at each decision point using a top-down

[4] Details see Beales, Scholtes, and Tett. 2007. Failing grades. Financial Times. Available at: https://www.ft.com/content/595b8988-03da-11dc-a931-000b5df10621

approach (PCAOB, 2007, AS No.5). Auditing Standard No.8 (AS No.8) describes the audit risks as a function of inherent risk,[5] control risk,[6] and detection risk[7] (PCAOB, 2010a). Inherent risk and control risk are related to the firm environment, internal control, and auditors' assessment based on appropriate and sufficient evidence. An effective way that auditors respond to increased risks is by increasing audit efforts (Lobo & Zhao, 2013), charging a higher risk premium, or both (DeFond & Zhang, 2014). Previous studies well document that abnormal audit fees reflect increased audit effort, risk premium or both (DeFond & Zhang, 2014). However, existing literature does not consider the serial correlation in abnormal audit fees. Coulton, Livne, Pettinicchio, and Taylor (2016) document that abnormal audit fees are highly serially correlated (i.e., stickiness) and can be affected by past or current events. That is, the annual abnormal audit fees represent more than unique period-specific variations in audit effort, audit risk or both. Coulton et al. (2016) thus suggest that the difference between the abnormal audit fees and the long-run sticky component, that is, the jump component can better explain the *annual* variation of audit fees. They highlight that, compared to the long-run sticky component, the jump component has a much-reduced correlation with previous abnormal audit fees[8] and reflects auditors' response to the current period's accounting problems. The results of their study indicate that the jump component is a more appropriate proxy for financial information quality.

Inspired by Coulton et al. (2016)'s findings, to examine auditors' responses to changes in credit ratings, we thus specifically investigate the following four related research questions. First, how do downgrades and upgrades of credit ratings influence abnormal audit fees? Second, how do downgrades and upgrades of credit ratings have an asymmetric influence on the jump component of abnormal audit fees? Third, if auditors charge higher abnormal fees when firms experience downgrades, what are the underlying mechanisms through which downgrades impact audit fees? Fourth, we further investigate the other outcomes of audit service to provide more insights into the

[5] Inherent risk refers to the susceptibility of an assertion to misstatement due to error or fraud that could be material, individually or in combination with other misstatements, before consideration of any related controls (PCAOB, 2010a, AS No. 8, para. 7a).

[6] Control risk refers to a misstatement due to the ineffectiveness of the design and operation of internal control, which will not be prevented or detected on a timely basis by the company's internal control (PCAOB, 2010a, AS No.8, para.7b).

[7] Detection risk is the risk that the procedures performed by the auditor will not detect a misstatement. This risk is a function of the effectiveness of the substantive procedures and their application with due professional care (PCAOB, 2010a, AS No. 8, para. 9).

[8] Coulton et al. (2016) show the jump component is unaffected by the serial correlation.

impact of downgrades on auditors. Specifically, we further test whether auditors spend more time preparing audit reports and whether they are more likely to issue a going concern opinion for firms that experience downgrades.

Utilizing a sample of S&P long-term domestic issuer ratings for the period 2000–2016, we investigate the effect of changes in credit ratings on the jump component of abnormal audit fees. In line with previous studies, we use abnormal audit fees (e.g., Bentley, Omer, & Sharp, 2013; Knechel, Rouse, & Schelleman, 2009) to investigate auditors' responses to increased audit risk.[9] Consistent with our theoretical prediction, we find that firms with downgrade rating changes are associated with higher abnormal audit fees. In particular, downgrades are positively associated with the jump component of abnormal audit fees. This is also consistent with the findings in a previous study (Du, Masli, & Meschke, 2018). That is, when auditors face high engagement risk, they will correspondingly charge high audit fees.

Furthermore, we explore the two underlying mechanisms through which downgrades significantly increase abnormal audit fees: heightened default risk and increased misstatement risk. As discussed above, downgrades are highly correlated with bankruptcy and default risk. Auditors are thus exposed to higher engagement risk (Du et al., 2018; Palmrose, 1997). As a result, auditors charge extra audit fees, as a risk premium or for extra audit efforts to mitigate high risk, or both. In addition, we show that downgrades indicate financial deterioration and a poor information environment (Goh & Ederington, 1993). For example, both Standard & Poor and Moody's lowered American International Group Inc (AIG) debt ratings due to its financial restatements for years 2000-2003. Its annual report in 2004 suggested that those downgrade actions had continuously negative impacts on AIG's operations and increased borrowing costs and reduced firm profitability. Hribar, Kravet, and Wilson (2014) document that unexplained audit fees (i.e., audit fee residuals) are highly correlated with fraud and restatements. An anecdotal case is AIG which paid over $33 million audit fees in 2004 compared with those of 2003 because it restated the accounting numbers in the years 2000-2003.[10] We thus posit that downgrade indicates a high restatement risk which further raises unexplained audit fees. In addition, a poor information environment with downgrades makes the detection of material misstatements difficult. Moreover, the rating-based

[9] For example, the existing literature uses observable audit fees to represent unobservable audit effort due to higher risk (Knechel et al., 2009).

[10] More details, see: https://www.sec.gov/litigation/complaints/comp19560.pdf

performance pricing provisions in loan contracts motivate managers to engage in upward earnings management (Kraft, 2015a). This imposes a high reputation risk on auditors due to the failure to detect material misstatements (DeFond et al., 2016). Collectively, heightened default risk and increased misstatement risk carried in downgrades prompt auditors to charge higher unexplained audit fees.

This study establishes a one-way relation between the jump component of abnormal audit fees and credit rating changes. One possible concern of our study is the presence of reverse causality, where the changes in ratings may be driven by the quality of audit services (hence the increased audit fees). This is because SEC states that "the rating agencies, like other market participants, must be able to rely on the integrity of the audit process in producing financial information that is accurate and complete" (SEC, 2002). Thus, reverse causality running from abnormal audit fees to credit rating changes cannot be easily ruled out. Nonetheless, we argue that audit services and rating agencies, both acting as information sources, provide relevant and useful information regarding the creditworthiness of credit instruments and other financial performance measures. Credit rating agencies can update their ratings at any time, while auditors provide auditing services at the end of the fiscal year. Thus, credit rating agencies provide more timely information than auditors.

Moreover, previous studies (e.g., Funcke, 2015) suggest that credit rating agencies provide incremental information to auditors, and the credit ratings information is incorporated into the auditors' decision making. Particularly, we highlight that credit rating changes may provide information beyond annual reports or accounting numbers to explain abnormal audit fees and their changes. This is why our study focuses on abnormal audit fees and their jump component rather than simplistically uses changes in total audit fees to capture the impact of credit rating changes. In addition, we attempt to address the endogeneity issue by using several strategies. First, we re-estimate our model by employing the instrumental variable approach. Second, we re-estimate our model using the dynamic Generalized Method of Moments (GMM) approach. Third, we perform a difference-in-differences (DiD) analysis using downgrades as the shocks to credit ratings. Our results still hold, which supports our finding of the relation between downgrades and abnormal audit fees.

We additionally explore the outcomes of audit services in clients with rating changes. We find that downgrades also positively relate to longer audit report lags but do not lead to lawsuits against

auditors. Furthermore, we examine the relationship between credit rating changes and the likelihood of a firm receiving a going concern opinion. We find that firms experiencing downgrades are more likely to receive a going concern opinion.

We contribute to the existing literature in the following three ways. First, this study focuses on how credit rating changes influence abnormal audit fees and their jump component. This is distinct from Bruno, Cornaggia, and Krishnan (2016), which focus on overall abnormal audit fees. In addition, they examine how abnormal audit fees drive changes in ratings. Given the above argument that credit rating agencies can update their ratings at any time, while auditors provide auditing services at the end of the fiscal year, we are more interested in how the jump component changes when clients experience downgrades. Our study is also different from the traditional measure of audit fees such as client size (Simunic, 1980), auditor size (DeAngelo, 1981), accounting quality (Danielsen, Van Ness, & Warr, 2007), task complexity (Simunic, 1980; Bonner, 1994), audit committee expertise (Ghafran & O'Sullivan, 2017), product market competition (Leventis, Weetman, & Caramanis, 2011), and business strategy (Bentley, Omer, & Sharp, 2013). Our evidence shows that changes in credit ratings can explain abnormal audit fees and their components. We particularly find downgrades significantly affect the jump component of additional audit fees. We extend the existing literature (Coulton et al., 2016) by providing further evidence on the argument that the jump component of abnormal audit fees can be driven by an auditor's reactive effort and/or higher risk premium due to additional risk.[11] This enhances our understanding of audit fees and abnormal audit fees in a variety of settings, making it useful for triangulating research questions regarding audit fees.

Second, we enrich previous literature regarding associations between credit ratings and audit services (e.g., Gul & Goodwin, 2010) and information content of credit ratings (Galil & Soffer, 2011). Although previous literature shows associations between ratings or debt with audit fees, our study complements the above literature by providing a more complete picture of the relationships between credit ratings and audit fees. First, we use abnormal audit fees, distinct from previous studies examining the impact of debts or ratings on normal fees. Normal fees are mainly determined by factors that are common across different clients, while abnormal audit fees provide

[11] Coulton et al. (2016) explain the negative correlation between both components (i.e., the fixed and jump components) of abnormal audit fees and accounting quality. They indicate that the long-run component reflects client-specific risk factors not included in the standard audit fees model, while the jump component represents the auditor's reactive effort motivated by concerns in the current period regarding financial reporting quality.

incremental information regarding an auditor's reactive effort or risk premium charged to compensate for additional client risk characteristics (Choi, Kim, & Zang, 2010; Doogar et al., 2015). In addition, our study is also complementary to Bruno et al. (2016) and Funcke (2015). Bruno et al. (2016) document that abnormal audit fees can affect credit ratings, while Funcke (2015) shows that credit rating downgrades can affect the likelihood of issuing going concern opinions.

In our study, we examine the impact of rating changes on the jump component of abnormal audit fees and other outcomes of audit service such as going concern opinion and the timeliness of audit report. Compared to the above studies, the unique features of our study also include: i) decomposition of abnormal audit fees; and ii) examination of asymmetric responses of audit fees and other outcomes of audit service to rating announcements. Thus, this study provides new insights into abnormal audit fees and auditors' responses to changes in the firm's overall creditworthiness. In addition, we also contribute to the literature regarding credit ratings and audit services by clarifying the underlying mechanisms through which rating changes impact abnormal audit fees.

Third, this study provides *ex-ante* empirical evidence on the PCAOB's current research agenda of the auditor's role regarding other information[12] and non-GAAP performance measures. To protect investors and the public interest, PCAOB seeks to establish related professional practice standards to provide informative, accurate, and independent audit reports. On June 30, 2018, PCAOB issued the standard-setting update regarding AS 2710, *Other Information in Documents Containing Audited Financial Statements*.[13] Under current PCAOB standards, auditors are not required to perform the relevant procedures related to other information (PCAOB, 2018, Standard-Setting Update, 6). However, given both investors' and other stakeholders' continuing focus on company performance measures regarding GAAP and non-GAAP disclosures, the PCAOB is re-evaluating the need to revise the standards and to change the auditor's reporting responsibilities related to other information. To date, there is scant research on this issue. Our study investigates the usefulness of the other information (i.e., the credit ratings) in assisting auditors to provide informative, accurate, and independent audit reports. Thus, this research has significant

[12] Other information includes disclosures of company performance measures outside the financial statements such as management's discussion, registration statements, earnings releases, calls with analysts, information on the company's website, and other communications. "Under AS 2710, the auditor has a responsibility to "read and consider" other information in documents containing audited financial statements" (PCAOB, 2018, Standard-Setting Update, p. 6).
[13] Available at the following link: https://pcaobus.org/Standards/Documents/Q2_2018_Standard-Setting_Update.pdf.

implications for the PCAOB regarding the potential need to improve the scope of auditors' responsibilities.

The remainder of this study proceeds as follows. Section 2 presents the literature review and develops testable hypotheses. Section 3 presents the model design for abnormal audit fees. Section 4 describes the data, sample selection, variable measurements, and preliminary empirical results. Section 5 examines the mechanisms through which credit ratings affect the jump component of abnormal audit fees. Section 6 discusses the robustness tests and deals with endogeneity problems. Section 7 examines the impacts on other outcomes of audit service. Section 8 concludes this study.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

An extensive number of existing studies focus on how accounting information such as accounts receivable, accounts payable, inventory, and other accruals determine audit effort, audit fees, and audit quality (Danielsen et al., 2007). Undoubtedly, accounting, as an important information source, provides strong signals regarding a firm's information environment, performance, and risks. Existing research documents that auditors incorporate other information and broader aspects into their decision-making process (Gul & Goodwin, 2010). Funcke (2015) documents that credit rating agencies, as an important information intermediary, provide incremental information to auditors. This is because credit rating agencies with professional experience and expertise have access to proprietary firm data. Thus, they are able to conduct highly specialized assessments of the underlying firm information using sophisticated models (SEC, 2000). This results in a more in-depth and accurate evaluation of firms' creditworthiness, which benefits auditors and helps them make reasonable decisions and judgements. In addition, private information requests differ between credit rating agencies and auditors. Ederington and Yawitz (1987) and Dhaliwal et al. (2011) find that credit rating agencies typically require information about the minutes of board meetings, new product plans, future strategies, and broader economic and industry-wide factors, while auditors rely on this rating information to save billable hours. Hence, investigating how credit ratings influence auditors' behaviour is important in order to obtain a more comprehensive and complete picture of auditors' decision-making process.

To deepen our understanding of the rationale of informativeness of credit rating changes to changes in audit fees, we assess numerous cases of credit rating action reports from previous studies (Agarwal, Chen, & Zhang, 2016; Löffler, Norden, & Rieber, 2019). This is because "[a]

credit rating report typically describes the rationale behind a rating action and is a reflection of accountability of the Credit Rating Agencies (CRA) for the rated company and information users" (Agarwal et al., 2016, p. 2220). We provide the rationales stated in the sample action reports in Appendix A. Sample one is an extract of S&P credit rating change (i.e., downgrade) report. For the downgrade to "BB-" from "BB", the rationale is that the downgrade reflects ongoing weakness in the industry. This downturn is projected to hurt operational performance and therefore challenge the firm's ability to meet financial covenants over the next few quarters. In addition, the chairman and CEO are likely to be replaced. This could further lead to unexpected changes in business strategies. According to this downgrade report, this study posits that a firm that experiences a downgrade tends to have a higher risk of default and going concern issues.

In Sample two, Moody's Investors Service lowered Avery's debt ratings to Baa2 from Baa1. The rationale is that "the company is expected to continue, over the intermediate term, to face negative margin pressure resulting from a combination of raw material cost inflation and declining sales volumes across most businesses units". Avery also experienced a preliminary non-cash goodwill impairment charge of $ 820 million for the retail information services business unit. The above information reflects the higher business risks of Avery's overall performance. We thus posit that credit rating changes are informative to auditors. Particularly, abnormal audit fee changes and going concern opinions are likely to be associated with downgrades.

2.1 Abnormal audit fees and credit rating changes

The audit fees paid to auditors compensate them for their effort and reflect the informational uncertainty related to audit failure or firm failure (Danielsen et al., 2007; Simunic, 1980). Lobo and Zhao (2013) note that "the external auditor responds to increases in misstatement risk by increasing audit effort" (p. 1386). Audit effort is a main determinant of the probability that an existing material error is detected by auditors (Caramanis & Lennox, 2008). Theoretically, a higher level of audit effort is exerted to enhance the likelihood of error detection, thereby reducing the likelihood of undetected errors (Hillegeist, 1999; Matsumura & Tucker, 1992). Danielsen et al. (2007) find that auditors take into account firm transparency to price audit fees, with higher information opacity corresponding to higher audit fees to capture the risk in auditing an opaque firm. While a mountain of previous research pays close attention to abnormal audit fees, the

interpretations remain inconclusive (Asthana & Boone, 2012[14]; Bruno et al., 2016[15]; Hribar, Kravet, & Wilson, 2014[16]; Kinney & Libby, 2002[17]).

Abnormal audit fees are treated as an indicator of a risk premium not otherwise captured in the standard fee model (Chen, Gul, Veeraraghavan, & Zolotoy, 2015; Coulton et al., 2016; Ghosh & Tang, 2015). Abnormally high audit fees reflect the extra audit effort required to audit clients facing higher risk (Blankley, Hurtt, & MacGregor, 2014; Bruno et al., 2016; Doogar, Sivadasan, & Solomon, 2015; Hribar et al., 2014). Hoitash, Markelevich, and Barragato (2007) find that firms with higher earnings management experience a higher level of abnormal audit fees, which indicates audit firms tend to charge extra audit fees for clients with poor information environment quality. This is because the lower quality of financial reporting is associated with a higher likelihood of litigation risks (Hogan, 1997) or reputational damage (Johnson, Khurana, & Reynolds, 2002).

As mentioned above, credit ratings reflect rating agencies' assessment of a firm's overall creditworthiness and its ability to meet its financial obligations (Ashbaugh-Skaife et al., 2006; S&P, 2002). Rating agencies have access to information that is not publicly available (Funcke, 2015). Holthausen and Leftwich (1986) document that the review processes of both Moody's and S&P include discussion with management, field visits to company premises, and reviewing management's forecasts of financial performance. Particularly, credit rating agencies make adjustments to reported accounting numbers by incorporating off-balance sheet obligations (Kim, Kraft, & Ryan, 2013; Kraft, 2015a) and qualitative disclosure (Kraft, 2015b).

Downgrades indicate bad news, while upgrades are rarely informative for equity and debt investors (Kraft, Xie, & Zhou, 2017). For example, Dichev and Piotroski (2001) find negative abnormal returns (with a magnitude of 10 to 14 per cent) in the first year following a downgrade,

[14] Asthana and Boone (2012) extend previous research (DeFond, Raghunandan, & Subramanyam, 2002; Hoitash et al., 2007; Krishnan, Sami, & Zhang, 2005) by providing evidence on the joint effects of client bargaining power and economic bonding on abnormal audit fees.

[15] Bruno et al. (2016) associate abnormal audit fees with favorable credit ratings. They document that unexplained audit fees can be used to capture certification agents' observable risk which is not modelled by accounting ratios. Thus, less favorable ratings can be predicted by abnormally higher audit fees.

[16] Hribar et al. (2014) explain unexpected audit fees from an earnings quality perspective. They state that "unexplained audit fees have the potential to summarize the auditor's unobservable private information about accounting quality, which potentially captures more information than measures of accounting quality that are based on realized financial statement data" (p. 508).

[17] Kinney and Libby (2002) analyze the determinants of abnormal audit fees from economic bonding and auditor's independence perspectives using the Predictive Validity Model based on Libby's box framework.

while there are no reliable abnormal returns following upgrades. Similar findings are provided by Holthausen and Leftwich (1986), Hand, Holthausen, and Leftwich (1992), Goh and Ederington (1993), and Kraft et al. (2017). They consistently show that downgrades are informative with negative implications, while there is generally no significant reaction to the announcement of upgrades.

As discussed earlier, rating downgrades reveal higher uncertainties, weaker governance mechanisms, and opacity of firms' information environment. In this context, rating downgrades are used as a proxy for abnormally high opacity, which is not revealed in accounting ratios or numbers. Based on engagement risk concerns, auditors are more sensitive to downgrades. Funcke (2015) documents that more severe downgrades are more informative to auditors, and changes in ratings may lead to audit errors. Du et al. (2018) provide empirical evidence that when auditors face high engagement risk, they tend to charge high audit fees. Given the high possibility of financial deterioration and auditors' conservatism, auditors are likely to exert more effort to provide audit reports or charge a fee premium to compensate for engaging a risky client when firms experience downgrades. Abnormal audit fees thus capture the risks detected by auditors that are not typically reflected in accounting information (Bruno et al., 2016). Thus, we predict the following relation between abnormal audit fees and changes in credit ratings:

H1: Abnormal audit fees are positively (negatively or not) associated with downgrades (upgrades).

2.2 The jump component of abnormal audit fees and credit rating changes

We further disentangle the inherent 'sticky' (long-run component) and jump component of abnormal audit fees. The sticky long-run component, which reflects client-specific risks, is serially correlated and relatively stable over multiple audit periods.[18] The jump component reveals the auditors' reactive efforts to address concerns in the current period such as the aggressiveness of financial reporting. Rating downgrades and upgrades signify the company's credit worthiness has deteriorated or improved (Altman, 1998). Kraft (2010) provides evidence that rating agencies are efficient processors of accounting information for firms' credit risk assessments. Particularly, she

[18] Coulton et al. (2016) document that serial correlation between consecutive abnormal audit fees is 0.70. Although this declines over time, the correlation remains at around 0.50 after five years. This indicates that it is appropriate to distinguish the fixed component (captures multiple period risks) and the current jump component (captures the current period-specific risk).

shows that "GAAP numbers reported in balance sheets and income statements need to be substantially adjusted before they can be used to estimate default risk" (Kraft 2010, p. 2). Therefore, the rating agencies, based on financial statements, adjust accounting information to better portray the reality (S&P, 2006) and reflect the underlying economics of transactions and events (Moody's, 2006; S&P, 2008).

Bruno et al. (2016) find that abnormal audit fees indicate a risk factor, which is observable to certification agents but not reflected in accounting ratios. Instead, it is incorporated into credit ratings. In addition, credit rating downgrades are a credible signal to auditors. This is because Löffler (2005) documents that credit rating agencies carefully change ratings, and changes take place only when they are fairly sure reversals will not occur later. As Coulton et al. (2016) document, the current jump component of abnormal audit fees captures the current period-specific firm risk and reveals the auditors' reactive efforts to the aggressiveness of financial reporting in the current period, while the long-run component of abnormal audit fees captures multiple period risks. Credit rating agencies can update ratings at any time during the year and are thus able to adjust ratings on a timelier basis compared to audit reports (Funcke, 2015). Changes in credit ratings can provide credible and timely incremental information regarding a firm's future viability and overall creditworthiness for auditors. Thus, we predict the following relations:

H2: The jump component of abnormal audit fees is positively (negatively or not) associated with downgrades (upgrades).

2.3 Downgrades, default risk, and the jump components

Downgrades indicate that a firm has financial difficulties in meeting contractual and financial obligations. The less likely a firm will be able to repay its debt, the more likely it will have to file for bankruptcy (S&P, 2003). The increased likelihood of covenant violation in turn heightens default risk and the probability of financial distress (Chen & Church, 1992). Consequently, this increases auditor litigation risk since shareholders in financial distressed firms are more likely to sue the auditors (Palmrose, 1997). Dichev and Piotroski (2001) document that downgrades are a signal of firms' deteriorating prospects. In addition, credit rating downgrades are significantly correlated with defaults (Güttler & Wahrenburg, 2007). Du et al. (2018) find that bankruptcy risk and technical defaults significantly raise auditors' engagement risk. Higher engagement risk further results in abnormally higher audit fees due to auditors' extra effort to mitigate engagement risk or auditors charging a fee premium to compensate for additional high risk or both (DeFond &

Zhang, 2014). This may drive changes in the jump component of abnormal audit fees to reflect the increased engagement risk in the current period. We posit that downgrades affect the jump component of abnormal audit fees through the heightened client bankruptcy risk.

H3: Downgrades are positively associated with the jump component of abnormal audit fees through the heightened bankruptcy risk.

2.4 Downgrades, misstatement risk, and the jump components

Previous studies document that credit rating downgrades lead to negative abnormal stock returns (Goh & Ederington, 1993; Hsueh & Liu, 1992). Downgrades carry valuable information to both bond and equity investors (Ederington & Goh, 1998). Collectively, previous studies suggest that downgrades are a negative signal to the capital market, indicating firms' overall poor information environment and worse overall creditworthiness. This may increase the difficulties for auditors to detect material misstatements due to clients' adverse circumstances (i.e., downgrades). As discussed earlier, auditors exert more efforts to respond to increased misstatement risk (Lobo & Zhao, 2013; Zhang & Shailer, 2021), which raises the audit fees (Johnstone & Bedard, 2004). Danielsen et al. (2007) also find that auditors charge higher audit fees to opaque clients.

In addition, ratings as benchmarks of issuers' credit worthiness, the large proportion of provisions of debt contracts are based on rating changes (Kraft, 2015a). These rating-based performance pricing provisions render debt contracts sensitive to rating changes (Nicholls, 2005). A rating downgrade thus may increase contractual interest rates, accelerate debt repayment, and trigger additional collateral demand. As a result, changes in ratings can directly and immediately impact firms' cash flows (Kraft, 2015a). This motivates the issuers to seek favorable ratings from the agencies. The above argument is consistent with the debt covenant hypothesis proposed by Watts and Zimmerman (1986). They state that the financial ratio-based performance pricing in loan covenants motivates managers to engage in upward earnings management. Beatty and Weber (2003) also document that debt contracts create incentives for managers to make accounting changes to increase earnings. Therefore, downgrades are more likely to motivate managers to manipulate earnings upwards. DeFond et al. (2014) document that auditors tend to charge higher audit fees for clients with poor earnings quality which poses a greater reputation risk to auditors. The poor earnings quality also increases the difficulties for auditors to detect material misstatements (DeFond et al., 2016). Previous studies well document that auditors tend to exert greater effort or charge fee premium for clients with a greater likelihood of misstatement or fraud

(Hillegeist, 1999). The increased audit effort and fee premium are eventually reflected in higher audit fees (DeFond et al., 2016).

As mentioned above, abnormal audit fees capture auditors' increased effort, risk premium or both (DeFond & Zhang, 2014). The long-run sticky component of abnormal audit fees that could be affected by past or current events, thus, is highly serially correlated. However, the abnormal audit fees capture more than unique period-specific changes in audit effort, audit risk or both (Coulton et al., 2016). The jump component thus reflects the current period of information environment changes and captures the annual variation of audit effort, audit risk or both. Downgrades, as a negative signal of firms' overall information environment and creditworthiness, indicate a greater likelihood of corporate misstatement or fraud and also difficulties in detecting material misstatements. We thus posit that downgrades impact a jump in audit fees through the increased misstatement risk.

H4: Downgrades are positively associated with the jump component of abnormal audit fees through the heightened misstatement risk.

3. RESEARCH DESIGN

3.1 Empirical model specifications

To test our hypotheses, we investigate the impact of credit rating changes on abnormal audit fees in addition to the jump component of abnormal audit fees. We begin by regressing abnormal audit fees on the credit rating changes, without any control variables and fixed effects to avoid multi-collinearity issues (since many firms' and auditors' characteristics are taken into account when estimating the abnormal audit fees). We estimate the abnormal audit fees as the residuals from the regression of audit fees on a number of firm and auditor characteristics motivated by the model in Du et al. (2018). The residuals are obtained by running the audit fee model separately by year and Fama-French 12 industry classifications. The definitions of all variables are provided in Appendix B, and the construction of the model is provided in Appendix C.

In the spirit of the methodology proposed in Kopczuk, Saez, and Song (2010), we calculate the long-run component of the abnormal audit fees as the average fee residuals over rolling three-year windows. Distinct from Kopczuk et al. (2010), we define the long-run average fee residuals across the past 3 years instead of across K years centred around year t. Next, we estimate the jump component of abnormal audit fees as the difference between the current year audit fee residuals

and the average past three-year fee residuals. In this manner, the jump component measures the deviation of current year audit fee residuals from the previous three-year average residuals. Furthermore, in one of our robustness tests, similar to Coulton et al. (2016), we convert the annual audit fee residuals into ranks. We average the annual rank of fee residuals over a rolling three-year window and use it as the long-run component of the abnormal audit fees. The jump component is then defined as the difference between the current year fee residuals rank and the rolling average of the past three-year ranks of audit fee residuals.

To examine the relation between changes in credit ratings and the jump component of abnormal audit fees, we employ the following specifications:

$$\begin{aligned} Abauditfee\_jump \\ = \beta_0 + \beta_1 Ratingchg + \beta_2 Size + \beta_3 Empl + \beta_4 Lev + \beta_5 Invrec + \beta_6 ROA + \\ \beta_7 MTB + \beta_8 Current + \beta_9 Debt3 + \beta_{10} Decye + \beta_{11} Initialyr + \\ \beta_{12} Loss + \beta_{13} Big4 + \beta_{14} Instholding + \beta_{15} Auditorchg + \beta_{16} Foreign + \\ \beta_{17} S\&PRatings + \beta_{18} Litigation + \\ \beta_{19} Ana\_Forecast\_Disp + \beta_{20} Religiosity + \sum Firm + \sum Year + \varepsilon \quad (1) \end{aligned}$$

The dependent variable in Equation (1) used to test Hypothesis H2 is the jump component of abnormal audit fees. Our main variables of interest are the rating change dummy (*Ratingchg*), namely, the downgrade (*Downgrade*) and upgrade (*Upgrade)* dummies. *Downgrade* (*Upgrade)* is a dummy variable equal to one if a rating downgrade (upgrade) happened within the current fiscal year.

Simunic (1980) documents that audit fees are associated with factors that drive more or less work during the course of the audit. Hence, consistent with previous studies (Bentley et al., 2013; Danielsen et al., 2007), we control for the firm's financial fundamentals such as the natural logarithm of total assets (*Size*), the complexity of audit task, risk, other firm-specific characteristics, and auditor's characteristics. We use the number of employees (*Empl*), inventory and receivables scaled by total assets (*Invrec*), a dummy that equals one if the firm has foreign operations (*Foreign*), total debts scaled by total assets (*Lev*), market-to-book ratio (*MTB*), current assets divided by total assets *(Current)*, percentage of debt maturing within three years after current fiscal year end (*Debt3*), and a dummy that equals one if the firm's fiscal year end falls on December (*Decye*) as a proxy for audit complexity. The return on assets (*ROA*), a dummy that equals one if the firm reports a loss in the current fiscal year (*Loss*), and S&P credit ratings (*S&P Ratings*) are employed as the

proxies for the firm's riskiness. Other firm characteristics include the percentage of institutional investors' shareholdings (*Instholding*), a dummy that equals one if the firm operates in a high litigation risk industry (*Litigation*) (Bruno et al., 2016) and analyst forecast dispersion, the standard deviation of earnings forecast divided by the closing price of the previous year (*Ana_Forecast_Disp*) (Dahiya, Iannotta, & Navone, 2017).

Auditor characteristics include a dummy that equals one if the firm is audited by one of the Big Five audit firms (Arthur Andersen, Deloitte & Touche, Ernst & Young, KPMG, and PricewaterhouseCoopers) or Big Four audit firms after the exit of Arthur Andersen (*Big4*) (Nguyen, Vu, & Yin, 2020), a dummy equals one if the firm changes auditors during the fiscal year (*Auditorchg*), and a dummy equals one if the firm's auditor is in the first or second year of audit engagement (*Initialyr*). Existing studies well document that religious social norms, as an important informal institutional environment, play a significant role in shaping economic behaviour such as accounting or auditing decisions. For example, previous literature shows that firms located in more religious areas exhibit fewer corporate failures and malpractice (Kanagaretham, Lobo, & Wang, 2014), fewer accounting manipulations (Conroy & Emerson, 2004; Longenecker, McKinney, & Moore, 2004), and lower accounting restatements (Dyreng, Mayew, & Williams, 2012). Leventis, Dedoulis, and Abdelsalam (2018) and Gul and Ng (2018) find that religiosity, an informal institution's characteristic, can decrease audit risk, as a result, reducing audit pricing. We thus incorporate religiosity, as an informal institution's characteristic, in our model to control for its impact on abnormal audit fees jump. The proxy for religiosity (*Religiosity*) is the number of religious adherents in the county where the firm is headquartered scaled by the population in the county (Dyreng, Mayew, & Williams, 2012; Hilary & Hui, 2009; Leventis et al., 2018). A high religiosity value indicates more religious adherents in the county. Finally, we include year and firm fixed effects in the regression models. Appendix B provides a complete description of all variables considered in our models and the sources of data.

4. DATA AND SAMPLE SELECTION

We obtain our sample of long-term domestic issuer ratings from the Compustat S&P credit ratings from 2000 to 2016 inclusive. The audit data are collected from the Audit Analytics database, and the accounting data are from Compustat. The institutional investors' shareholding data are

obtained from Thomson Reuters 13F. The analyst forecast data are from the Institutional Brokers' Estimate System (I/B/E/S), and the data for religiosity are collected from the Churches and Church Membership files of the Association of Religion Data Archive (ARDA) for 2000 and 2010. To make sure we can obtain data regarding audit services and the fundamentals, we select a sample period that is covered by both Audit Analytics and Compustat. Since the SEC mandated firms to disclose audit and non-audit fees from 2000, we set the starting point of our sample period from 2000. [19] Consistent with previous research, we exclude financial service firms (SIC codes 6000 – 6999) and utilities (SIC codes 4900 – 4999). Following convention, ratings are converted to numerical rating codes, from 1 to 22 (AAA is 1 and D is 22), with lower numbers indicating a better rating (Huang, Svec, & Wu, 2021). To mitigate the influence of outliers driving our results, we winsorize all continuous variables at the 1st and 99th percentile.

4.1 Baseline results

Starting with 111,470 non-financial and non-utilities firm-year observations which have data in Compustat and Audit Analytics, we calculate the abnormal audit fees. Our untabulated results show the mean value of abnormal audit fees is zero. Then we merge the dataset with the S&P rating dataset and exclude observations with missing values. As a result, the final sample contains 17,152 observations for audit fees. Panel A in Table 1 provides the descriptive statistics of our sample. The mean natural logarithm of audit fees is 14.61 with a standard deviation of 1.15. The mean of the jump is -0.005. In addition, the mean S&P rating in our sample is 10.612 with a total of 1,943 credit rating changes as reported in Panel C of Table 1. Of these credit rating changes, 874 are rating downgrades. Panel D reports the correlation matrix between pairs of key variables used in the analysis. [20] That downgrade is positively correlated with the jump component of abnormal audit fees. This provides the preliminary evidence to support Hypothesis 2. Panel E reports the variance inflation factors (VIFs) for all independent variables. The VIFs are less than 5, indicating that there is no significant multicollinearity among the independent variables.

[Insert Table 1 about here]

[19] Since the estimation of the jump component requires the past three years audit fees, the jump component starts from 2003.
[20] The full correlation matrix is presented in the online appendix.

We begin our analysis by regressing abnormal audit fees on downgrades and upgrades without any control variables and fixed effects. All standard errors are clustered at the firm level. Table 2 reports the impact of rating changes on abnormal audit fees. We find a positive relation between abnormal audit fees and downgrades. In terms of economic significance, firms that experience a downgrade have 2.1% higher abnormal audit fees compared to firms that do not experience a downgrade. In addition, we report an asymmetric effect of credit ratings on abnormal audit fees. Our results complement research on the asymmetric responses to rating announcements commonly observed in the equity, bond, and credit default swap markets. To our knowledge, these asymmetric effects have never been studied and documented in the audit literature. Hence, our study is the first to show that rating upgrades have little impact on abnormal audit fees, while downgrades have a positive and significant influence on abnormal audit fees. The results support our H1.

[Insert Table 2 about here]

We then examine the association between rating changes and the jump in abnormal audit fees. We expect rating changes (particularly downgrades) to be positively associated with the jump component. The results in Table 3 are consistent with our expectations. We find that *Downgrade* is positively and significantly associated with the jump component (Columns 1 and 3). These findings support our hypotheses H2.

[Insert Table 3 about here]

5. ECONOMIC MECHANISMS

5.1 Default risk mechanism

Since downgrade function as a signal to indicate a deterioration in creditworthiness and financial viability, in the event of a downgrade, auditors are likely to exert more effort during the audit process due to a potential increase in default risk, which in turn raises auditors' engagement risk. Therefore, we expect the positive association between downgrades and the jump component to be stronger when default risk is higher. To examine this mechanism, we employ two proxies for default risk: 1) Altman's Z-Score (1968) and 2) Distant-to-Default.[21] A lower Z-score or Distant-

[21] The distance-to-default, estimated from Merton (1974) option model, has been widely used to determine a firm's default probability (Acharya et al., 2007; Bharath & Shumway, 2008; Hillegeist et al., 2004). We thank the Risk Management Institute of National University of Singapore for making the distance-to-default data publicly available. See https://nuscri.org/en for details.

to-Default indicates a higher default risk. Then we re-run the baseline regressions by including the interaction terms between downgrades and two proxies for default risk in two separate regressions (Akamah & Shu, 2021; Dai, Parwada, & Zhang, 2015). The regression results are presented in Panel A of Table 4. We find that the coefficients of *Downgrade×Z-Score* and *Downgrade×Distant-to-Default* are negative and statistically significant at the 5% level (Columns 1 and 3). These results suggest that the effect of downgrades on the jump component is stronger in firms with high default risk, which supports our hypothesis H3. For the case of upgrades, the coefficients of the interaction terms are not statistically significant for both Z-score (Column 2) and Distant-to-Default (Column 4).

[Insert Table 4 about here]

5.2 Misstatement risk mechanism

Downgrades may increase the difficulty in detecting material misstatements for two reasons. First, downgrades indicate firms' poor environment and deteriorating creditworthiness (Goh & Ederington, 1993; Hsueh & Liu, 1992), thus may make detection of material misstatements difficult for auditors. Second, the adoption of rating-based performance pricing provisions in debt contracts motivates issuers to engage in upward earnings management because a downgrade may adversely affect the contractual interest rate and other terms in the debt contract (Kraft, 2015a; Nicholls, 2005). Thus, auditors are likely to increase the audit efforts, and thus charge higher audit fees for clients with greater earnings management tendencies. Therefore, we posit that the impact of downgrades on the jump component is stronger in firms with a higher tendency to manipulate their earnings. To examine the influence of misstatement risk on the relation between downgrades and the jump component, we use abnormal discretionary accruals as the proxy for financial reporting quality (DeFond & Park, 2001). Specifically, we employ the Jones (1991) and the modified Jones (1991) models to calculate the discretionary accruals following Kothari, Leone, and Wasley (2005). We create the proxy, *Reporting_quality*, which is the absolute value of the discretionary accruals. A higher value indicates a higher misstatement risk.

We re-run the baseline regressions by including the *Reporting_quality* and its interaction term with the downgrade dummy. The results of the regression are shown in Panel B of Table 4. We find the effect of downgrades on the jump component to be stronger for firms with poorer reporting quality. The coefficients of *Downgrade×Reporting_quality* are positive and statistically significant at 5% level in Columns 1 and 3. This result provides some evidence that auditors tend

to exert more reactive effort or charge a higher risk premium for firms with poor financial reporting quality to mitigate misstatement risk. Our finding also provides support to our hypothesis H4. Again, we do not find a statistically significant coefficient on the interaction term between *Upgrade* and misstatement risk (Columns 2 and 4).

6. ROBUSTNESS TESTS

6.1 Alternative measure of the jump component of abnormal audit fees

To check the robustness of our findings, we employ an alternative measure of the jump component of abnormal audit fees. Instead of using the actual numbers, we follow Coulton et al. (2016) by utilizing rankings based on the residuals deciles. The results are reported in Table 5. We consistently find a significantly positive relation between the jump component and downgrades (where the coefficient of downgrades is 0.201 with a *t*-statistic 2.540 for Column 1 and 0.204 with a *t*-statistic 2.575 for Column 3, respectively). These findings are similar to those obtained in Table 3. Again, we do not find a statistically significant association between upgrades and the jump component of abnormal audit fees. As such, we focus on the impact of downgrades on the jump component in the following sections. Overall, our findings still hold using different measures of the components of abnormal audit fees.

[Insert Table 5 about here]

6.2 Impact of corporate governance

In this section, we examine how the relation between downgrades and abnormal audit fees varies with the strength of a firm's corporate governance. A number of existing studies document that firms' ownership structures substantially influence corporate governance, firm performance, and financial information quality (Fama & Jensen, 1983; Wong, 2016). In addition, previous literature documents that effective boards (e.g., more independent boards) are important to strengthen corporate governance and could enhance transparency and reliability of financial reporting, thereby reducing audit risk (Turley & Zaman, 2004; Young, 2000; Zaman, Hudaib, & Haniffa, 2011). Thus, we focus on the impact of corporate governance on our baseline findings using blockholder percentage and proportion of independent directors.

Furthermore, previous literature documents that better corporate governance can reduce audit risk, thus, leading to audit fee reduction (Griffin, Lont, & Sun, 2008). Similarly, Tsui, Jaggi, and Gul (2001) show a negative relation between audit fees and board independence because stronger

corporate governance could reduce control risk, thereby lowering audit fees. On the contrary, weaker corporate governance indicates higher control risk and less transparent financial reporting. This could increase difficulties for auditors to detect material misstatements or auditors' additional effort to obtain sufficient and appropriate evidence to issue an audit opinion. This thus will raise audit fees. In our study, we expect that clients with a weaker governance system that experienced downgrades would be subjected to the payment of even higher abnormal audit fees. We test this prediction as follows.

We divide our sample into two subsamples based on the median blockholder percentage. A firm with blockholder percentage greater (less) than the sample median is classified into a stronger (weaker) corporate governance subsample. Similarly, we classify a firm into a stronger (weaker) corporate governance subsample if its independent director percentage is higher (smaller) than 85%. Columns 1-4 of Table 6 report the results of the subsample analysis using blockholder percentage and the proportion of independent directors as the proxies for corporate governance (Chahine & Filatotchev, 2011). Consistent with our expectation, we find that downgrades have a pronounced effect on the jump component in firms with a relatively weak corporate governance system.

[Insert Table 6 about here]

6.3 Impact of Firm Litigation Risk

Stice (1991) suggests that "[Client characteristics associated with litigation] could aid auditors in assessing appropriate risk levels presented by clients. Auditors could then institute appropriate audit procedures to compensate for increased litigation risk and/or price their services to reflect the assessed level of litigation." (p. 532). This indicates that auditors could charge higher audit fees for clients in industries with high incidences of litigation. Previous studies document litigation risk is a significant concern and the primary consideration in the audit fees for U.S. accounting firms (Pratt & Stice, 1994). Pratt and Stice (1994) suggest that "audit fees reflect both the amount of audit evidence collected and an additional premium to cover litigation risk … suggesting that auditors may be charging clients to insure against future litigation losses" (p. 640). Seetharaman, Gul, and Lynn (2002) and Venkataraman, Weber, and Willenborg (2008) also provide evidence that auditors charge higher audit fees when facing higher litigation risk. Auditors should face even higher litigation risk when clients are in higher litigation risk industries and experienced rating downgrades.

Following Francis et al. (1994), we set a high litigation risk dummy to equal one if a firm's industry belongs to the industries with a high incidence of litigation such as biotechnology, computers, electronics, and retailing, and zero otherwise. Columns 5-6 of Table 6 show that our results are concentrated in high litigation risk industries. That is, our results are consistent with and also extend previous studies that higher litigation risk significantly increases abnormal audit fees, particularly the jump component of abnormal audit fees.

6.4 Endogeneity

In the previous sections, we establish a positive relation between the jump component of abnormal audit fees and downgrades. However, the results obtained may suffer from endogeneity biases. One plausible endogeneity problem is the omitted variable bias. To mitigate the concern of this bias, we have included firm fixed effects into the regression models. To further alleviate the omitted variable concern and assess the robustness of our results, we have implemented two strategies: 1) Including additional control variables, and 2) the Oster test.

First, we introduce additional control variables in our main regression model. That is, we add three new control variables to the first regression (Column 1) in Table 3. These variables are formal institution's characteristic, state variable, and CEO turnover. As the proxy for a formal institution's characteristic, we define *DFA* as a dummy variable for the Dodd-Frank Act adoption that equals one for the year 2010 and afterwards, and zero otherwise. Dodd-Frank Act has granted exemptions to small firms from the costly provisions of Sarbanes-Oxley Act, which has substantially increased small firms' audit fees (Evans Jr & Schwartz, 2014). In addition, previous literature documents that firms are likely to change financial policies following CEO turnover (Pan, Wang, & Weisbach, 2016). This thus affects auditors' perception of financial reporting risk (Chao, 2022) and audit litigation risk (Bills, Lisic, & Seidel, 2017). Consequently, CEO turnover can significantly affect audit fees (Chao, 2022; Huang, Parker, Yan, & Lin, 2014). We thus include state gross domestic product (*State GDP*) growth rate and a dummy that equals one if the firm's CEO changes (*CEO Turnover*).[22] Columns 1-3 in Panel A of Table 7 present the results of the regressions with these three control variables separately. In addition, these three control variables are all included simultaneously into one regression as reported in Column 4. Panel A shows that the positive

[22] We thank Andrea Eisfeldt and Camelia Kuhnen for making the CEO turnover data publicly available. See Eisfeldt and Kuhnen (2013) for details.

relationship between the jump component and downgrades still holds after including these control variables.

[Insert Table 7 about here]

Although we incorporate numerous factors and firm and year fixed effects that could affect abnormal audit fees, our baseline results may still be subject to the omitted variable concern. As the second strategy, we follow previous literature (Buggle & Nafziger, 2021; Dixon, Hong, & Wu, 2021) to identify the potential omitted variable bias by performing a test proposed by Oster (2019). Oster (2019)'s approach compares the coefficient estimate sensitivity and the R^2 change between uncontrolled versus controlled regressions. We use two key parameters δ (selection proportionality-the ratios of observed variables to unobserved variables) and R_{max} (the maximum goodness of fit for regression equations if omitted variables can be observed). Specifically, we follow Oster (2019): β* takes value of 0, and we then get the value of δ. If δ is larger than 1 or less than -1, our baseline result is less likely to suffer from omitted variable bias. Our results in Panel B of Table 7 show that, adding control variables only changes the coefficient of *Downgrade* from 0.022 to 0.033, while the R^2 dramatically increases from 0.001 to 0.259. The corresponding delta δ is -15.898. This suggests that the omitted variable bias should not be a concern for our baseline estimation.

Another possible endogeneity problem that could arise is reverse causality from the jump component of abnormal audit fee to downgrades. We implement three strategies to mitigate this endogeneity concern. Our first strategy is to use the instrumental variable (IV) approach and Table 8 reports the two-stage least squares (2SLS) regression results. Specifically, Columns 1-2 report the results using the percentage of downgrades in the firm's industry (*Indperc*) (Harford & Uysal, 2014) and sentiment expressed by firms' earnings conference call participants when discussing politics-related issues (*Political Sentiment*)[23] as the instruments. Since *Political Sentiment* is constructed by conditioning on positive and negative tone words, more positive news relating to politics indicates a lower probability of downgrade (Hassan, Hollander, Lent, & Tahoun, 2019). Column 1 reports the results from the first-stage regression for the endogenous variable, *Downgrade*. We show that *Indperc* is positively correlated with *Downgrade*, while *Political*

[23] We thank Economic Policy Uncertainty for making the political sentiment data publicly available. See Hassan, Hollander, Lent, and Tahoun (2019) for the detailed steps involved in these calculations.

Sentiment is negatively correlated with *Downgrade*. Column 2 reports the results from the second-stage regression. Our main variable is replaced by its fitted value from the first-stage regression. The coefficient is positive and statistically significant at 1% level in Column 2,[24] which supports our findings in Table 3. In addition to the regression results, we also report the Anderson-Rubin F-statistics, the Hansen-J statistics for the overidentification test and perform the Stock and Yogo (2004) weak instruments test to ensure the validity of our instrument selection. Our results show that our instruments are valid.

[Insert Table 8 about here]

In the second strategy, we re-estimate the model presented in Column 1 of Table 3 using the dynamic GMM approach and include the first lag of the abnormal audit fee jumps. In the dynamic panel regression estimation, we allow the lagged abnormal audit fee jumps, downgrades, and control variables to be endogenous. The result in Column 3 of Table 8 shows that the coefficient for downgrades is positive and statistically significant at the 5% level, corroborating the findings of our earlier strategies to mitigate endogeneity concerns.

In the third strategy, we perform a DiD analysis using downgrades as the shocks to credit ratings.[25] In this experiment, we assign firms that experienced a credit rating downgrade to the treatment group and the remaining firms to the control group. Then, we run a probit regression by including all the control variables in the main regression. The dependent variable for this probit model is a dummy that equals one if the firm is in the treatment group, and zero otherwise.

Panel A of Table 9 presents the results of the probit regressions before and after performing the propensity-score matching without replacement. Comparing the two Columns in Panel A, we see that 1) all the explanatory variables in the probit regression are statistically insignificant after matching; 2) the pseudo-R^2 decreases from 15.5% to 0.42% after matching; and 3) the p-value of the Chi-squared test increases to 1.000 after matching. These results suggest that we cannot reject the null hypothesis that all coefficients are zero, which provides further evidence that the parallel-trends assumption holds.

In addition, Panel B of Table 9 shows that all the differences in firms' characteristics are statistically insignificant after matching, suggesting that the parallel-trends assumption is not

[24] The reported magnitude of the coefficient is 9 times larger in the IV estimations compared with the baseline results, which is a common problem in empirical studies as documented by Jiang (2017). Hence, we focus our economic interpretation on the baseline estimates, as they provide a lower bound on the likely effect of downgrades.
[25] We thank the anonymous reviewer for suggesting this analysis.

violated. Finally, to perform a DiD regression, we define *Treat* as a dummy variable that equals one if the firm is in the treatment group, and zero otherwise. *Post* is a dummy variable that equals one for the year after the downgrade occurs, and zero for the year before the occurrence of the downgrade. We run a DiD regression by including *Treat*, *Post*, and the interaction term between *Treat* and *Post*. The results of the DiD regression are reported in Panel C. The coefficient on the interaction term is positive and statistically significant, which is consistent with our main findings.

[Insert Table 9 about here]

6.5 Alternative sample periods and dependent variable

Previous studies document that the global financial crisis (GFC) leads to increased audit fees for the following reasons. First, the financial crisis may increase the default risk and the financial misstatement risk, which thus heightens the probability of audit failure, the potential for reputation damage, and litigation risk (Xu, Carson, Fargher, & Jiang, 2013). Xu et al. (2013) find audit fees significantly increase during the period of GFC compared with the pre-GFC period. In addition, during a period of the financial crisis, the clients may face increased financial difficulties and regulatory scrutiny. Auditors thus need to perform more extensive procedures to obtain sufficient and reliable evidence to provide appropriate audit opinion and evaluate going-concern assumptions, which could raise higher audit fees (Francis & Wang, 2008; Geiger, Raghunandan, & Rama, 2005; Joe, 2003; Zhang & Huang, 2013). Moreover, auditors are expected to increase their professional scepticism (Sercu et al., 2006) and audit efforts to respond to increased litigation risk during economic downturns (Alexeyeva & Svanström, 2015), thereby resulting in increased audit fees. Empirical evidence shows that auditors charged higher audit fees during the GFC in China (Zhang & Huang, 2013) and Sweden (Alexeyeva & Svanström, 2015). Consequently, we predict that abnormal audit fees should be much higher if a client experiences downgrade during the period of GFC. To test this conjecture, we divide our sample period into pre- and post-GFC and run a separate regression for these two sub-periods. Columns 1-2 in Panel A of Table 10 report the results of the analysis. Consistent with our expectation, we find the relationship between downgrades and the jump component is more evident after GFC.

In addition, since the GFC falls within our sample period of 2000-2016, to mitigate the concern that our results may be affected by GFC in this section, we eliminate the firm-year

observation for 2008 and 2009 from our sample and rerun the baseline regressions following Huang et al. (2021). Column 3 in Panel A of Table 10 shows that our results remain unchanged.

Furthermore, we divide the jump component of abnormal audit fees into negative and positive jumps. We re-estimate the baseline model by replacing the jump component of abnormal audit fees with positive and negative jumps. Panel B of Table 10 shows that the positive effect of downgrades on the jump in abnormal audit fees concentrates in positive jump subsample only. This indicates that downgrades particularly result in increasing the jump component of abnormal audit fees. This is indeed consistent with the spirit of previous studies that auditors tend to charge higher abnormal audit fees in respond to the current period-specific firm risk (Coulton et al., 2016).

[Insert Table 10 about here]

7. OTHER OUTCOMES OF AUDIT SERVICE

To further triangulate our results, we test the outcomes of audit service (i.e., audit quality) for firms that experience downgrades. Particularly, we investigate how downgrades influence audit report lags, auditor litigation risk, and the issuance of going concern opinions.

7.1 Audit report lags and Lawsuits against Auditors

According to Simunic (1980) and other previous literature (Arens & Loebbecke, 1988; Pratt & Stice, 1994; Stice, 1991), audit pricing is the function of audit effort to institute appropriate audit procedures and obtain sufficient and appropriate audit evidence and risk premium to compensate for potential lawsuits against auditors. As examined earlier, downgrades increase abnormal audit fees, which may be due to auditors' additional effort and/or auditor litigation risk. We thus further investigate whether downgrades are associated with longer auditing periods (reflect longer auditing hours and more effort) and the possibility of lawsuits against auditors.

Audit report lags: The timeliness of audit reports is an important determinant of financial reporting quality (Lambert, Jones, Brazel, & Showalter, 2017). The audit report lag is defined as the length of time from a firm's fiscal year-end and the auditor's signing date and is used as a proxy for the timeliness of audit reports (Du et al., 2018; Whittred, 1980; Whittred & Zimmer, 1984). The timeliness of audit reports is significantly associated with the market's reaction to the accounting information released and the application of the released information to decision making

and stock prices (Ashton, Willingham, & Elliott, 1987). The issuance of a series of policies by the SEC since 2006 to enhance the timeliness of audit reports and corporate financial reports (SEC, 2002; 2004; 2005) further highlights the importance of audit report timeliness.

It is widely acknowledged that the financial information reported is the result of negotiations between the auditors and management (Salterio, 2012). These negotiations frequently occur towards the end of the audit process (Salterio, 2012). The efficiency of the negotiations is influenced by numerous factors, such as client size, operational complexity, and non-financial information (Knechel & Payne, 2001). Thus, any unusual event involving auditor-client disagreements during the process can cause an audit report delay (Ashton et al., 1987). Our study extends previous research by investigating how rating changes influence the timeliness of the audit report.

As discussed earlier in this paper, downgrades are treated as a signal of financial deterioration and credit risk. Thus, we expect audit report lags to be positively associated with downgrades. To examine the impacts of downgrades on audit report lags, we replace the components of abnormal audit fees with audit report lags as follows. Consistent with Du et al. (2018), we define the audit report lags as the difference between the fiscal year end and the auditor's signature date. The dependent variable is the natural logarithm of audit report lags, while the independent variables are the same as those in Equation (1).

The results are reported in Column 1 of Table 11. We find a significantly positive relation between the audit report lags and downgrades (coefficient of 0.021 with *t*-statistic 2.122). This result is consistent with our expectations. Since a downgrade function as a signal regarding a firm's financial viability and bankruptcy, auditors are likely to exert more effort to ensure the quality of financial reporting in the event of a downgrade.

[Insert Table 11 about here]

Lawsuits against Auditors: Although auditors exert additional effort, it may be possible that auditors still cannot detect all misstatements and face a potential lawsuits risk (Arens & Loebbecke, 1988). Stice (1991) suggests that it is possible that auditors correctly apply generally accepted auditing standards (GAAS) but will be sued due to erroneous financial statements. Palmrose (1988) documents that litigation against auditors is viewed as a negative signal of audit quality. This could lead to auditor reputation damage. We thus further investigate the impact of downgrades on the

risk of lawsuits against auditors by replacing the jump component of abnormal audit fees with auditor litigation risk as follows.

Following Lennox and Li (2014), we create a dummy variable *Auditor Litigation Risk* that equals one if the firm is audited by an audit firm that was sued in year *t*, and zero otherwise. The data on all lawsuits where audit firms are named as the defendant are collected from Audit Analytics. In line with Schmidt (2012) and Lennox and Li (2014), we limit the sample to lawsuits involving financial reporting matters. The results are shown in Column 2 of Table 11. We find that the coefficient of *Downgrade* is negative but statistically insignificant, indicating that credit rating changes have no effect on Auditor litigation risk.

7.2 Going concern opinion

A drop in credit rating is also a signal of a firm approaching financial failure (as shown in Appendix A). Credit rating downgrades represent a serious indicator of financial deterioration and a forward-looking indication of credit risk (S&P, 2013). Credit rating downgrades are significantly correlated with technical defaults such as debt covenant violations (Güttler & Wahrenburg, 2007). Menon and Williams (2010) show that technical defaults are an important determinant of the going concern opinion decision. Funcke (2015) documents that credit rating downgrades provide incremental information for going concern opinions and specifically finds a positive association between downgrades and the likelihood of issuing a going concern opinion. Thus, we directly test how downgrades influence the likelihood of receiving a going concern opinion using Equation (1), where the dependent variable is *Going concern*, which is an indicator variable equal to one if the firm receives a going concern assumption from its auditor, and zero otherwise.

The results are shown in Column 3 of Table 11. Consistent with Funcke (2015), we find a significant and positive relation between credit rating downgrades and the likelihood of issuing a going concern opinion (coefficient of 0.393 with *t*-statistic 1.872).[26] This indicates that auditors tend to make more conservative decisions when firms experience credit rating downgrades. This is consistent with our previous finding that downgrades serve as a signal of a firm's financial

[26] To alleviate the concern that our results are driven by the going concern opinion in the previous period, we remove samples that experience a going concern opinion in the previous year. The results still hold and are available upon request.

deterioration and future viability. Our results complement the studies by Gul and Goodwin (2010) and Bruno et al. (2016) and provide a more complete picture of the relationship between credit ratings and audit fees.

8. CONCLUSIONS AND IMPLICATIONS

This study investigates the association between abnormal audit fees and changes in credit ratings. Particularly, we decompose abnormal audit fees into the jump and long-run components. The jump component reveals the additional audit risk arising from the aggressiveness of current period financial reporting, while the long-run component reflects multiple periods firm-specific risks. We find a significantly positive relation between abnormal audit fees and credit rating downgrades. Furthermore, we find this relationship is particularly significant for the jump component. This indicates that credit rating downgrades provide relatively timely and credible signals regarding the firm's financial condition and future viability to auditors. Correspondingly, higher audit fees are charged as compensation for the additional audit effort and/or increased risk premium. Further analysis reveals that heightened default risk and misstatement risk are the two mechanisms through which downgrades have an impact on the jump component.

For robustness purposes, we use alternative measures of the jump component of abnormal audit fees based on ranking data and consider the differential effects of corporate governance on the relation between the jump component and downgrades. We find that the effect of downgrades on the jump in abnormal audit fees is more pronounced in firms with poor corporate governance and high litigation risk.

A potential limitation of our study is that we cannot fully address the endogeneity issue due to reverse causality. The auditors and credit rating agencies both function as information intermediaries. They may obtain the same information from the audited firms. While we acknowledge the existence of the possible effect of abnormal audit fees on downgrades, we argue that the credit rating agencies provide more timely signals and request different information from firms, which is likely to benefit auditors by saving billable hours. To alleviate this endogeneity concern, we implement the instrumental variable approach, GMM estimation approach, and a DiD analysis. Collectively, our results still hold through a series of robustness tests.

We further test how changes in credit ratings affect the other outcomes of audit service. We investigate how credit rating changes influence the timeliness of audit reports (i.e., audit report

lags), auditor litigation risk, and the likelihood of receiving a going concern opinion. Consistent with our findings of the jump component indicating additional audit risk regarding the aggressiveness of financial reporting during the current period, we find that downgrades are significantly and positively associated with audit report lags and the likelihood of receiving a going concern opinion but have no effect on auditor litigation risk.

The findings in this study have important implications for academic researchers, auditors, credit rating agencies, regulators, and practitioners. We firstly contribute to the abnormal audit fees literature by adding evidence on how credit rating changes, as a proxy for the firms' overall information environment changes and provide explanations for abnormal audit fees and their components. Second, we investigate the asymmetry effects of downgrades on the jump component of abnormal audit fees, which have not been explored in previous audit literature. Coulton et al. (2016) investigate how the jump and long-run components of abnormal audit fees impact accounting quality. We go one step further by investigating the factors driving the jump in abnormal audit fees. Third, we respond to the current PCAOB's research agenda regarding auditors' role in the collection and use of other information. We provide ex-ante evidence that other relevant information such as credit rating changes, particularly, downgrades, are significantly informative in determining abnormal audit fees and audit quality. Fourth, we provide further evidence in terms of the usefulness of credit rating changes. We show that credit rating downgrades provide credible signals regarding financial deterioration and firms' future viability to auditors. Specifically, auditors become more conservative (e.g., more likely to issue a going concern opinion) after credit rating downgrades.

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Table 1
Summary statistics.

Name	Obs	Mean	Median	Min	Max	P25	P75	Std
Panel A: Descriptive statistics for dependent variables								
Auditfee	17,152	14.611	14.597	11.948	17.402	13.850	15.363	1.149
Abnormal audit fees	17,152	0.047	0.054	-1.231	1.328	-0.273	0.374	0.498
Jump_actual	8,076	-0.005	-0.007	-0.859	0.908	-0.181	0.167	0.296
Jump_rank	8,076	-0.020	0	-8	7.905	-1	1	1.759
Auditreportlag	11,074	3.945	4.007	2.944	5.198	3.850	4.094	0.309
Auditor litigation risk	11,869	0.866	1	0	1	1	1	0.340
Going concern	8,395	0.005	0	0	1	0	0	0.071
Panel B: Descriptive statistics for independent variables								
Size	8,076	8.479	8.349	5.107	12.158	7.549	9.264	1.308
Empl	8,076	2.382	2.389	-1.931	5.796	1.406	3.439	1.544
Lev	8,076	0.302	0.280	0	0.907	0.187	0.398	0.158
Invrec	8,076	0.231	0.210	0.011	0.743	0.102	0.320	0.158
ROA	8,076	0.041	0.048	-0.518	0.237	0.017	0.081	0.081
MTB	8,076	3.657	2.375	0.249	33.607	1.545	3.844	4.737
Current	8,076	0.344	0.344	0	0.816	0.195	0.476	0.192
Debt3	8,076	0.280	0.162	0	4.073	0.027	0.371	0.434
Initialyr	8,076	0.047	0	0	1	0	0	0.212
Decye	8,076	0.730	1	0	1	0	1	0.444
Loss	8,076	0.171	0	0	1	0	1	0.376
Big4	8,076	0.966	1	0	1	1	1	0.181
Instholding (%)	8,076	59.826	75.8491	0	100	19.816	89.953	37.528
Auditorchg	8,076	0.045	0	0	1	0	0	0.207
Foreign	8,076	0.391	0	0	1	0	1	0.488
S&P Ratings	8,076	10.612	11	1	20	8	13	3.210
Litigation	8,076	0.224	0	0	1	0	0	0.417
Ana_Forecast_Disp	8,076	0.004	0.001	0	0.101	0.000	0.003	0.010
Religiosity	8,076	0.035	0.035	0.032	0.039	0.033	0.037	0.002
Downgrade	8,076	0.108	0	0	1	0	0	0.311
Upgrade	8,076	0.132	0	0	1	0	0	0.339

Panel C: Rating Changes

S&P Rating Changes	No. of Obs	No. of Unique Firms
Downgrade	874	546

Upgrade	1,069	601
Total	1,943	829

Panel D: Correlation Matrix

	Jump_actual	Downgrade	Upgrade
Jump_actual	1		
Downgrade	0.025*	1	
Upgrade	-0.011	-0.093***	1

Panel E: Variance Inflation Factors (VIFs)

	VIFs
Downgrade	1.13
Upgrade	1.03
Size	3.07
Empl	2.38
Lev	1.92
Invrec	1.62
ROA	2.19
MTB	1.25
Current	2.05
Debt3	1.05
Initialyr	1.38
Decye	1.16
Loss	2.00
Big4	1.07
Instholding (%)	1.07
Auditorchg	1.38
Foreign	1.06
S&P Ratings	2.63
Litigation	1.19
Ana_Forecast_Disp	1.27
Religiosity	1.13

Notes: This table reports the descriptive statistics for variables used in the main regressions. Panel A (B) reports the descriptive statistics for dependent variables (independent variables), Panel C reports the number of rating changes used in the regressions, Panel D reports the correlation matrix, and Panel E reports the variance inflation factor for all independent variables. Variable definitions are provided in Appendix B.

Table 2
OLS regression of rating changes on abnormal audit fees.

Variables	(1) Abnormal Audit Fees	(2) Abnormal Audit Fees	(3) Abnormal Audit Fees
Downgrade	0.021*		0.022*
	(1.693)		(1.782)
Upgrade		0.015	0.017
		(1.111)	(1.254)
Controls	No	No	No
Firm FE	No	No	No
Year FE	No	No	No
Observations	17,152	17,152	17,152
R-squared	0.000	0.000	0.000

Notes: This table reports the univariate regression results for the impact of rating changes on abnormal audit fees. Column 1 (2) includes downgrades (upgrades), and Column 3 includes both downgrades and upgrades in the regression. Standard errors are clustered by firm and t-values are shown in brackets. ***, **, * represent a significance level at 1, 5, and 10 percent, respectively. Variable definitions are provided in Appendix B.

Table 3
OLS regression of rating changes on the jump component of abnormal audit fees after controlling for other variables.

Variables	(1) Jump_actual	(2) Jump_actual	(3) Jump_actual
Downgrade	0.033**		0.034**
	(2.505)		(2.519)
Upgrade		0.005	0.006
		(0.496)	(0.574)
Size	-0.043*	-0.040	-0.042*
	(-1.755)	(-1.627)	(-1.729)
Empl	0.067***	0.067***	0.067***
	(2.730)	(2.731)	(2.727)
Lev	0.010	0.021	0.011
	(0.149)	(0.319)	(0.169)
Invrec	-0.433***	-0.435***	-0.432***
	(-4.390)	(-4.384)	(-4.380)
ROA	-0.096	-0.115	-0.098
	(-1.261)	(-1.495)	(-1.286)
MTB	-0.001	-0.001	-0.001
	(-0.711)	(-0.779)	(-0.724)
Current	0.013	0.007	0.013
	(0.190)	(0.102)	(0.189)
Debt3	0.002	0.002	0.002
	(0.197)	(0.208)	(0.195)
Initialyr	-0.085***	-0.086***	-0.086***
	(-3.468)	(-3.478)	(-3.470)
Decye	-0.090	-0.091	-0.090
	(-0.978)	(-0.988)	(-0.981)
Loss	-0.104***	-0.101***	-0.104***
	(-6.577)	(-6.415)	(-6.575)
Big4	-0.080	-0.079	-0.080
	(-1.089)	(-1.081)	(-1.083)
Instholding	-0.000*	-0.000*	-0.000*
	(-1.769)	(-1.735)	(-1.768)
Auditorchg	-0.001	-0.001	-0.001
	(-0.043)	(-0.053)	(-0.047)
Foreign	-0.041**	-0.042**	-0.042**
	(-2.321)	(-2.318)	(-2.324)
S&P Ratings	0.011**	0.014***	0.012**
	(2.360)	(3.005)	(2.385)
Litigation	-0.033	-0.034	-0.033
	(-0.790)	(-0.797)	(-0.787)
Ana_Forecast_Disp	1.092*	1.168**	1.087*
	(1.877)	(2.008)	(1.871)
Religiosity	12.107***	12.280***	12.174***
	(3.975)	(4.031)	(3.998)
Constant	-0.003	-0.063	-0.015
	(-0.012)	(-0.225)	(-0.053)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Observations	8,076	8,076	8,076
R-squared	0.220	0.219	0.220

Notes: This table reports the regression results for the impact of rating changes on the jump component of abnormal audit fees. Both firm and year fixed effects are included. Standard errors are clustered by firm and t-values are shown in brackets. ***, **, and * represent a significance level at 1, 5, and 10 percent, respectively. Variable definitions are provided in Appendix B.

Table 4
Economic mechanisms: Default risk and misstatement risk.

Panel A: Default risk

	(1)	(2)	(3)	(4)
Variables	Jump_actual	Jump_actual	Jump_actual	Jump_actual
Downgrade×Z-score	-0.017**			
	(-2.224)			
Downgrade×Distant-to-Default			-0.011**	
			(-2.364)	
Downgrade	0.084***		0.060**	
	(3.308)		(2.519)	
Upgrade		-0.014		-0.042
		(-0.658)		(-1.577)
Upgrade×Z-score		0.004		
		(0.836)		
Upgrade×Distant-to-Default				0.006
				(1.637)
Z-score	-0.020***	-0.022***		
	(-3.835)	(-4.026)		
Distant-to-Default			-0.002	-0.004
			(-1.017)	(-1.554)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	7,684	7,684	6,436	6,436
R-squared	0.215	0.213	0.199	0.199

Panel B: Misstatement risk

	(1)	(2)	(3)	(4)
Variables	Jump_actual	Jump_actual	Jump_actual	Jump_actual
Downgrade×Reporting_quality1	0.261**			
	(2.409)			
Downgrade×Reporting_quality2			0.237**	
			(2.169)	
Downgrade	0.016		0.018	
	(1.009)		(1.099)	
Upgrade		0.003		0.004
		(0.247)		(0.303)

Upgrade× Reporting_quality1		-0.033		
		(-0.237)		
Upgrade×Reporting_quality2				-0.043
				(-0.319)
Reporting_quality1	0.018	0.056		
	(0.436)	(1.324)		
Reporting_quality2			0.022	0.058
			(0.551)	(1.393)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	7,724	7,724	7,724	7,724
R-squared	0.228	0.226	0.228	0.226

Notes: This table reports the regression results to examine the mechanisms through which downgrades and upgrades affect the jump component of abnormal audit fees. Panel A reports the results for the default risk mechanism and Panel B reports the results for the misstatement risk mechanism. Both firm and year fixed effects are included. Standard errors are clustered by firm and t-values are shown in brackets. ***, **, and * represent a significance level at 1, 5, and 10 percent, respectively.

Table 5

OLS regression of rating changes on the jump component of abnormal audit fees based on ranks following Coulton et al. (2016).

Variables	(1) Jump_rank	(2) Jump_rank	(3) Jump_rank
Downgrade	0.201**		0.204**
	(2.540)		(2.575)
Upgrade		0.076	0.081
		(1.185)	(1.263)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	8,076	8,076	8,076
R-squared	0.203	0.202	0.203

Notes: This table reports the regression results for the impact of rating changes on the jump component of abnormal audit fees, using the alternative measure of the jump component following Coulton et al. (2016). Column 1 (2) includes downgrades (upgrades), and Column 3 includes both downgrades and upgrades in the regression. Both firm and year fixed effects are included. Standard errors are clustered by firm and t-values are shown in brackets. ***, **, and * represent a significance level at 1, 5, and 10 percent, respectively.

Table 6

Cross-sectional analysis.

Variables	Blockholder		Independent directors		Litigation risk	
	Low Jump_actual	High Jump_actual	Low Jump_actual	High Jump_actual	Low Jump_actual	High Jump_actual
Downgrade	0.049**	0.006	0.038*	0.019	0.021	0.064**
	(2.136)	(0.278)	(1.901)	(1.033)	(1.412)	(2.134)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,316	3,338	4,010	3,739	6,265	1,804
R-squared	0.279	0.301	0.284	0.285	0.223	0.249

Notes: This table reports the regression results for the impact of rating downgrades on the jump component of abnormal audit fees, conditional on sub-samples split based on firms' corporate governance measures (i.e., blockholder percentage and proportion of independent directors) and firm litigation risk. Both firm and year fixed effects are included. Standard errors are clustered by firm and t-values are shown in brackets. ***, **, and * represent a significance level at 1, 5, and 10 percent, respectively.

Table 7
Endogeneity test – Omitted variable bias.

Panel A: Additional controls

	(1)	(2)	(3)	(4)
VARIABLES	Jump_actual	Jump_actual	Jump_actual	Jump_actual
Downgrade	0.033**	0.035**	0.033**	0.035**
	(2.505)	(2.574)	(2.505)	(2.575)
DFA	0.181			0.135
	(1.191)			(0.848)
State GDP		-0.002		-0.001
		(-0.721)		(-0.713)
CEO Turnover			0.006	0.010
			(0.146)	(0.250)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	8,076	7,898	8,076	7,898
R-squared	0.220	0.220	0.220	0.220

Panel B: Oster test

	Without Controls	With Controls
Downgrade	0.022	0.033
R-squared	0.001	0.259
Delta δ		-15.898

Notes: This table reports the results of regression analyses to address the omitted variable biases. Panel A reports the regression results by including a dummy variable for Dodd-Frank Act adoption, state GDP growth rate, and a dummy variable for CEO turnover as the control variables. Panel B reports the results of Oster (2019) test. Both firm and year fixed effects are included. Standard errors are clustered by firm and t-values are shown in brackets. ***, **, and * represent a significance level at 1, 5, and 10 percent, respectively.

Table 8
Further tests on endogeneity.

Variables	IV regression		GMM approach
	First Stage Downgrade	Second Stage Jump_actual	
Downgrade		0.307***	0.073**
		(2.785)	(2.044)
Indperc	0.619***		
	(8.290)		
Political Sentiment	-0.000***		
	(-4.560)		
Lagged audit fee jump			0.081***
			(2.580)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
F-statistics	44.90***		
Anderson-Rubin F-statistics		4.35**	
Hansen J-statistics (p-value)		0.102 (0.75)	
Observations	8,420	8,420	7,015

Notes: This table reports the 2SLS regression analysis and the GMM analysis of the impact of rating downgrades on the jump component of abnormal audit fees. Columns 1-2 present the results for the 2SLS regression, while Column 3 shows the results for GMM regression. Both firm and year fixed effects are included. Standard errors are clustered by firm and t-values are shown in brackets. ***, **, and * represent a significance level at 1, 5, and 10 percent, respectively.

Table 9

DiD analysis.

Panel A: Probit regressions		
	(1)	(2)
VARIABLES	Pre-match	Post-match
Size	0.104***	-0.023
	(3.464)	(-0.439)
Empl	0.083***	0.011
	(3.492)	(0.258)
Lev	0.733***	-0.190
	(3.918)	(-0.708)
Invrec	-0.225	0.313
	(-1.404)	(1.055)
ROA	-2.190***	0.180
	(-6.642)	(0.306)
MTB	-0.010*	-0.000
	(-1.869)	(-0.064)
Current	0.192	-0.079
	(1.139)	(-0.284)
Debt3	0.042	-0.030
	(0.888)	(-0.399)
Initialyr	-0.067	0.091
	(-0.613)	(0.514)
Decye	-0.021	0.024
	(-0.394)	(0.281)
Loss	0.425***	0.003
	(6.295)	(0.026)
Big4	0.223**	0.202
	(2.144)	(1.072)
Instholding	-0.000	-0.000
	(-0.602)	(-0.251)
Auditorchg	0.022	0.045
	(0.209)	(0.265)
Foreign	-0.024	-0.002
	(-0.499)	(-0.031)
S&P Ratings	0.061***	0.007
	(5.446)	(0.437)
Litigation	0.102	-0.009
	(1.362)	(-0.075)
Ana_Forecast_Disp	8.287***	0.611
	(4.698)	(0.188)
Religiosity	-7.203	-3.512

	(-0.538)	(-0.162)
Constant	-2.947***	-0.042
	(-4.902)	(-0.042)
Observations	8,076	1,530
Prob>chi2	0.000	1.000
Pseudo R-squared	0.155	0.0042

Panel B: Differences in independent variables

	Control	Treatment	Control - Treatment	t-stat
Size	8.509	8.462	0.047	0.707
Empl	2.436	2.397	0.039	0.483
Lev	0.352	0.347	0.005	0.638
Invrec	0.213	0.222	-0.009	-1.180
ROA	0.004	0.003	0.001	0.147
MTB	3.372	3.287	0.085	0.340
Current	0.317	0.324	-0.007	-0.725
Debt3	0.289	0.281	0.008	0.330
Initialyr	0.047	0.056	-0.009	-0.808
Decye	0.735	0.732	0.003	0.116
Loss	0.369	0.373	-0.004	-0.159
Big4	0.963	0.971	-0.008	-0.862
Instholding	56.439	55.801	0.637	0.318
Auditorchg	0.046	0.052	-0.007	-0.592
Foreign	0.361	0.359	0.001	0.053
S&P Ratings	11.511	11.620	-0.108	-0.679
Litigation	0.213	0.221	-0.008	-0.372
Ana_Forecast_Disp	0.005	0.005	0.000	-0.512
Religiosity	0.036	0.036	0.000	0.000

Panel C: DiD Analysis

Variables	(1) Jump_actual
Treated*Post	0.046*
	(1.662)
Treated	-0.010
	(-0.486)
Post	-0.025
	(-1.214)
Controls	Yes
Observations	2,051
R-squared	0.015

Notes: This table reports the regression results for the impact of rating changes on the jump component of abnormal audit fees using downgrades as the shocks. Panel A reports coefficient estimates from the probit model to estimate propensity scores. Panel B presents the difference in the mean of firms' characteristics between the treatment and control groups. Panel C reports the DiD regression results. Standard errors are clustered by firm and t-values/z-values are shown in brackets. ***, **, and * represent a significance level at 1, 5, and 10 percent, respectively.

Table 10

Alternative sample periods and dependent variables.

Panel A: GFC

	Pre-GFC	Post-GFC	Excluding GFC
Variables	Jump_actual	Jump_actual	Jump_actual
Downgrade	0.019	0.050***	0.039**
	(0.635)	(2.787)	(2.402)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	2,383	4,390	6,876
R-squared	0.433	0.302	0.249

Panel B: Positive and negative jumps

	Positive Jump	Negative Jump
Variables	Jump_actual	Jump_actual
Downgrade	0.022*	0.012
	(1.749)	(1.012)
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	3,786	3,991
R-squared	0.381	0.365

Notes: This table reports the regression results for the impact of rating downgrades on the jump component of abnormal audit fees by dividing the full sample period into pre- and post-GFC (Columns 1-2 in Panel A), excluding the GFC period (Column 3 in Panel A), and positive and negative jumps (Panel B). Both firm and year fixed effects are included. Standard errors are clustered by firm and t-values are shown in brackets. ***, **, and * represent a significance level at 1, 5, and 10 percent, respectively.

Table 11
Impact on other outcomes of audit services.

Variables	(1)	(2)	(3)
	Report Lag	Auditor Litigation Risk	Going concern
Downgrade	0.021**	-0.010	0.393*
	(2.122)	(-0.190)	(1.872)
Controls	Yes	Yes	Yes
Firm FE	Yes	No	No
Industry FE	No	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	11,074	11,869	8,395
R-squared/ Pseudo R-squared	0.545	0.123	0.557

Notes: This table reports the regression results for the impact of rating downgrades on audit report lags (Column 1), auditor litigation risk (Column 2), and the likelihood of receiving going concern opinions (Column 3). Both firm and year fixed effects are included in Column 1, while industry and year fixed effects are included in Columns 2-3. Standard errors are clustered by firm and t-values/z-values are shown in brackets. ***, **, and * represent a significance level at 1, 5, and 10 percent, respectively.

Appendix A

Sample one is an extract of S&P's credit rating report from Agarwal et al. (2016): "Building Materials Holding Corp. Downgraded to 'BB-', Remaining on CreditWatch Negative" written by Pamela Rice and Andy Sookram and published on November 20, 2007 by Standard & Poor's Financial Services LLC.

"…The downgrade reflects the ongoing weakness in the U.S. housing industry and our expectation that this downturn will last longer than previously expected. Given BMHC's exposure to residential construction, this trend has hurt, and will continue to hurt, the company's operating performance. As a result, its consolidated credit measures have deteriorated in 2007, reaching levels that are inconsistent with the former ratings. Although the company has substantial availability under its revolving credit facility, its ability to meet its financial covenants over the next few quarters could be challenged, given our expectations that markets will decline further in 2008.

Chapman Capital announced in October that it was seeking to replace BMHC's chairman and CEO, Robert Mellor, with Stanley Wilson, president of BMHC subsidiary BMC West Corp. Should this change occur, it could lead to unexpected changes in business strategies that are neither supportive of credit quality nor within our expectations for the current ratings on BMHC..."

Sample two is an extract of Moody's credit rating report from Löffler, Norden, and Rieber (2019): "Moody's lowers Avery Dennison's ratings to Baa2" published on May 19, 2009.

"…Avery's ratings were lowered to Baa2 as the company is expected to continue, over the intermediate term, to face negative margin pressure resulting from a combination of raw material cost inflation and declining sales volumes across most businesses units. We expect that this combined pressure will result in cash flows and credit metrics that, in the short term, are more consistent with a rating in the high end of the Ba category, hence the negative outlook. The outlook also reflects Avery's recent preliminary non-cash goodwill impairment charge of $820 million for the retail information services business unit that served to initially reduce Avery's balance sheet goodwill account by over 47%..."

Appendix B

Definition of Variables.

Key dependent variables	
Auditfee	The natural logarithm of audit fees (Audit Analytics).
Abnormal audit fees	Abnormal audit fees estimated as the residuals from Equation (C1) in Appendix C.
Jump_actual	The difference between the current period fee residuals and the 3-year average fee residuals.
Long_run_actual	The average of fee residuals over the last three years (t-3 to t-1).
Rank	Ranking based on deciles of residuals (Coulton et al., 2016).
Jump_rank	The difference between the current period fee residuals rank and the average rank of fee residuals over the last three years (Coulton et al., 2016).
Long_run_rank	The average ranking over the last three years (t-3 to t-1) (Coulton et al., 2016).
Auditreportlag	The natural logarithm of the difference between fiscal year end and auditor signature date (Audit Analytics).
Auditor litigation risk	Equals one if the Auditor firm was sued in year t, and zero otherwise (Audit Analytics).
Going concern	Equals one if the firm received a going concern assumption from its auditor, and zero otherwise (Audit Analytics).
Audit fees, jump & long-run models (Tables 3─11)	
Size	The natural logarithm of total assets (Compustat).
Empl	The natural logarithm of the number of employees (Compustat).
Lev	Total debts divided by total assets (Compustat).
Invrec	Inventory and receivables divided by total assets (Compustat).
ROA	Net income divided by total assets (Compustat).
MTB	Market value of equity divided by book value of equity (Compustat).
Current	Current assets divided by total assets (Compustat).
Debt3	The percentage of debt maturing within three years after current fiscal year end (Compustat).
Initialyr	Equals one if the firm auditor is in the first or second year of audit engagement, and zero otherwise (Audit Analytics).
Decye	Equals one if the firm's fiscal year end falls in December, and zero otherwise (Compustat).
Loss	Equals one if the firm reported a loss in current year, and zero otherwise (Compustat).
Big4	Equals one if the firm is audited by one of the Big Five audit firms (Arthur Andersen, Deloitte & Touche, Ernst & Young, KPMG, and PricewaterhouseCoopers) or Big Four audit firms after the exit of Arthur Andersen, and zero otherwise (Audit Analytics).
Instholding (%)	Percentage of shares held by institutional shareholders at the beginning of the fiscal year (Thomson Reuters 13F).
AuditorChg	Equals one if the firm changed auditors during the fiscal year, and zero otherwise (Audit Analytics).
Foreign	Equals one if the firm has foreign operations, and zero otherwise (Compustat).
S&P Ratings	S&P credit ratings, numerical values ranging from one (for AAA rated bonds) to twenty-two (for D rated bonds) (Compustat).
Litigation	Equals one for high litigation risk industries, and zero otherwise (Bruno et al., 2016).
Downgrade	A rating downgrade happened within the current year (Compustat).
Upgrade	A rating upgrade happened within the current year (Compustat).
Z-Score	Altman Z-score (Altman, 1968).
Distant-to-Default	The distance to default estimated from Merton (1974) option model (Risk Management Institute of National University of Singapore).
Reporting_quality	Firm's absolute discretionary accrual, which is estimated based on the Jones (1991) and the modified Jones (1991) model following Kothari et al. (2005) (Compustat).

Blockholder percentage	The percentage of blockholder ownership (Thompson Reuters 13F).
Independent director	The percentage of independent director (Boardex).
CEO Turnover	Equals one if the firm's CEO changes, and zero otherwise (Eisfeldt & Kuhnen, 2013).
Ana_Forecast_Disp	Standard deviation of earnings forecast divided by the closing price of the previous year (IBES).
Political Sentiment	The sentiment expressed by firms' quarterly earnings conferencing call participants when discussing politics-related issues (Hassan et al., 2019).
Indperc	The percentage of downgrades in the firm's industry (Harford & Uysal, 2014).
Abnormal audit fees model: additional variables not defined above	
Cashflow	Operating cash flow divided by total assets (Compustat).
Material weakness	Equals one if the firm discloses an internal control material weakness in current year, and zero otherwise (Audit Analytics).
Missing material weakness	Equals one if the data on material weakness are missing in current year, and zero otherwise (Audit Analytics).
Merger	Equals one if firm engaged in a merger or acquisition in current year, and zero otherwise (Compustat).
Restate	Equals one if the firm restated the audit fee in current year, and zero otherwise (Audit Analytics).
Restructure	Equals one if the firm experienced restructuring in current year, and zero otherwise (Compustat).
Specialitem	Special items divided by total assets (Compustat).
Sqempls	Square-root of the number of employees (Compustat).
Unqualifiedopin	Equals one if the firm received an unqualified audit opinion in current year, and zero otherwise (Compustat).

Appendix C

Estimations of Abnormal Audit Fees

We estimate the abnormal audit fees as the residuals from the regression of audit fees on a number of firms' and auditor's characteristics motivated by the model in Du et al. (2018). In the spirit of Picconi and Reynolds (2012) and Hribar et al. (2014), the model is estimated separately by year and Fama-French 12 industry classifications.

$$\begin{aligned} Auditfee = {} & \beta_0 + \beta_1 Big4 + \beta_2 Size + \beta_3 Lev + \beta_4 Loss + \beta_5 ROA + \beta_6 Cashflow + \\ & \beta_7 Sqempls + \beta_8 Foreign + \beta_9 Merger + \beta_{10} \mathrm{Re}structure + \beta_{11} Specialitem + \\ & \beta_{12} Materialweakness + \beta_{13} Invrec + \beta_{14} \mathrm{Re}state + \beta_{15} Auditreportlag + \beta_{16} Decye + \\ & \beta_{17} Going-concern + \beta_{18} Unqualifiedopin + \beta_{19} Mis\sin gmaterialweakness + \varepsilon \end{aligned} \quad \text{(C1)}$$

The definitions of all variables in Equation (C1) are provided in Appendix B. The dependent variable is the natural logarithm of audit fees (*Auditfee*). To account for the complexity of the audit process and the resources required to perform the audit, we include in Equation (C1) the natural logarithm of total assets *(Size)*, square-root of the number of employees (*Sqempls)*, total debts divided by total assets *(Lev)*, a dummy equal to one if the firm has foreign operations (*Foreign)*, special items divided by total assets *(Specialitem)*, a dummy equal to one if the firm engaged in a merger or acquisition *(Merger)*, a dummy equal to one if the firm experienced restructuring *(Restructure)*, and a dummy equal to one if the firm disclosed an internal control material weakness *(Materialweakness)*. To control for the increase in inherent firm risk or audit engagement risk, which is likely to result in greater audit efforts, we include profitability (*ROA)*, operating cash flows divided by total assets (*Cashflow)*, a dummy equal to one if the firm reported a loss (*Loss)*, inventory and receivables scaled by total assets *(Invrec)*, a dummy equal to one if the firm restated the audit fee *(Restate)*, a dummy equal to one if the firm received a going concern assumption from its auditor *(Going-concern) and* a dummy equal to one if the firm received an unqualified

opinion *(Unqualifiedopin)*, and a dummy equal to one if the data on material weakness are missing *(Missing material weakness)*. Other auditor's characteristics that are expected to affect audit engagement include a dummy that equals one if the firm is audited by one of the Big Five audit firms (Arthur Andersen, Deloitte & Touche, Ernst & Young, KPMG, and PricewaterhouseCoopers) or Big Four audit firms after the exit of Arthur Andersen *(Big4)*, audit report lag *(Auditreportlag)*, and a dummy equal to one if the firm's fiscal year end falls in December *(Decye)*. The results of the regression are presented in Table C1. The sign of most variables turns out to be the same as the predicted one. The mean R^2 for 170 estimations of audit fee equation by year and Fama-French 12 industry classifications is 0.859.

Table C1
Abnormal audit fees.

Variables	Predicted sign	Auditfee
Big4	+	0.453***
		(4.028)
Size	+	0.463***
		(13.104)
Lev	+	0.017
		(0.141)
Loss	+	0.122
		(1.172)
ROA	-	-0.026
		(-0.436)
Cashflow	-	-0.097
		(-0.719)
Sqempls	+	0.043*
		(1.684)
Foreign	+	0.110
		(1.190)
Merger	+	0.033
		(0.381)
Restructure	+	0.209**
		(2.025)
Specialitem	+	0.071
		(0.301)
Material weakness	+	0.247*
		(1.662)
Invrec	+	0.520**
		(2.419)
Restate	+	0.037
		(0.276)
Auditreportlag	+	-0.001
		(-0.907)
Decye	+	0.185**
		(2.276)
Going concern	+	0.125
		(0.632)
Unqualifiedopin	-	-0.072
		(-0.678)
Missing material weakness	-	-0.090
		(-0.208)
Constant		9.810***
		(36.968)
Observations		75,819
R-squared		0.859

Notes: This table reports the regression results for the estimation of abnormal audit fees. Column 1 reports the mean coefficients of year and industry regressions of the audit fee model represented in Equation (C1). The t-values shown in brackets are calculated using the mean standard errors of the coefficients. ***, **, and * represent a significance level at 1, 5, and 10 percent, respectively. Variable definitions are provided in Appendix B.