Accounting, Organizations and Society 87 (2020) 101168

Contents lists available at ScienceDirect

Accounting, Organizations and Society

journal homepage: www.elsevier.com/locate/aos

The effect of audit materiality disclosures on investors' decision making☆

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ARTICLE INFO

Article history:
Received 4 January 2018
Received in revised form
16 July 2020
Accepted 27 July 2020
Available online 6 September 2020

Keywords:
Audit report
Audit materiality
Investors
Materiality disclosure

ABSTRACT

Recent reviews of the academic literature indicate that little is known regarding how users evaluate the materiality levels auditors use or respond to quantitative materiality disclosure. Regulators around the world have taken different stances on whether materiality should, or should not, be disclosed in the auditor's report. In response to the dearth of research on these policy decisions, we examine the effect of audit materiality disclosures, or lack thereof, on professional investors' decision making across different investment contexts (debt vs. equity, public vs. private). Our study is designed to test global audit public policy and as such our hypotheses are motivated by assertions made by regulators, auditing standards, and audit theory. Among a sample of 246 professional investors in our main experiment and 91 professional investors in two supplemental experiments, we find no consistent evidence that investors incorporate materiality disclosures into their investment decisions. Most importantly, we find evidence that investors' understanding of materiality is not in line with regulator assertions. For example, investors fail to make consistent connections between the amount of disclosed audit materiality and the level of auditor effort. Our results hold across debt and equity investment settings for both public and private companies. In sum, our findings suggest that disclosures of audit materiality are not well understood by professional investors and are not viewed as decision relevant. This research informs practitioners, regulators, and academics regarding the effect of materiality disclosure on investor decision making as well as stakeholders' views and expectations of overall materiality.

1. Introduction

The potential disclosure of auditors' materiality judgments has been discussed in the academic and professional literature for some time (Holstrum & Messier, 1982; Leslie, 1985; Messier, Martinov-Bennie, & Eilifsen, 2005; PCAOB, 2011a, b). Recently, global regulators have struggled with whether to require the disclosure of materiality in the auditor's report. During the deliberations about revising the auditor's report, surveyed investors supported increased disclosure about materiality (Singh & Peters, 2015). Further, the U.K.'s Financial Reporting Council (FRC) (2013d), p. 8) arguing that the requirement to disclose materiality will provide increased visibility of the impact of materiality on the conduct of audit work. However, some commenters to the Public Company Accounting Oversight Board (PCAOB) (2011b, Appendix C) stated that disclosing materiality in the auditor's report could result in

☆ We appreciate helpful comments from Mark Peecher (Editor), two anonymous reviewers, the participants of the UNLV workshop, the 28th Audit & Assurance Conference of the British Accounting & Finance Association, and the SDA Bocconi 7th Workshop on Audit Quality. We also thank Anna Gold, Wendy Green, Erin Hamilton, Bill Kinney, Aaron Saiewitz, and Jason Smith. Professor Messier received financial support for this research from his Norwegian Institute of Public Accountants (DnR) Professorship in Auditing at NHH. Professor Glover acknowledges financial support from the K. Fred Skousen Distinguished Endowed Professorship in Accounting at BYU. We would like to thank KPMG LLP for providing funding for this research. The findings and opinions included in this study are solely the authors.

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https://doi.org/10.1016/j.aos.2020.101168
0361-3682/

inconsistent communication and that trying to select which materiality number to disclose could be especially difficult. In the end, standard setters in both the U.K. (FRC, 2013c) and the Netherlands (NBA, 2014) issued standards that require auditors to disclose the materiality threshold used for financial statement audits.[1] However, the International Auditing and Assurance Standards Board (IAASB) and the PCAOB decided to *not* require materiality disclosures (IAASB, 2015a, 2015d; PCAOB, 2017), although both regulators appear willing to revisit their decisions as more information is obtained regarding the impact of disclosing materiality (IAASB, 2015a, 2015b, 2015c, 2015d; PCAOB 2017, p. 56).

Materiality is one of the basic concepts of auditing (Messier, Glover, & Prawitt, 2019) and materiality serves as the "scope" for audit work; that is, this amount is used to determine which accounts and locations to audit and the amount of auditor effort to apply to those accounts and locations.[2] However, recent academic reviews of audit reporting indicate that little is known regarding how users respond to materiality disclosures or evaluate the level of materiality used by auditors (see reviews by Church, Davis, & McCracken, 2008; Mock et al., 2013). Gray, Turner, Coram, and Mock (2011) argue that if materiality disclosure does not impact users' analysis of financial statements, then it does not warrant adding the efforts, regulatory actions, and risks associated with such disclosures. Therefore, in a time when some regulators require the materiality disclosures requested by the majority of investors and others have decided to not require disclosure while they continue to consider such a disclosure, academic research in this area can provide important insights to regulators.

Our main objective is to examine the effect of audit materiality disclosures on professional investors' decisions. Because little is known regarding how users respond to or incorporate materiality disclosures,[3] we conduct controlled experiments to isolate the effect of disclosing materiality on professional investors' decisions.

We rely on the prescriptions provided in audit standards and the stated intent of policy makers to formulate our predictions. Malsch and Salterio (2016, 5) argue that, "Auditing standards can either be evaluated in light of what practitioners do in the field or used to evaluate their practices (or both)." Further, an important motivator of academic research is to explicitly test policy makers' prescriptions and assertions as specified in auditing standards (Kinney, 2018, 2019). To this end, in our main experiment, we examine professional investors' investment decisions in four areas given the disclosure of materiality by the auditor. First, does the disclosure of materiality affect professional investors' investment decisions? Second, does the *level* of materiality disclosed by the auditor affect professional investors' investment decisions? Third, does the disclosure of materiality differentially affect professional investors' decisions when considering the type of investment entity (i.e., *publicly* traded versus *privately* held equity investments)? Fourth, does the disclosure of materiality differentially affect professional investors' decisions when considering the type of investment vehicle (i.e., *equity* versus *debt*)?

In our main experiment, we investigate investors' decisions by manipulating (1) the presence or absence of the audit materiality disclosure, (2) two levels of quantitative materiality (4 and 10 percent of pre-tax income), and (3) three levels of investment type (public equity, private equity, and public debt). We asked 246 U.S. and U.K. professional investors to evaluate a company in which auditors' materiality considerations are disclosed in the entity's audit report like those currently provided in the audit reports of U.K. filers. We solicited responses from U.S. and U.K. participants for several reasons. First, Bédard, Coram, Espahbodi, and Mock (2016) encourage research beyond the U.K. environment and our study is responsive to their call for additional research focused directly on users in both the U.S. and the U.K. Utilizing responses from both U.S. and U.K. professional investors provides insights into investment behavior of professionals in two important capital markets and enables us to better address the global debate regarding materiality disclosure. Second, utilizing responses from both jurisdictions enables us to examine whether differences in investor responses exist between investors with past experience with materiality disclosures (i.e., U.K. investors) relative to investors with little or no experience with such disclosures (i.e., U.S. investors) in case there is some learning effect (Maksymov & Nelson, 2017).

The results from the main experiment show the following. First, relative to a control group, the disclosure of materiality in the audit report has no effect on users' decisions to increase or decrease current investment levels. This result helps triangulate emerging archival research on investors' response to expanded U.K. audit reports (Gutierrez, Minutti-Meza, Tatum, & Vulcheva, 2018; Lennox, Schmidt, & Thompson, 2019) and interview-based research (FRC, 2017; Houghton, Jubb, & Kend, 2011). The fact that we find no significant effect on investor judgments in a simplified, controlled experimental environment suggests that the lack of a significant effect in archival studies (e.g., Gutierrez et al., 2018) is neither due to investor overload from having to understand both the audit report and lengthy financial statements and related footnotes nor to effects from other concurrent disclosures such as key audit matters.

Second, we find some evidence that the level of disclosed materiality (4 vs. 10 percent) affects investor decision making, but in a direction that runs counter to audit theory and prescriptions of auditing standards.[4] Specifically, investors are slightly more likely to increase their investment when audit materiality is set at 10 percent of pre-tax income than when materiality is 4 percent of pre-tax income, even though a higher materiality threshold typically means less auditor effort and less precision. This result suggests that professional investors fail to understand the inherent relationship between audit materiality and auditor effort. Third, we find no significant effect of materiality on investment decisions between professional investors considering their investment in public equity compared to private equity or, separately, public debt compared to public equity.

[1] The European Union (2014) requires that the auditor in an additional report provided to the audit committee to "disclose the quantitative level of materiality applied to perform the statutory audit for the financial statements as a whole … and disclose the qualitative factors which were considered when setting the level of materiality" (Article 11, para 2. (h)).

[2] The IAASB's guidance (2009, ISA 320.04) states "the auditor's determination of materiality is a matter of professional judgment, and is affected by the auditor's perception of the financial information needs of users of the financial statements." The PCAOB defines materiality by referring to the Supreme Court of the United States which states that a fact is material if there is "a substantial likelihood that the… Fact would have been viewed by the reasonable investor as having significantly altered the 'total mix' of information made available" (AS 2105.02). Thus, both standard setters take a *user* perspective when providing guidance to auditors about materiality.

[3] The only behavioral research study that examines the effect of a materiality disclosure on equity investors' judgments that we have identified is Eilifsen, Hamilton, and Messier (2020). They find that the disclosure of materiality helps investors to better judge the uncertainty of complex estimates where quantitative sensitivity analyses are reported in a footnote disclosure. The findings from the emerging archival research on investors' response to the disclosure of materiality in the expanded U.K. audit reports are mixed. Gutierrez et al. (2018) do not find evidence that the disclosure of materiality affects investors' reaction to auditors' reports while Amiram et al. (2017) find that the disclosure of materiality influences the relative pricing of earnings.

[4] When we refer to audit theory in the paper, we are referring to seminal works such as Mautz and Sharaf's, *The Philosophy of Auditing* (American Accounting Association Monograph, 1961).

Although the evidence from our main experiment suggests that investors do not understand the relationship between audit materiality and auditor effort, an alternative explanation is that investors perceive lower materiality as signaling auditors' perception of higher entity business risk, thus decreasing investment attractiveness.[5] To address this alternative explanation and better understand professional investors' understanding of audit materiality, we ran two supplemental experiments using 91 professional U.K. investors. The results from these two supplemental experiments provide three main takeaways. First, when explicitly told that company business and misstatement risks have increased, investors' investment decisions are the same regardless of whether auditors respond to this higher risk with increased or decreased materiality levels (where an increase in materiality level in the presence of increased risk is inconsistent with auditing standards and audit theory). Second, when explicitly told that company business and misstatement risks are held constant, investors' decisions are the same regardless of whether auditors change their materiality level to become higher or lower than the industry norm (where a decrease in materiality level in the absence of risk change suggests greater audit precision). Third, less than ten percent of participants answered debriefing questions about the inherent relationship between audit materiality, auditor effort, and the risk of material misstatement in a manner that is consistent with audit theory as put forth by auditing standard setters and regulators.

Taken together, the findings from the main and supplemental experiments indicate that even sophisticated investors do not understand audit materiality in line with audit theory and as prescribed in auditing standards, upon which rest policy makers' arguments to require the disclosure of materiality in the audit report. Further, investors' decisions in response to disclosed materiality levels do not consistently reflect that they perceive that the level of auditor materiality signals auditee entity risk (i.e., a lower/higher materiality level is perceived to signal a higher/lower risk level), and auditors' materiality level disclosures are not important in investors' decisions. Thus, our study raises important questions as to whether the current requirement to disclose audit materiality in some jurisdictions is serving its intended purpose to provide relevant information to investors.

Our study informs practitioners, regulators, and academics how the disclosure of audit materiality fails to influence financial statement users' judgments and decisions in a variety of settings. Our results suggest that users may not interpret the relationship between audit materiality and auditor effort the same way that auditing regulators and audit theory predict, which could provide support for the decision by the IAASB and the PCAOB to not require its disclosure in an expanded audit report. If audit materiality is considered for disclosure in the future, our results suggest the importance of clearly educating investors as to the inherent relationship between quantitative materiality and auditor effort. We also provide potentially useful insights into users' expectations of materiality. Future research may want to examine users' expectations of materiality as a better understanding of users' expectations may influence how auditors plan and execute audits (Altiero, Kang, & Peecher, 2019). In sum, our findings enhance regulators', firms', and academics' understanding of how users think about the concept of materiality.

[5] Amiram et al. (2017, p. 11) argue: "In practice, audit materiality is unlikely to be as easily interpretable as implied by the simple example. Observing a relatively low materiality threshold could be indicative of high-quality financial statements, or it could be a signal of higher inherent operational risk of the client or that the client has a less reliable internal control system."

2. Hypotheses development

2.1. The effect of disclosing overall materiality on investors' decisions

Mock et al. (2013, p. 342) call for researchers to examine changes to the audit report that could potentially "affect users' decisions or improve the communicative value of the audit report." In response to this call for research, and in response to the divergent regulatory stance on the usefulness of materiality disclosures, our first research question examines whether the disclosure of overall audit materiality[6] affects professional investors' investment decisions. By disclosing materiality, the auditor provides the investor with the "precision" of the audit; that is, the amount used by the auditor to make planning decisions about which accounts and locations to include for audit testing and the "scope" for testing (i.e., the nature, timing and extent of audit procedures).[7] Audit materiality is also used in evaluating financial statement disclosures, unadjusted misstatements, and proposed audit adjustments at the completion of the audit to determine if the financial statements are fairly presented in all material respects.

According to auditing standards (ISA 320.04), the auditor should determine materiality based on their "perception of the financial information needs of users of the financial statements" and "in this context, it is reasonable for the auditor to assume that users understand that financial statements are prepared, presented and audited to levels of materiality." Therefore, if audit materiality is disclosed in the audit report, professional investors should be able to benchmark the amount disclosed to an amount that they consider important for investing purposes. Certain regulator assertions are consistent with this assumption. The FRC appears to have relied on investor statements that changes to the audit report, including the new materiality disclosure, "enable investors to assess the value they are getting … for the audit" and that information regarding materiality specifically "will be very useful to [investors] in assessing not only the audited financial statements but also the *quality* of the audit" (FRC 2013a, emphasis added).

In sum, regulators and standard setters expect professional investors to understand the relationship between the level of disclosed audit materiality and the nature and extent of audit testing (i.e., a lower/higher audit materiality level requires more/less audit testing and more/less effort), as well as an understanding that materiality has an overall effect on the quality and reliability of the financial statements. Thus, disclosing materiality *should* provide incrementally useful information for investors' decisions compared to situations in which materiality is not disclosed. This discussion leads to our first hypothesis:

H1. Professional investors who receive a disclosure of audit materiality are more likely to change the level of existing investment in a company than professional investors who do not receive materiality disclosures.

Despite the coherent relationship between audit materiality and auditor effort, qualitative research by Houghton et al. (2011) and some survey findings by the FRC (2013b, 2016, 2017) indicate that

[6] Overall materiality is the level of materiality established by the auditor for the financial statements as a whole.

[7] In an early experimental market study Fisher (1990) provides evidence that materiality information is relevant to trader decisions and that the disclosure results in more efficient markets. Results from Fisher (1990) could differ from our findings due to differences in materiality disclosures (our study references materiality as applied to the entire financial statements whereas Fisher (1990) only references earnings), subjects (professional investors vs. students), and method (single decision vs. repeated period game).

even professional investors may not fully understand how materiality relates to the extent of audit work. For example, in reviewing auditors' materiality disclosures as implemented under their standard, the FRC reports that investors would welcome better explanations of how materiality practically impacts the conduct of the audit (FRC 2016, p. 59). Similarly, other research evidence suggests that the disclosure of materiality may not be informative to investment decisions (Gutierrez et al., 2018). Thus, it is possible that professional investors may not have a good working understanding of how audit materiality might be informative for their investment decisions. An experiment allows us to examine the effect of disclosing audit materiality on professional investors' decisions.

2.2. The effect of disclosed level of materiality on investors' decisions

Our second question examines whether professional investors' investment decisions are affected by the *level* of materiality disclosed by the auditor. Audit firm guidance allows for a range of percentages to be applied to the financial quantitative benchmarks (i.e., net income before taxes (NIBT), assets, revenues, etc.) used to set materiality. For example, Eilifsen and Messier (2015, Table 3) report that firms allow a range of 3–10 percent of NIBT (the most common benchmark) for determining overall materiality. Holstrum and Messier (1982), Leslie (1985), and Messier et al. (2005) find that some measure of income is the preferred benchmark, but that the percentages applied vary significantly.[8] Prescriptions in audit standards and firm guidance imply that a lower level of audit materiality implies more audit work. Thus, holding the risk of material misstatement and other factors constant, users should assess that lower levels of disclosed materiality imply more audit work, which would lead to arguably higher value to investors than audits conducted using higher levels of audit materiality.[9]

Consistent with this notion, Amiram, Chirop, Landsman, and Peasnell (2017) find that firms in the U.K. with disclosed audit materiality thresholds below the sample mean benefit from disclosing their more stringent threshold. They document that the difference in earnings multiples of high and low materiality firms decreases once materiality is disclosed. This is consistent with improved perceived reliability of the financial statements for low materiality firms. In contrast, Gutierrez et al. (2018) find no evidence that the regulatory change in the U.K. to disclose materiality significantly affects investors' reaction to the release of auditors' reports. In sum, Gutierrez et al. (2018) findings are consistent with the expanded auditor's report providing little incremental information to investors. These findings are consistent with Lennox et al. (2019) who conclude that the new U.K. disclosures on risks of material misstatements in the auditor's report are not incrementally informative to investors, in part because the risks were already priced before auditor disclosure. Bédard et al. (2016, p. 261) warn, however, that care should be taken in assessing the "value" of the new audit report from market-level data, given that the motivation of standard setters is to improve the information set to a broad group of stakeholders. Thus, they propose examination of the decision effects on specific stakeholders (in our case professional investors) as well as specific market settings (in our case public equity, private equity, and public debt) will remain a relevant consideration going forward.

In their feedback to the FRC, some commentators warned that disclosure of materiality might lead to additional confusion as investors compare levels of materiality between companies (FRC, 2013b). Further, Citi Research's analysis of materiality disclosure

Table 1
Participant demographic information.

Gender:	U.S.%	U.K.%	Total%
Female	23	34	29
Male	77	66	71
Current Role:	U.S.%	U.K.%	Total%
Investment banker	13	13	13
Asset manager	18	17	17
Financial analyst	38	34	36
CEO/CFO	19	14	16
Broker	8	6	7
Auditor	3	10	7
Other	1	7	4
Years of Experience as Professional Investor:	U.S.%	U.K.%	Total%
0 to 5	5	3	4
6 to 15	62	54	58
16 to 25	25	35	30
26 to 35	6	7	7
>35	3	0	1
Industry Specialization as Investor:	U.S.%	U.K.%	Total%
Mining	6	6	6
Manufacturing	19	19	19
Transportation/Communication	5	11	8
Utilities	4	13	9
Sales	21	9	15
Financial/Insurance	32	29	30
Services (tech, healthcare)	11	11	11
Other	3	2	2

How often do you refer to the audit opinion to inform your investment decisions?

	U.S.	U.K.
Always	47%	52%
Sometimes	51%	45%
Never	2%	3%

Education:*	U.S.%	U.K.%	Total %
Undergrad-Acct/Fin/Mgmt	22	12	18
Undergrad-Other	3	9	6
Masters-Acct/Fin/Mgmt	25	21	23
Masters-Other	12	17	14
MBA	24	7	15
PhD	8	6	7
Certifications: *			
CPA/CA/ACA/FCA/ACCA/FCCA	10	15	13
CIA	4	9	7
CFA	18	16	17
CFP	10	7	9
CFE	2	2	2
CMA	3	4	3

(U.S.: n = 120, U.K.: n = 126).
* Participants were asked to mark the highest level of education obtained and what certifications, if any, they have held. Because some participants included multiple degrees and not just their highest degree obtained, percentages do not add up to 100 percent.

[8] Choudhary et al. (2019) analyze a sample of audits inspected by the PCAOB between 2005 and 2015. The most common reported materiality base in their sample is pretax income (59.7%) with applied mean percentage of 5.31 (standard deviation 1.24). They observe that generally the distributions of reported materiality base percentages are within the ranges described in Eilifsen and Messier (2015, Table 3), but occasionally fall below the minimums specified, consistent with auditors interpreting their firms' policy guidance as setting maximum thresholds.

[9] Choudhary et al. (2019) provide evidence that relatively looser materiality threshold judgments within the boundaries specified by audit firm guidance are (1) negatively correlated with auditor effort measured by audit hours and audit fees and (2) associated with lower proposed audit adjustments and with more restatements. However, it is also key that for lower materiality to improve audit and financial reporting quality, auditors must choose the *correct* procedures that address the identified risk of misstatement and evaluate the evidence correctly. Otherwise, reducing audit materiality may actually increase risk (Budescu, Peecher, & Solomon, 2012).

Table 2
Overall test of effect of materiality level and type of investment on investment decisions.

Panel A: Mean (Standard Deviation) of Participants' Investment Decision

	MATERIALITY_LEVEL—4%			*MATERIALITY_LEVEL*—10%				
	Private Equity	Public Debt	Public Equity	Private Equity	Public Debt	Public Equity	Control	Overall
U.S.	n = 22 3.30 (0.52)	n = 18 3.33 (0.50)	n = 19 3.60 (0.65)	n = 18 3.62 (0.73)	n = 17 3.60 (0.62)	n = 12 3.53 (0.66)	n = 13 3.27 (0.91)	n = 119 3.46 (0.65)
U.K.	n = 24 2.89 (1.05)	n = 19 3.26 (0.46)	n = 20 3.37 (0.67)	n = 19 3.41 (0.92)	n = 17 3.34 (0.74)	n = 14 3.49 (0.64)	n = 12 3.59 (0.68)	n = 125 3.30 (0.79)
All	n = 46 3.09 (0.86)	n = 37 3.29 (0.48)	n = 39 3.48 (0.66)	n = 37 3.51 (0.83)	n = 34 3.47 (0.68)	n = 26 3.51 (0.64)	n = 25 3.42 (0.81)	

Panel B: Effect of Any Materiality Disclosure on Investment Decision vs. Control Group (H1)

Source	df	SS	F	p-value
CONTROL	1	0.04	0.08	0.775
COUNTRY	1	1.66	3.12	0.079
Error	241	127.85		

Panel C: ANCOVA– Investment Decision (H2)

Source	df	SS	F	p-value
MATERIALITY_LEVEL	1	2.31	4.65	0.032
INVEST_TYPE	2	1.40	1.41	0.247
*MATERIALITY_LEVEL * INVEST_TYPE*	2	1.39	1.40	0.248
COUNTRY	1	2.63	5.30	0.022
Error	212	105.29		

Investment decision is a scale bounded by decrease investment to 1 percent and increase investment to 5 percent.
CONTROL equal to 1 if participant was in the Control Treatment, and equal to 0 for all other treatments. *MATERIALITY_LEVEL* equal to 1 if 4%, 2 if 10%. *INVEST_TYPE* equal to 1 if private equity, 2 if public debt, and 3 if public equity. *COUNTRY is* equal to 1 for U.S. participants, 0 for U.K. participants.
ANCOVA comparison in Panel C does not include the control group as they are not presented with materiality levels and thus are omitted from the regression.

Table 3
Planned contrast tests.

Panel A: Publicly Traded vs Privately Held Equity (H3)

Contrast	df	F	p-value
INVEST_TYPE (1, −1)	1	2.81	0.095

Panel B: Public Debt vs Public Equity Investment (H4)

Contrast	df	F	p-value
INVEST_TYPE (1, −1)	1	0.96	0.329

Two planned contrasts based on the 2 x 3 ANOVA estimated in Panel C of Table 2. To test H3 (Panel A), we code the private equity treatment as 1, public debt as 0, and public equity treatment as −1. Thus, public debt is omitted from the test, resulting in a comparison of public and private equity. To test H4 (Panel B), we code public debt as 1, private equity as 0, and public equity as −1. Thus, private equity is omitted from the test, resulting in a comparison of public debt and public equity. All statistical inferences are verified using standard t-tests (untabulated).

in 88 U.K. audit reports, including 35 of the largest companies in the U.K., concludes that investors may reach incorrect conclusions about the comparability of auditor effort if they review materiality percentages cited in the auditor's reports across a range of companies (Citi Research, 2014a). However, the FRC and Dutch standard setters dismissed such concerns, asserting that well-informed investors would be able to understand the disclosures and find the disclosed levels of audit materiality useful and as a result ruled to require the disclosure of materiality (FRC, 2013a; NBA, 2014).

Based on standard setters' and regulator assertions about investors' understanding of audit theory and audit materiality, we expect that professional investors will recognize the relationship between the disclosed *level* of audit materiality and auditor effort. With company-specific risks of material misstatement held constant across conditions, we expect that investors should be more willing to invest in a company when reported audit materiality is a lower percentage of NIBT than when audit materiality is a higher percentage of NIBT. This leads to the following hypothesis:

H2. Professional investors who receive audit materiality disclosed at a lower percentage of NIBT (4 percent) are more likely to increase the level of existing investment than professional investors who receive audit materiality disclosed at a higher percentage of NIBT (10 percent).

2.3. The effect of ownership structure on investors' decisions

Although H1 and H2 predict that materiality disclosures will be useful to investors overall, it is not clear the extent to which these anticipated benefits will vary across different investment settings. Thus, our third question investigates whether the disclosure of materiality differentially affects professional investors' equity investment decisions for publicly-traded versus privately-held

investments. Prior literature finds that audited financial statements are associated with lower cost of debt, are relied upon more heavily by users, and companies that issue audited financial statements receive higher credit ratings than those that issue unaudited financial statements (Lennox & Pittman, 2011; Minnis, 2011). However, the level of information asymmetry—and thus the demand for audit assurance—is not the same in all investment settings. Publicly-traded companies are characterized by absentee owners and diffuse ownership structures, thus increasing the information asymmetry between management and users. Chen, Noronha, and Singal (2004) report that companies included in the S&P 500 have approximately 20,000 unique shareholders, the vast majority of which are absentee owners. Absentee and diffuse ownership increase the information asymmetry between the small number of managers and the very large number of owners (Ang, Cole, & Lin, 2000). Privately-held companies, on the other hand, have more centralized ownership. Lisowsky and Minnis (2020), for example, find that private companies with assets of $10 million or more average only 14 owners and often the owners of privately held companies are more involved in the day-to-day activities of the business. Thus, generally we would expect less information asymmetry between managers and owners of privately held companies. In summary, public company investors would have a higher demand for external audit assurance and thus react more strongly to information about audit materiality than private company investors. Thus, we propose the following hypothesis for the effect of disclosing materiality on investors' investment decisions:

H3. Professional investors holding publicly-traded equity are more likely to change the level of existing investment than professional investors holding an investment in privately-held equity when materiality is disclosed.

2.4. The effect of type of investment on investors' decisions

Our final question examines whether the disclosure of materiality differentially affects professional investors' decisions when considering the type of investment (equity versus debt). The type of financing being secured through audited financial statements may influence the level of auditor precision desired by investors and is a fundamental characteristic that auditors are encouraged to consider when determining materiality (IAASB, 2009).

Gray et al. (2011) and Asare and Wright (2012) suggest that nonprofessional investors, bankers, and auditors interpret audit reports differently. Prior research also suggests that equity investors and debt investors do not use the same financial statement information in making their investment decisions (Holthausen & Watts, 2001). Although equity investors are concerned with net income as evidenced by positive market returns to earnings that just meet analysts' expectations (Bartov, Givoly, & Hayn, 2002), debt investors' response to beating such earnings targets is more muted (Jiang, 2008). Instead, debt investors may be more concerned with the company's liquidity, balance sheet strength, and the corresponding relationship with the company's ability to cover the debt. For example, Bharath, Sunder, and Sunder (2008) and Kim, Simunic, Stein, and Yi (2011) find that higher levels of tangible assets and higher current ratios are associated with significantly lower interest rates. These accounts, though often material, are traditionally based in historical cost and thus subject to lower levels of uncertainty and subjectivity than other areas of estimation and valuation in the financial statements (Christensen, Glover, & Wood, 2012). Therefore, if equity investors focus more on performance measures such as pretax income, which for many public companies is a value influenced by a number of complex accounting and estimation judgments (e.g., revenue recognition, fair value measures, post-retirement benefits, lease accounting), they may be more interested in the precision the auditor uses to evaluate, test and provide assurance on these complex values. This suggests that equity investors should be more interested in, and find more value in, materiality disclosures than debt investors. Thus, we state our fourth hypothesis as follows:

H4. Professional investors holding publicly-traded equity are more likely to change the level of existing investment than professional investors holding publicly-traded debt when materiality is disclosed.

3. Main experiment

3.1. Method

3.1.1. Design and independent variables

We utilized a $2 \times 3 + 1$ between-participant design to test the hypotheses. The first independent variable, *MATERIALITY_LEVEL,* is manipulated at two levels: 4% and 10%. Eilifsen and Messier (2015) find that firm guidance provides allowable ranges from 3 to 10 percent of income before taxes. However, surveys (Citi 2014a; 2014b) show that materiality is rarely set below 4 percent of income before taxes. Thus, our use of 4–10 percent is consistent with the range of thresholds commonly used in practice. The second independent variable was the type of investment (*INVEST_TYPE)*, which is manipulated at three levels: public equity, private equity, and public debt. We include a control condition where the audit report is for a public equity company with no materiality disclosure. The control condition included a public company because the materiality disclosure is currently only used for listed (public) companies in the U.K. and the Netherlands. Fig. 1 shows the experimental design.

3.1.2. Dependent variable

In our case, participants act as the fund manager for an actively managed mutual fund. In this setting, the dependent variable used to test the hypotheses is based on the participants' responses to the following question: "Assume that the mutual fund currently holds 3 percent of the *[investment type]* in the Company. Based on the information provided about Trans-Global Exports, please indicate whether the fund should increase, decrease, or maintain its current 3% investment" and participants were asked to use the following scale[10]

Significantly Decrease to 1%				Maintain at 3%	Significantly Increase to 5%			
1.0%	1.5%	2.0%	2.5%	3.0	3.5%	4.0%	4.5%	5.0%

3.1.3. Case materials and procedures

Participants were presented with the financial information for a fictitious company, Trans-Global Exports – that "manufactures and ships first-rate, high quality tools to carpenters, contractors, production facilities, and fabricators across North and South America, and Europe. The Company's products are largely sold directly to the end users." The case was adapted from an instrument used in Clor-Proell, Proell, and Warfield (2014).

The participants were told that for the purposes of this study,

[10] Participants could respond in increments of 0.1% in the on-line survey instrument (e.g., 1.1%, 1.2%, etc.).

		Type of Investment			
		Public Equity	Private Equity	Public Debt	Public Equity
Materiality Level	4%	A	B	C	
	10%	D	E	F	
	No disclosure (control)				G

Fig. 1. Experimental design.

they were to assume the role of the fund manager for a large mutual fund that is actively managed (that is, the fund is not an index fund). They were told that, "The fund invests in common stock and bonds from public and private companies. Assume you are evaluating the fund's current investment in Trans-Global Exports." They were then presented with three years of ratios, the auditor's report, simplified income statement and balance sheet for two years, and a footnote excerpt about the fair value of their securities investments. The participants were then asked to respond to the dependent variable question and a series of post-experimental questions related to the investment decision, questions about materiality not related to the case, and demographic information. The control group received the same information except that materiality was not disclosed in the audit report. The instrument, available in the Appendix, was administered using Qualtrics.[11]

3.1.4. Participants

Because professional investors are difficult to obtain in traditional settings, we contracted with "*Empanel Online*" (www.empanel.com), a reputable online survey company, to obtain this class of investor.[12] To receive case information and proceed with the study, participants were required to answer questions regarding their status as professional investors, years of experience as a professional investor, number of financial statements analyzed for investment purposes over the prior 12 months, and a knowledge-based question regarding discount rates and discounted cash flow valuation models. Participants were only allowed to proceed if they self-identified as professional investors with at least 5 years of experience, who analyzed at least 3 sets of financial statements last year, and who correctly answered the question on discounted cash flow analysis.

To identify our desired pool of informed investors, we also applied additional screens relating to the manipulation checks that were completed after viewing the case materials. First, we asked, "In the case study, you were asked to evaluate Trans-Global Exports for a potential investment in the Company's (participants selected one from the following categories: Publicly traded equity, Publicly traded debt, Privately held equity, or Privately held debt)?" As advised by *Empanel Online*, participants were not able to proceed to the subsequent debriefing questions if they failed this first manipulation check. Second, we asked, "In the case study, auditors set materiality at (participants selected one from the following categories): It was not specified in the case, 4% of pre-tax income ($11.5M), or 10% of pre-tax income ($29M)." Because users' response to a particular level of materiality is central to our study, we also screen out participants who missed this second manipulation check. Finally, we screened out participants who spent less than 2 min on the task.[13] The participant screens help increase the likelihood that our results are based on a sample of professional investors who paid attention to the case at hand.

Our final sample consists of 246 professional investors from *Empanel Online* at a cost of approximately $46 per usable response.[14] 120 participants were from the U.S. and 126 were from the U.K. We control for participants' home country in all analyses. Table 1 provides the demographic data. Overall, 71 (29) percent of the respondents were male (female). The distribution of participants' current employment position is reasonably consistent across the two countries. The bulk of the participants are financial analysts (36%), asset managers (17%), executives (16%), and investment bankers (13%). Eighty-eight percent of the participants had 6–25 years of experience as professional investors. Participants indicated that the industry that best matched most of their investment expertise was financial services (30%), manufacturing (19%), sales (15%), and services (tech & healthcare, 11%). Most participants held advanced degrees and professional certifications (e.g., CPA/CA, CFA, CFP). Thus, demographic information suggests that our sample included an experienced and knowledgeable group of investors.

3.2. Results

3.2.1. Hypotheses tests

Table 2 presents the results of our main experiment. Panel A presents descriptive statistics for participants' investment decision across all treatments, and by country.[15] Our first hypothesis predicts that investors presented with any type of materiality disclosure will be more likely to change their level of investment than investors lacking information on the auditor's materiality level. We test H1 in Table 2, Panel B, by examining how investment decisions vary between participants in the control treatment and those in all other cells. As reported in Table 2, Panel B, we find no evidence that the disclosure of materiality affects investors' decision making ($p = 0.775$).[16] The *COUNTRY* variable was moderately significant ($p = 0.079$, two-tailed). Based on cell means (3.46 U.S., 3.30 U.K.), the U.S. participants tend to increase their investment more than

[11] The three experiments were approved by the Institutional Review Board.

[12] Brandon, Long, Loraas, Mueller-Phillips, and Vansant (2014) discuss the use of *Empanel Online*. It has been used in prior investor studies (e.g., Arnold, Bedard, Phillips, and Sutton (2011; 2012)).

[13] Two minutes represents the 10th percentile. The average (median) time for the 246 participants included in the final study to complete the questionnaire was 531 (437) seconds. No inferences change if we use more stringent cutoff times of 4 or 5 min.

[14] Cost per usable response is approximated because we also paid for unusable responses.

[15] In untabulated analysis, all measured variables were included as covariates. None were significant at conventional levels.

[16] We also find no significant difference in decision making if we only compare the control treatment to the two public equity treatments ($F = 0.19$; $p = 0.668$, untabulated).

U.K. participants, although this difference in means appears to be driven by one cell of participants in the U.K. (private equity, 4% materiality, mean 2.89). Thus, H1 is not supported.

H2 predicts that the *level* of materiality will affect investor decision making. We test this hypothesis using a 2 × 3 ANCOVA (omitting the control group). As shown in Table 2, Panel C, we find a main effect for *MATERIALITY_LEVEL* ($p = 0.03$; two-tailed; mean 3.50 for 10% materiality, 3.28 for 4% materiality). However, the significant effect is opposite to that predicted by audit theory, auditing standards, and regulator assertions. Specifically, participants presented with audit materiality of 10 percent increase their investment in the company to a slightly greater extent than participants presented with audit materiality of 4 percent. In other words, investors increase their investment as materiality increases, even though precision and thus the extent of auditor testing and effort decreases.[17] This result is consistent with concerns voiced by investor surveys (Houghton et al., 2011), practitioners (PwC, 2013), and consultants (Citi Research, 2014a) that investors may not understand how different levels of audit materiality would affect auditor effort and, as such, disclosures of audit materiality could be meaningless, or potentially confusing, to investors. We also note that the *COUNTRY* variable is significant ($p = 0.022$, two-tailed; mean 3.49 for U.S., 3.27 for U.K.),[18] consistent with results presented in Panel B.

An alternative explanation to investor confusion about materiality disclosures is that investors interpret lower materiality as a signal of higher risk, even though company-specific risks were held constant across the experimental conditions and research suggests that 5 percent is the most common threshold (Eilifsen & Messier, 2015). As noted in Section 3.2.2 below, investors' self-determined materiality for the case materials obtained in a debriefing question was approximately 10 percent across conditions. Therefore, if 10 percent is considered by the investors to be typical, it is possible that the apparent preference for a higher materiality is driven by investors' assessment of risk. We examine this alternative explanation more fully in Section 3.2.2 and again through two supplemental experiments in Section 4. We conclude that the alternative explanation is not supported.

H3 examines how materiality disclosures differentially affect participants making investment decisions in publicly traded equity compared to privately held equity. Our hypothesis predicts that because of greater information asymmetry inherent to publicly traded companies, investors will find materiality disclosures more useful when considering a public company investment than a private company investment. As reported in Table 3, Panel A, when materiality is disclosed, we find a marginally significant difference between the investment decisions of participants in the public and private equity treatments ($p = 0.095$, two-tailed; mean 3.49 for public equity, 3.28 for private equity), with public equity participants being slightly more willing to increase their investment level. Thus, we find only weak support for H3.

Table 3, Panel B, presents the results of testing H4, which relates to debt versus equity investors. As shown in Table 3, Panel B, the investment decisions of participants in the public debt and public equity treatments are not significantly different ($p = 0.329$, mean 3.49 for public equity, 3.38 for public debt). Thus, H4 is not supported. Taken together, our main tests suggest that the disclosure of audit materiality does not generally affect investors' decisions and in the cases where disclosure of materiality may affect decisions, the disclosed information does not seem to be understood in a manner predicted by audit regulators and standard setters.

3.2.2. Additional analyses

In addition to our main dependent variable, we also obtained information on participants' assessment of auditors' disclosed materiality level (too low vs. too high), their own materiality estimates, confidence in their investment decision, and confidence that no misstatement exists greater than audit materiality. These questions all related specifically to the hypothetical investment decision they faced in the case. Participants' responses to these questions are reported in Table 4, Panels A–D. This information is relevant in shedding light on our hypothesis tests.[19]

First, we asked the professional investors to assess the amount of disclosed audit materiality. As presented in Table 4, Panel A, investors provide some indication that the amount of disclosed materiality is high since the overall mean assessment of 6.26 is significantly higher than the midpoint of 5 ($p < 0.01$). However, we find no effect of materiality level or investment setting on participants' assessment of disclosed materiality in a 2 × 3 ANCOVA ($p > 0.05$ on all variables of interest, untabulated).

Panel B presents participants' own estimates of materiality. Across all non-control treatments, participants' estimates of what audit materiality should be ($28.58 million on average, or 9.84 percent of pre-tax income), are higher than the traditional benchmark of 5 percent of pre-tax income ($28.58 vs $14.53 million; $p < 0.01$).[20] Further, participants in treatment conditions reported estimated materiality amounts that are not significantly different from the average provided by the control group ($28.58 vs $25.24 million; $p = 0.22$). For this assessment, the experimental setting does affect decision making, as participants in the 10 percent treatment have significantly higher materiality estimates (mean of $31.74 million) than the participants in the 4 percent treatment (mean of $26.06 million; *t*-test significant at $p < 0.01$). Thus, even though participants assessed the disclosed materiality as being slightly higher than necessary (Table 4 Panel A), participants in the 4 percent disclosure treatment provided a self-assessed materiality for the hypothetical company of 9 percent. Taken together, Panel B suggests that participants in our study appear to prefer and/or expect materiality levels at about 10 percent. However, the inconsistency between Panels A and B provides additional evidence that investors may not fully understand the concept of materiality or the effect of lower materiality on the audit.

Evidence regarding H2 suggests that investors were slightly more willing to increase investment in the hypothetical company when reported audit materiality was 10 percent of pre-tax income than when it was 4 percent. As reported in Table 4 Panel B, investors' self-determined level of materiality was around 10 percent across conditions. As such, the alternative explanation to explain the H2 findings is that reporting materiality of 4 percent could signal higher auditee risk, in which case investors may be more comfortable investing in companies for which auditors assess materiality at 10 percent. Data in Table 4, Panel C, provides some

[17] This interpretation is consistent with investors viewing "more" materiality as being superior to "less" materiality. We note that our materiality disclosures in the audit report are consistent in content with those disclosed in the U.K. This language suggests that lower audit materiality results in auditors being concerned about smaller dollar errors, but we do not explicitly tell participants of the inherently inverse relation between audit materiality and auditor effort.

[18] The U.S. and U.K. means from ANOVA in Table 2 Panel C are slightly different than those in Table 2 Panel B because Panel C excludes the control treatment.

[19] Using a more general context, we also asked about investors' familiarity with the concept of materiality, information about how frequently they adjust to reported information when calculating materiality benchmarks, and their preferred benchmarks for various types of investments. We omit this information for parsimony.

[20] We note that this average response of $28.58 million approximates the midpoint of the scale of $29 million.

Table 4
Other debriefing questions.

Panel A: Mean (Standard Deviation) of Participants' Assessment of Audit Materiality

	MATERIALITY_LEVEL—4%			*MATERIALITY_LEVEL*—10%		
	Private Equity	Public Debt	Public Equity	Private Equity	Public Debt	Public Equity
U.S.	n = 22 5.50 (1.54)	n = 18 5.89 (1.53)	n = 19 6.05 (1.93)	n = 18 6.61 (2.00)	n = 17 6.12 (1.80)	n = 12 6.25 (1.96)
U.K.	n = 24 5.88 (2.03)	n = 18 6.83 (1.42)	n = 21 6.43 (1.25)	n = 18 6.83 (1.04)	n = 17 6.29 (1.49)	n = 14 6.93 (1.77)

'Assessment of Auditor's Materiality' is bounded by materiality threshold is much too low (0) and materiality threshold is much too high (10). The control group is not included as they are not presented with materiality levels.

Panel B: Mean (Standard Deviation) of Participants' Own Audit Materiality Estimates

	MATERIALITY_LEVEL −4%			*MATERIALITY_LEVEL* −10%			
	Private Equity	Public Debt	Public Equity	Private Equity	Public Debt	Public Equity	Control
U.S.	n = 22 21.23 (10.52)	n = 18 21.04 (8.72)	n = 19 29.39 (16.20)	n = 18 35.92 (13.31)	n = 17 32.53 (8.14)	n = 13 28.43 (13.19)	n = 13 21.95 (13.77)
U.K.	n = 24 27.43 (14.70)	n = 19 30.19 (13.64)	n = 21 27.08 (12.74)	n = 19 29.64 (11.11)	n = 17 29.29 (10.37)	n = 14 34.31 (6.26)	n = 12 28.82 (14.71)

'Participants' Own Materiality Estimate' is bounded by $0 and $58 million.

Panel C: Mean (Standard Deviation) of Participants' Confidence in Investment Decision

	MATERIALITY_LEVEL −4%			*MATERIALITY_LEVEL* −10%			
	Private Equity	Public Debt	Public Equity	Private Equity	Public Debt	Public Equity	Control
U.S.	n = 22 6.64 (1.79)	n = 18 6.67 (1.46)	n = 19 7.26 (1.66)	n = 18 7.67 (1.41)	n = 17 7.65 (1.46)	n = 12 8.00 (0.95)	n = 12 7.42 (1.83)
U.K.	n = 24 7.08 (1.79)	n = 19 7.00 (1.53)	n = 21 6.62 (1.94)	n = 18 6.94 (1.35)	n = 17 7.59 (1.42)	n = 14 7.36 (0.84)	n = 12 8.00 (1.41)

'Confidence in Decision' is bounded by not confident (0) and very confident (10).

Panel D: Mean (Standard Deviation) of Participants' Confidence that No Misstatement Exists

	MATERIALITY_LEVEL −4%			*MATERIALITY_LEVEL* −10%			
	Private Equity	Public Debt	Public Equity	Private Equity	Public Debt	Public Equity	Control
U.S.	n = 22 6.45 (1.74)	n = 18 5.83 (1.95)	n = 19 7.16 (2.14)	n = 18 6.50 (2.43)	n = 17 7.24 (1.71)	n = 13 7.00 (1.53)	n = 13 7.54 (1.56)
U.K.	n = 24 6.79 (1.84)	n = 19 7.05 (0.91)	n = 21 6.33 (1.39)	n = 19 6.84 (1.57)	n = 17 6.71 (1.93)	n = 14 7.14 (1.10)	n = 12 7.33 (2.10)

'No Misstatements Exist' is bounded by not confident (0) and very confident (10).

isolated support for this interpretation. Specifically, participants in the 10 percent materiality treatment are more confident in their investments (7.51 vs. 6.88; $p < 0.01$). However, participants in the 10 percent materiality treatment are not significantly more confident that the financial statements are free of misstatement (Panel D, 6.89 vs. 6.61; $p = 0.24$). Further, Panel A does not support that professional investors considered 4 percent as too low (i.e., below expected or typical). Thus, we fail to find evidence supporting the alternative explanation that participants viewed a 4 percent disclosed audit materiality threshold as representing higher auditee risk.[21] Instead, it appears that even experienced professional investors have difficulty understanding the concept of auditor materiality.

4. Supplemental experimentation

Results from Tables 2–4 suggest that professional investors view audit materiality as irrelevant to their investment decision and/or fail to understand the fundamental relationship between audit materiality and auditor effort. To better understand the dynamics behind investors' responses and to address the alternative explanation that lower disclosed materiality signals increased entity business risk, we ran two 1 × 2 supplemental experiments (SEs) that included the basic case materials used in the main experiment. Namely, the case still revolved around a potential investment in Trans-Global Exports, but we amended the case to exclude the simplified financial statements and the footnote regarding fair value measurement. The four cells were run at the same time using participants from *Empanel Online* similar to those used in the main experiment, with similar screens on participation (i.e., only professional investors who passed four initial screening

[21] Additional analysis shows that the overall significant difference in investment preference between the 4 percent and 10 percent treatments documented in Table 2 only holds within the private equity treatment (untabulated), and then primarily due to the U.K. participants (see Table 2, Panel A). Further, we find this average effect no longer holds ($p > 0.05$) when participants who state they are less familiar with audit materiality (i.e., responses less than 6 on a scale bounded by Not Familiar (0) to Very Familiar (10)) are removed from the sample (untabulated). We find similar results when we restrict the sample to those who signal they are certified public/chartered accountants (untabulated). Combined, these results also fail to support the alternative explanation of a risk response.

questions, passed a key manipulation check regarding auditors' disclosed materiality, and spent more than 2 min on the task). Our final sample of SE1 and SE2 consist of 45 and 46 U.K. professional investors, respectively, at an approximate cost of $38 per participant.[22] The demographic data of the participants in both SEs is comparable to the main experiment, with the largest proportion of participants indicating employment as a financial analyst with between 6 and 15 years of experience, some level of graduate education, and professional certifications.

In both SEs, participants were told to assume "that you are a professional money manager and you are considering making an investment in Trans-Global Exports." Instead of the blunt investment-decision dependent variable used in our main experiment, in our SEs we use a set of more traditional Likert scale questions about potential investment attractiveness, likelihood, confidence, optimism, and risk. This change in experimental design is meant to rule out the alternative explanation that our main experiment's results failed to reject the null in a way that is consistent with audit theory because of the nature of the dependent variable. Thus, in both SEs we included five primary dependent variables: (1) After reviewing the financial information, the analyst team's rating, and the auditor's report, how would you rate the attractiveness of Trans-Global Exports' stock as an investment? (0 = not attractive to 10 = very attractive), (2) How likely are you to invest in Trans-Global Exports' stock? (0 = not likely to 10 = very likely), (3) How confident are you in your investment decision? (0 = not confident to 10 = very confident), (4) How optimistic are you about your investment decision? (0 = not optimistic to 10 = very optimistic), and (5) How risky do you view this investment decision? (0 = not risky to 10 = very risky). We also asked three follow-up questions to better understand how participants relate company risks, materiality levels, and amounts of audit evidence gathered, as well as three general questions about familiarity with disclosed materiality and the audit opinion similar to questions asked in the main experiment.

4.1. Supplemental experiment 1

In SE1 (n = 45), participants in both cells were told that the risk of material misstatement had increased at Trans-Global Exports relative to the prior year. We then manipulated whether auditors responded to this increased risk with an increase in materiality from 4 to 10 percent of pre-tax profit or a decrease from 10 to 4 percent.[23] We tested this manipulation in an attempt to provide further evidence of whether investors understand that audit materiality level relates inversely to company risks, a necessary condition for investors to perceive that the disclosed materiality level signals company risks (i.e., a lower/higher materiality level is perceived to signal a higher/lower risk level).

The wording in the auditor report for the hypothetical company used to manipulate the increased risk in the two experimental conditions was as follows:

Increase Materiality: On the basis of our risk assessment, together with our assessment of the Group's overall control environment, we increased overall audit materiality for the Group in 2018 to 10% of the Group's pre-tax profit (i.e., overall audit materiality of $29 million) from 4% pre-tax profit used in 2017 (i.e., overall audit materiality of $11.5 million). The rationale for applying a higher overall materiality in the 2018 audit is to reflect the increased business and misstatement risks associated with the implementation of a new financial system and processes in the Group's two largest subsidiaries. Our objective is to provide reasonable assurance that total detected and undetected misstatements do not exceed $29 million for the financial statements as a whole.

Decrease Materiality: On the basis of our risk assessment, together with our assessment of the Group's overall control environment, we decreased overall audit materiality for the Group in 2018 to 4% of the Group's pre-tax profit (i.e., overall audit materiality of $11.5 million) from 10% pre-tax profit used in 2017 (i.e., overall audit materiality of $29 million). The rationale for applying a lower overall materiality in the 2018 audit is to reflect the increased business and misstatement risks associated with the implementation of a new financial system and processes in the Group's two largest subsidiaries. Our objective is to provide reasonable assurance that total detected and undetected misstatements do not exceed $11.5 million for the financial statements as a whole.

We acknowledge that auditors' response as outlined in the Increase Materiality condition is not consistent with audit standards or prescriptions based on audit theory. That is, auditors should respond to an increase in business and misstatement risk with lower or perhaps equivalent levels of audit materiality, but not a higher level. Thus, this manipulation essentially serves as a litmus test to see if investors understand the relationship between audit materiality, auditor effort, and audit precision.

The results from SE1 show that in a setting where company business and misstatement risks have increased, investors do not differentially respond to an increase versus a decrease in reported audit materiality. That is, we find no significant differences in participants' responses (t-tests, $p > 0.10$) to any of the five dependent variables between the treatments.[24] We also find no significant difference between treatments when using a composite dependent variable ($t = -0.34$, $df = 43$, $p = 0.74$).[25] These findings indicate that investors do *not* perceive an inverse relationship between materiality level and company risks, a necessary condition for investors to view disclosures of lower materiality levels in our main experiment as a signal of higher company risk.

Investors' insensitivity in their investment decisions to changes in materiality in a setting of increased company risks indicates a general lack of understanding of the relationship between audit materiality, auditor effort, and audit precision. To provide further evidence in this regard, participants in both SEs responded to the following three questions on how they relate company risks, materiality levels, and amounts of audit evidence gathered:

> Q1. When comparing two similarly profitable companies with pre-tax profit of $100 million for a potential investment, which level of overall audit materiality most reduces the risk of an undetected $5 million misstatement in the financial statements?
> Q2. When comparing two companies for a potential investment and when business and misstatement risks are the same across the two companies, which overall audit materiality level makes the investment more attractive to you as an investor, and why?

[22] We focus on U.K. investors because we only observed marginal differences between U.K. and U.S. investors in the main experiment, and U.K. investors likely have relatively more experience with audit reports disclosing materiality.

[23] Pre-tax "profit" instead of "income" was used because SE1 and SE2 were run only on U.K. participants who use such terminology.

[24] Specifically, investment attractiveness ($t = -1.02$, $df = 43$, $p = 0.31$), likelihood of investing ($t = -0.83$, $df = 43$, $p = 0.41$), investment confidence ($t = 0.55$, $df = 43$, $p = 0.59$), optimism regarding investment ($t = -0.69$, $df = 43$, $p = 0.49$), and investment risk ($t = -0.72$, $df = 43$, $p = 0.48$).

[25] The question regarding risk was reverse scored to align with other questions about investment preference.

Q3. In which of the settings below do you believe the auditor will generally be required to gather more extensive audit evidence to support their audit opinion?

The three questions offered the same three answer alternatives[26]

A1. Overall audit materiality does not affect the risk of undetected misstatements (Q1); my investment decisions (Q2); the extent of audit evidence gathered (Q3).
A2. Overall audit materiality of 10% of pre-tax profit.
A3. Overall audit materiality of 4% of pre-tax profit.

Audit theory and auditing standards prescriptions suggest the correct answer is A3 for all three questions. However, participants' responses do not reflect a sound understanding of audit materiality as prescribed in auditing standards and practice. For the two treatment groups combined, the distribution of the percentage of answers to Q1, Q2, and Q3 across the three alternatives is: Q1: 20% (A1), 36% (A2), 44% (A3); Q2: 38% (A1), 29% (A2), 33% (A3); and Q3: 18% (A1), 31% (A2), 51% (A3). Only for Q3 does a slight majority of the participants indicate the "correct" answer, and only five participants answered all three questions "correctly."[27]

4.2. Supplemental experiment 2

In SE2 (n = 46), we held business and misstatement risk constant across the two experimental conditions but indicated that auditors moved away from industry norms for audit materiality. We manipulated whether auditors moved from an industry materiality norm of 4 percent of pre-tax profit to 10 percent or from an industry materiality norm of 10 percent of pre-tax profit to 4 percent. In both cases, the shift in materiality was explicitly reported as *not* being due to any change in assessed entity business or misstatement risks but rather due to refinements in audit firm guidance. We tested this manipulation to provide further evidence of whether investors' decisions are influenced by expectations of auditors' materiality level.

The wording used in our manipulations for the two experimental conditions was as follows:

Increase Materiality: Your analyst team's examination of other companies in Trans-Global's industry suggests that the industry standard used by auditors in this industry for overall audit materiality in the current year is 4% of pre-tax profit.

…[28]

We increased overall audit materiality for the Group in 2018 to 10% of the Group's pre-tax profit (i.e., overall audit materiality of $29 million) from 4% pre-tax profit used in 2017 (i.e., overall audit materiality of $11.5 million). The rationale for applying a higher overall materiality in the 2018 audit is driven by refinements in our firm's audit guidance. Our objective is to provide reasonable assurance that total detected and undetected misstatements do not exceed $29 million for the financial statements as a whole. On the basis of our risk assessment, together with our assessment of the Group's overall control environment, the Group's business and misstatement risks did not change relative to the prior year.

Decrease Materiality: Your analyst team's examination of other companies in Trans-Global's industry suggests that the industry standard used by auditors in this industry for overall audit materiality in the current year is 10% of pre-tax profit.

…

We decreased overall audit materiality for the Group in 2018 to 4% of the Group's pre-tax profit (i.e., overall audit materiality of $11.5 million) from 10% pre-tax profit used in 2017 (i.e., overall audit materiality of $29 million). The rationale for applying a lower overall materiality in the 2018 audit is driven by refinements in our firm's audit guidance. Our objective is to provide reasonable assurance that total detected and undetected misstatements do not exceed $11.5 million for the financial statements as a whole. On the basis of our risk assessment, together with our assessment of the Group's overall control environment, the Group's business and misstatement risks did not change relative to the prior year.

The results show that when company business and misstatement risks are held constant, we find no significant difference between treatments in the composite measure of all five dependent variables ($t = -0.06$, $df = 43$, $p = 0.95$) or in three of the five individual investment responses (t-tests for attractiveness of investment, likelihood of investment, and optimism about investment, $p > 0.10$).[29] We do find some evidence that participants are less confident in their investment decision ($t = -2.02$, $df = 44$, $p = 0.05$) and view the investment as less risky ($t = -2.43$, $df = 43$, $p = 0.02$) when auditors shifted away from the industry norm of 10 percent to a 4 percent level. However, such responses are inconsistent with each other. We therefore conclude that investors' decisions are not influenced by disclosed audit materiality, at least not in a manner consistent with audit prescriptions.

As in SE1, the participants in SE2 responded to three follow-up questions (Q1, Q2, and Q3) on how they relate company risks, materiality levels, and amounts of audit evidence gathered and were offered three answer alternatives (A1, A2, and A3). Similar to SE1, the answers do not reflect that participants understand audit materiality. Across both treatments, the distribution of the percentage of answers to Q1, Q2, and Q3 across the three alternative answers is: Q1: 22% (A1), 41% (A2), 37% (A3); Q2: 22% (A1), 40% (A2), 38% (A3); and Q3: 17% (A1), 43% (A2), 39% (A3). For none of the questions did more than 39% of the participants indicate the "correct" answer (i.e., A3), and only four participants answered all three questions "correctly."[30]

Taken together, results from SE1 and SE2 provide additional evidence that professional investors fail to incorporate materiality disclosures into their investment decisions and struggle to understand audit materiality as currently disclosed in audit reports of multiple jurisdictions.[31]

[26] Order of these option choices was randomized for all participants.

[27] In untabulated analysis, we find some evidence that investors in SE1 who identify themselves as certified public/chartered accountants (n = 12) correctly answer these three quiz questions more frequently than non-CPAs. While the overage number of correct answers is similar across CPAs and non-CPAs ($t = 0.53$), CPAs more frequently answer all three questions correctly than non-CPAs. However, we acknowledge that the sample size is small.

[28] In both SE1 and SE2, participants are provided with a general description of materiality similar to what was provided in the main experiment's audit report. This paragraph is omitted here for brevity.

[29] Specifically, investment attractiveness ($t = -0.26$, $df = 44$, $p = 0.80$), likelihood of investment ($t = 0.29$, $df = 44$, $p = 0.77$), and optimism about investment ($t = 0.00$, $df = 44$, $p = 1.00$).

[30] We find no evidence that CPAs in SE2 (n = 14) correctly answered these debriefing questions more frequently than non-CPAs ($t = 1.29$, untabulated).

[31] This overall inference holds even when we restrict the sample to CPAs. In neither SE1 nor SE2 do we find a significant difference in CPAs' investment decisions (untabulated). Thus, even professional investors with an accounting background do not incorporate audit materiality into their investment decision. Further, in neither SE1 nor SE2 do we find significant between-treatment differences when the sample is restricted to those participants who more frequently answer the three "quiz" questions correctly (untabulated).

5. Discussion

In a review of the literature on audit reports, Mock et al. (2013) note that we currently know very little about how financial statement users understand, respond to, or incorporate audit materiality. Given the recent regulatory debate regarding the disclosure of audit materiality and the importance of audit materiality in determining auditor effort, we examine the effect of audit materiality disclosures on professional investors' decision making in an experimental setting.

From a sample of 337 professional U.K. and U.S. investors across three distinct experiments, we find no consistent evidence that participants incorporate audit materiality into their investment decisions. Because other audit regulators outside of the U.K. and the Netherlands are taking a "wait and see" approach to requiring the disclosure of audit materiality, our results are timely and can help inform standard setters on future policy choices. Failing to incorporate the materiality information into the investment decision is consistent with recent archival studies that have examined the market's response to new U.K. materiality disclosures (e.g., Gutierrez et al., 2018). Our results are also consistent with statements made by analysts, one class of professional investor that is strongly represented in our sample. As reported in Brown, Call, Clement, and Sharp (2015), analysts view overall audit quality as less important relative to other inputs to earnings quality and "take the financial statements at face value." By triangulating evidence between multiple research methods, readers can be more confident in the actual effect (or lack thereof) of materiality disclosure on investor decision making.

In addition to investors apparently viewing materiality disclosures as irrelevant to their investment decisions, we also find evidence that investors in our setting do not appear to fully *understand* the inherent relationship between audit materiality, auditor effort, and audit precision. This is consistent with concerns raised by multiple stakeholders when the prospect of materiality disclosure was considered by various regulators (PCAOB, 2011b) as well as the results of qualitative research (Gray et al., 2011; Houghton et al., 2011). These combined results cast doubt on auditing standards' assumption that "users understand that financial statements are prepared, presented and audited to levels of materiality" (ISA 320.04) and perhaps suggest that regulators incorrectly assume that because audit regulators understand audit materiality, investors must also (Kennedy & Peecher, 1997). Thus, to the extent that other jurisdictions decide to begin requiring materiality disclosures, our results suggest it may be helpful to explicitly disclose the inverse relationship between audit materiality and auditor effort.

Our results are subject to limitations. First, although we go to great lengths to ensure that our study participants truly are professional investors, some of our screening requirements were dependent on self-reporting, which is subject to error. Second, we acknowledge that participants in our setting have a limited set of information and that additional information is available when investors make actual investment decisions. Third, professional money managers' investment decisions are subject to regulatory and internal fund oversight that were not present in our setting. Fourth, we did not collect all personal characteristics that could have affected outcomes, such as investors' experience investing in public versus private companies, or debt versus equity. To the extent these differences were not randomized away through random assignment, our inferences could be affected.

Despite these limitations, we believe our study provides important insights and leads to questions future research may want to pursue. For example, our results generally suggest that investors do not use the materiality disclosures as intended by regulators. We encourage future research to investigate the underlying constructs as to *why* investors struggle to understand audit materiality in a way that is consistent with audit theory. Further, future studies can examine whether explicitly stating the relationship between audit materiality and auditor effort is sufficient to bridge this understanding gap or whether additional steps are needed. Given the fundamental role of audit materiality in the performance of audits, the risk of misstatement, and the interpretation of audit results (Choudhary, Merkley, & Schipper, 2019), it is important to understand what interventions can be used to train investors in this regard. Gray et al. (2011) argue that materiality disclosures are not warranted if users do not impound them in their investment decisions. However, such a determination is challenging to make until it is certain that investors *understand* the disclosures themselves. We call on future research to move the literature forward in this regard.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.aos.2020.101168.

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