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Abstract: We use experimental economic markets to examine the impact of changing institutional design features on audit quality. Specifically, we manipulate auditors' economic accountability to managers by altering who hires the auditor—a manager or an independent third party—and auditors' psychological accountability to investors by explicitly stating that the auditor is hired on the investors' behalf. Our design shifts auditors' accountability from managers, who have directional goal preferences, to investors, who prefer judgment accuracy. We find that removing auditors' economic accountability to managers and replacing it with psychological accountability to investors significantly increases audit quality. This increase in audit quality occurs despite the independent third party randomly hiring auditors. In an additional treatment, we incorporate auditor accuracy into the third-party hiring algorithm and find even higher audit quality. Our results suggest that altering auditors' accountability relationships can significantly enhance audit quality. Data Availability: The laboratory market data used in this study are available from the authors upon request. [ABSTRACT FROM AUTHOR]

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Realigning Auditors' Accountability: Experimental Evidence

We use experimental economic markets to examine the impact of changing institutional design features on audit quality. Specifically, we manipulate auditors' economic accountability to managers by altering who hires the auditor—a manager or an independent third party—and auditors' psychological accountability to investors by explicitly stating that the auditor is hired on the investors' behalf. Our design shifts auditors' accountability from managers, who have directional goal preferences, to investors, who prefer judgment accuracy. We find that removing auditors' economic accountability to managers and replacing it with psychological accountability to investors significantly increases audit quality. This increase in audit quality occurs despite the independent third party randomly hiring auditors. In an additional treatment, we incorporate auditor accuracy into the third-party hiring algorithm and find even higher audit quality. Our results suggest that altering auditors' accountability relationships can significantly enhance audit quality. Data Availability: The laboratory market data used in this study are available from the authors upon request.

Keywords: audit quality; accountability; market structure; incentives; auditor hiring

I. INTRODUCTION

This paper uses experimental economic markets to examine the impact on audit quality of altering auditors' accountability to both managers and investors. We manipulate the auditors' economic accountability to managers and psychological accountability to investors in an experimental setting where game theory predicts multiple potential equilibria. Our study's motivation comes from a continued interest in identifying mechanisms to improve audit quality. For example: (1) while audit deficiencies are declining, the Public Company Accounting Oversight Board (PCAOB) issued 664 audit deficiencies to the largest eight U.S. auditing firms from 2004–2009 ([17]); (2) the PCAOB released Part II quality control reports for all of the Big 4 audit firms related to internal quality issues that were not resolved to the PCAOB's satisfaction; and (3) the PCAOB has indicated a concern over the high number of serious deficiencies identified through their inspections ([8]). Further, [24] recently suggested that reforming the auditor's business model is necessary to restore audit quality and investors' trust in financial markets. In this study, we focus on the core roles that auditors' economic incentives and accountability relationships play in determining audit quality.

The history of audit regulation provides repeated examples of significant revisions to accounting standards and regulatory reforms in response to audit quality concerns following frauds, scandals, and audit failures (e.g., the Financial Institutions Reform, Recovery, and Enforcement Act [FIRREA; [67]], and the Sarbanes-Oxley Act [SOX; [69]]). [1] While regulatory actions have addressed audit quality to varying degrees, none of the reforms fully address auditors' fundamental conflict of interest: the audited company hires its own auditor.[2]

This inherent conflict of interest significantly impacts auditors' decision-making, as auditors are arguably accountable primarily to the company they are auditing, rather than its current or future investors. The [56] provides a salient example of why they believe the auditor-client relationship is a real, rather than a theoretical, problem. Specifically, a [56]; emphasis added) concept release provides the following statements from one of the largest audit firms' proposal to a potential audit client:

- "Your auditor should be a *partner in supporting and helping [the issuer] achieve its goals*, while at the same time helping you better manage risk;" and
- "Support the *desired outcome* where the audit team may be confronted with an issue that merits consultation with our National Office."

These statements are consistent with a relationship where the auditor is accountable to management rather than independent of management.

We employ an experimental setting where we manipulate the auditors' economic accountability to managers and psychological accountability to investors. This manipulation of accountability impacts auditor choices in a way that enables us to make predictions in a multiple-period setting in which game theory does not have a unique, stable Nash equilibrium. We use accountability theory to refine game theory (e.g., [38]), and predict that auditors will significantly increase audit quality when auditors are accountable to investors and not accountable to managers. We employ a 2×2 "plus 1" experimental design that manipulates economic accountability to managers and psychological accountability to investors as between-subjects factors.

We manipulate economic accountability to managers by comparing treatments where managers hire auditors to treatments where auditors are randomly assigned. Random assignment removes auditors' economic accountability to managers by breaking the direct economic bond between the company and its auditor. We manipulate auditors' psychological accountability to investors by comparing treatments where the auditor is told she is hired on behalf of investors to treatments where no such statement is made. This statement increases the salience of investors as an audience to the auditor's decisions, which has been shown to engender accountability ([9]). Further, this treatment aligns with real-world practices where auditors are informed that the audit committee hires them in the interest of investors and, more generally, the public. Our "plus 1" treatment uses an assignment system that incentivizes higher audit quality through the assignment process, removes economic accountability to managers, and increases psychological accountability to investors.

The mechanisms we employ to alter auditor accountability, while relatively straightforward to implement, are not guaranteed to succeed in increasing audit quality. First, the random assignment system creates a direct economic incentive for auditors to choose the less costly low-quality audit, as audit quality does not affect future hiring decisions.[3] In effect, random assignment reduces competition among auditors to provide high-quality audits. The U.S. Government Accountability Office (GAO), Chamber of Commerce, and Center for Audit Quality all assert that increased competition can improve audit quality ([68]; [66]; [57]), implying that decreased competition reduces audit quality.[4] Second, our efforts to increase psychological accountability to investors will not necessarily impact auditor decisions. To manipulate investor accountability, we simply state in the instructions that auditors are hired on behalf of investors. Investors do not actually pay, hire, or even ratify the auditor. Game theory suggests that stating that the auditor works on behalf of investors will not change behavior, while accountability theory suggests that such a statement can change behavior.

Our experimental markets are similar to ones used in prior research that include managers, investors, and auditors (e.g., [48]; [33]; [41]). The market begins with managers making an investment choice. The hiring party, either the manager or an independent third-party assignor, then selects an auditor to attest to the manager's reported asset value. Auditors choose a high- or low-level investigation, where the cost of investigation varies directly with the level chosen, receive the audit results, and issue an audit report to investors.[5] Auditors' investigation choice serves as our audit quality measure.[6] Finally, investors bid on the assets after receiving: the manager's report, the auditor's report, the auditor's identification number, and the auditor's historical accuracy.[7] This basic design has multiple equilibria due to the multiple strategic players and periods.

We find that removing auditors' economic accountability to managers and replacing it with psychological accountability to investors significantly increases audit quality. Neither of these factors alone is sufficient to significantly improve audit quality. The lack of sufficiency of either of our independent variables alone is not a power issue. It appears that we need to both reduce the auditors' accountability to management and prompt the auditor to remember their accountability to investors. Furthermore, when auditor assignment is based on auditor accuracy, we find even higher levels of audit quality.

This research contributes to the literature on auditors' accountability and audit quality. It also provides insight to regulators and practice. Our experimental approach allows us to examine market structures that do not currently exist, but that have been proposed by others seeking to improve audit quality ([36]; [34]). We remove auditors' economic accountability to management through a random-assignment system—as proposed by [36]—and find that replacing this economic accountability with psychological accountability to investors significantly increases audit quality. Our experiment also addresses [34] assertion that auditors' economic bond with management must be broken to improve audit quality. Our results suggest that breaking the bond is not sufficient to increase audit quality. However, we provide evidence that reducing this economic bond can improve auditor quality when paired with making auditors' accountability to investors more salient, consistent with predictions of accountability theory. Importantly, this increase in audit quality contrasts the game theoretic prediction that auditors will not conduct high-quality audits under a random-assignment regime.

Our paper also extends [47] research into institutional design changes that enhance auditor independence. [47] find that investor ratification of managers' auditor selection enhances auditor independence. However, [47] remove the auditor's moral hazard to reach high levels of audit quality. Our more realistic environment achieves higher levels of audit quality in the face of moral hazard. It appears that the complete removal of the manager's influence over the auditor hiring decision, as employed in our paper, is needed to achieve higher audit quality, rather than allowing the manager to retain influence, as in [47]. Further, we provide complementary experimental evidence to [52] that a lack of audit market competition does not lead to lower audit quality.

Finally, our results suggest that audit quality is enhanced when the party selecting an auditor does not have economic accountability to managers. In theory, this party could be the audit committee. However, recent research highlights management's continued influence over the audit committee and auditor hiring decision ([18]; [27]; [4]; [20]). Our approach completely removes management from the auditor hiring process, thereby allowing a clean shift of auditors' accountability relationship from managers to investors.

This paper proceeds as follows. Section II provides a discussion of the setting and experimental design. In Section III, we develop our hypotheses. Section IV provides our analyses and results, and Section V concludes.

II. SETTING AND EXPERIMENTAL DESIGN

We approach audit quality from the perspective of the audit's role in the economy. An audit is an economically motivated response to information asymmetry. In a market economy, the information asymmetry between managers and stakeholders inhibits the efficient flow of capital by creating adverse selection problems for investors in distinguishing between good and bad investment opportunities. Managers have direct information about the company's value, while investors and other stakeholders have more limited information. The auditor reduces this information asymmetry by attesting to the objectivity of management-provided information, thereby mitigating adverse selection and enhancing capital allocation.

Information asymmetry also inhibits efficient contracting in principal-agent interactions ([39]). The objective information auditors provide enables principals and agents to form more efficient contracts than otherwise possible. However, the auditor is also an agent that is subject to moral hazard ([5]), and in some cases, the auditor is an agent of the agent (i.e., the company and management) rather than of the principal (i.e., shareholders). In either case, the auditor's value in enhancing efficient contracting depends on the credibility the auditor bestows on the information used in the contracts.

Given the importance of auditor objectivity to the auditor's economic role, auditor independence is a key determinant of both audit quality and the auditor's value to the economy.[8] Audits are of little value if auditors do not have actual and perceived independence from the company they are auditing. Accountability and independence are inextricably intertwined; if auditors are ultimately accountable to management, then they are not independent from management. In testament to its importance, concerns regarding auditor independence have continually resurfaced, and significant reforms have followed (e.g., the [59] modified auditor independence rules and disclosure requirements, and the Sarbanes-Oxley Act of 2002). Through these reforms, the accounting profession currently manages independence by limiting financial and managerial relationships between auditors and clients, limiting nonaudit services, prohibiting auditors from auditing their own work, requiring audit partner rotation, and formalizing the audit committee's responsibility for hiring the auditor. While these rules enhance auditor independence, they largely ignore the fundamental incentive issues that arise when the company being audited hires the auditor. This creates a situation where auditors remain accountable to management.

Audit Committees and Alternative Institutional Designs

One can argue that an independent audit committee (AC) that hires, dismisses, and pays the auditor can potentially alleviate the accountability concerns that arise when the company hires the auditor. While prior research has identified factors that contribute to effective ACs (e.g., [1]; [3]; [14]), research suggests that ACs are often not independent of the company or its management and that management still has a significant influence over the auditor hiring decision. [34], 124) notes that the SOX requirement that an AC perform the auditor hiring and dismissal function "appears to be a less effective way of introducing a third-party into this process" and that management can influence the selection of the AC. Research also suggests that there are different types of audit committee members. [54] find evidence suggesting that there are "vigilant" audit committee members that inhibit managements' earnings management, but there are also "compliant" audit committee members that assist management's efforts to manage earnings. Finally, research suggests that the AC's incentives are often aligned with management and can significantly influence AC decisions ([45]; [6]).

There is also evidence that management remains involved in auditor selection decisions. For example, [18], 752) conduct interviews of professional auditors and find that management retains significant influence in auditor hiring and firing decisions. This influence increases when the CEO is the chairman of, or influential within, the board of directors. [27] provide further evidence of management's influence through a field study of

a large, profitable public company with an ostensibly high-quality AC. They find that management largely controlled the auditor appointment decision and hired the auditor with the lowest fees and the least senior-level expertise. [4] and [20] also find evidence of management involvement in the AC's auditor hiring process. This research suggests that the AC, in its current form, does not always address accountability issues that exist between auditors and client management.

Given concerns regarding the AC's role in the auditor hiring process, both academics and regulators have considered changes to the current audit market structure to strengthen auditors' independence and alter their accountability. For example, [36] propose a system whereby a set of qualified auditors is established, and the auditor is subsequently appointed using random assignment. [34] suggests that a third party appointing the auditor is the most straightforward solution to what he terms as auditors' "perverse incentives." [10] suggest that one way to improve auditor independence is "having external (perhaps governmental) bodies appoint auditors or set fee structures." [9] However, [38] questions this suggestion by providing evidence that social pressures related to group affiliation can mitigate auditors' self-serving biases to cater to management's preferences. The European Commission ([25], 11) also recognizes that a third-party system is a potential alternative to the current approach, although they acknowledge that there are challenges to changing the current market structure (e.g., see [22]).[10]

Finally, audit firm mandatory rotation has been discussed as an alternative institutional structure that can potentially improve audit quality through independence. In practice, mandatory auditor rotation is theoretically distinct from our proposed random assignment regime, as rotation still allows managers to have a role in auditor hiring. This approach does not achieve the same change in auditor accountability that occurs through random assignment. [12], 1376) study mandatory rotation by altering the frequency at which auditor participants are randomly assigned to a manager—once in the first period (no rotation) or every period (rotation)—over their 20-period design.[11] The authors find that "rotation" alone does not significantly impact auditor effort, which is consistent with our H1 findings for random assignment. [12] also manipulate the framing of the auditor's task as assessing either the honesty or dishonesty of management's representations, and find that auditor effort depends on an interaction of "rotation" and framing: "Rotation" increases (decreases) auditor effort in a dishonesty (honesty) frame.[12][21] find that auditor rotation (retention) requirements decrease (increase) auditors' biased reporting. [70] find that rotation leads auditors to be less cooperative during negotiations with clients, which results in asset values more in line with auditors' preferences. However, [37] find that rotation does not influence non-professional investors' perceptions of auditors' independence.

Importantly, all of these proposals for alternative institutional designs are in alignment with altering the accountability of auditors, and most capture the intuition that breaking the bond between the auditor and management is critical. We experimentally test a market structure that breaks that bond. Specifically, we manipulate auditors' economic accountability to managers by altering who hires the auditor, and auditors' psychological accountability to investors by explicitly stating that the auditor is hired on the investors' behalf.

We alter who hires the auditor by implementing a random assignment process. [23] examine random assignment of environmental auditors for carbon emission audits. They find that their four-part treatment—which includes random assignment of auditors, fixed pay from a central pool, regulatory inspection, and incentive pay for accurate reporting—improves the quality of carbon emission audits and reduces companies' pollution in India. While this study informs ours, emission levels are directly measurable in a way that audit quality and underlying financial reporting quality are not. Audits are often considered a credence good for which quality is difficult to evaluate either *ex ante* or *ex post* ([15]). Further, it is difficult to determine which of

the four components [23] use cause the observed results. Our experimental design affords us control to isolate the effect of altering auditors' accountability relationships on audit quality.

Market Design

Before we proceed to related literature and develop our hypotheses, we describe our experimental economic markets. Our markets include managers, investors, and auditors. The market begins with managers making an investment choice that produces an asset and reporting the asset's value to investors. An auditor is hired to attest to the manager's reported asset value. Auditors choose a high- or low-level investigation, receive their audit results, and issue an audit report to investors. Investors bid on the assets after receiving managers' reports, auditors' reports, auditors' identification numbers, and auditors' historical accuracies.

We employ a 2×2 "plus one" repeated-measures between-subjects design, summarized in Figure 1. Our basic treatments manipulate two factors. First, we manipulate economic accountability to managers by altering who is responsible for hiring the auditor—either the manager or an independent third party that we refer to as the assignor. Second, we manipulate psychological accountability to investors as being present or absent. Our manipulations result in four basic treatments: *Manager*, *ManagerInvestor*, *Assignor*, and *AssignorInvestor*. Our "plus one" treatment mirrors *AssignorInvestor* with the exception that the assignor factors auditors' historical accuracy into its hiring algorithm; we label this treatment *AssignorAccuracy*.

Graph: FIGURE 1 Summary of Experimental Treatments

We conduct five market sessions of each treatment, totaling 25 sessions. We use the generic terms verifier, seller, and buyer in all of our experimental materials to reduce the risk of uncontrolled expectations influencing behavior ([61]). However, we use the terms auditor, manager, and investor in the paper for reader comprehension. We use the term assignor in our experimental materials and the paper to refer to the independent third party that hires the auditor in the *Assignor*, *AssignorInvestor*, and *AssignorAccuracy* sessions.

Each market includes nine or ten participants: three auditors, three managers, and three to four investors. The assignor's role is carried out electronically, following a preprogramed algorithm based upon the specific treatment. In the *Assignor* and *AssignorInvestor* sessions, the assignor assigns each auditor to one specific manager for the first three periods, after which the assignor randomly chooses an auditor for each manager based upon a random number generator and 60 percent probability the incumbent auditor will be selected and 20 percent probability that each of the other auditors will be selected.[13] In *AssignorAccuracy* sessions, the assignor follows the same process for the first three periods, after which the auditors are ranked by accuracy after each period, and have a 60/30/10 percent chance of being hired if they are ranked 1st/2nd/3rd.[14]

Participants are not told the assignor's preprogramed hiring algorithm in any of the assignor-hire treatments. [15] However, the instructions differ for each treatment regarding how the auditor is hired, as shown below:

- *Manager*: "Each seller needs to hire a verifier."
- *ManagerInvestor*: "Each seller needs to hire a verifier on behalf of the buyers."
- *Assignor*: "The assignor is responsible for hiring verifiers. The assignor uses a random process when selecting verifiers."

- *AssignorInvestor*: "The assignor works on behalf of the buyers and is responsible for hiring verifiers. The assignor uses a random process when selecting verifiers."
- *AssignorAccuracy*: "The assignor works on behalf of the buyers and is responsible for hiring verifiers. The assignor takes verifiers' previous accuracy into consideration when selecting verifiers."

Each session starts with the experimenter reading instructions to all participants, who read the instructions concurrently and then individually complete pre-experiment questions and earn money for each correct answer. These questions facilitate participants' understanding of the market. After reviewing the answers, participants are randomly assigned to the roles of auditor, manager, or investor, and then the market begins. The market lasts for 20 periods, followed by a post-experimental questionnaire.[16] We use experimental dollars (E\$) that are converted to US\$ at the end of the session. All markets follow the same sequence of actions:[17]

- Each manager privately selects a project (A or B) in which to invest. Project A costs E\$225, and 60 percent of the time yields a high-valued asset (E\$800, E\$1,000, or E\$1,200 with equal likelihood), and 40 percent of the time yields a low-valued asset (E\$200, E\$400, or E\$600 with equal likelihood). Project B costs E\$50 and always yields a low-valued asset. *The investment choices create information asymmetry that prohibits investors from focusing on simple expected values, and creates a role for the auditor to add credibility to financial reports.*
- In *Manager* and *ManagerInvestor* sessions, each manager privately selects an auditor to issue a report to investors that attests to the veracity of the manager's report concerning the asset's true value. Managers observe the auditor's historical accuracy when selecting an auditor. In *Assignor*, *AssignorInvestor*, and *AssignorAccuracy* sessions, the assignor performs this step. Managers and assignors can choose any auditor to provide these services, and each auditor can service multiple managers. Auditors' fees are fixed at E\$100 per hire, and are paid by the manager in all sessions.
- Managers privately learn the asset value generated by their investment and issue an asset value report to investors. Managers can choose to over-report assets' values, but cannot under-report. For example, managers can report an asset with a true value of E\$1,000 as E\$1,000 or E\$1,200, but not any values lower than E\$1,000. *We allow managers to misrepresent asset values at a higher value, which creates a role for auditors. We do not allow managers to report values lower than actual values as this is a weakly dominated strategy, and eliminating this option simplifies the design.*
- Each auditor privately learns whether he or she is hired and makes a decision to *Investigate-High* or *Investigate-Low*. If an auditor chooses *Investigate-High*, then he or she learns the asset's true value with a probability of 0.90. If an auditor chooses *Investigate-Low*, then he or she simply agrees with the report that the manager issues to investors. *Investigate-High (-Low) costs auditors E\$60 (E\$10). The differential costs proxy for the effort necessary to investigate and create a moral hazard for the auditor. All auditors perform at least a minimum effort level represented by the low-investigation cost. The probability that the auditor identifies the true value of the asset through the high-level investigation proxies for accounting and/or auditing uncertainty. Auditor choice of Investigate-High or Investigate-Low is our dependent variable for audit quality.*
- Each auditor privately learns the audit value of the manager's asset based upon their investigation choice, and decides whether to issue an *Agree* or *Disagree* report to investors. If auditors chose *Investigate-Low*, then they must issue an *Agree* report.

- Investors receive information regarding each manager's asset that includes: the manager's report, the auditor's report, the auditor's identification number, and the auditor's historical accuracy. Investors then engage in a first-price sealed-bid auction, with each asset's high bidder paying their bid and receiving the true asset value. All investors learn whether they are the high bidder for each asset.
- All participants receive an earnings summary for the period. Participants stay in the same role for the entire market. Manager identities are then scrambled and the next period begins. All markets proceed in this fashion for 20 periods. *We scramble managers' identities to control manager reputation effects. To reduce end-period effects, participants are not told how many periods are in the market.*

Auditors earn the sum of audit fees less investigation costs. Managers earn the high bid received less investment costs and audit fees. Winning investors earn the true asset values received less winning bids paid to managers. Further, investors earn a return of 10 percent on the cumulative value of the assets they acquire throughout the market.[18] Experimental sessions last approximately 90 minutes. Participants earn a \$5 show-up fee, up to \$2 for the pre-experiment questions, and their earnings from the market. Average total participant earnings are \$24.50.

III. THEORY AND HYPOTHESES

We leverage game theory and accountability theory to develop testable hypotheses. Game theory gives us an initial foundation to develop our hypotheses, but it does not provide point predictions about behavior. To further refine our predictions, we incorporate accountability theory, which allows us to more precisely predict behavior in our setting. Further, we show that accountability theory leads to different predictions than game theory under the random assignment treatments with investor accountability.

We start by outlining the game theoretic equilibria that are possible in the markets where the manager hires the auditor. From a game-theoretic perspective, our experimental setting produces multiple equilibria. Prior research focuses on two—the Lemons and Reputation equilibria ([48], [47]; [33]). The Lemons equilibrium is the single-period equilibrium in all of our treatments. In the Lemons equilibrium, the auditor shirks on high investigation to save costs; as a result, investors know they cannot trust the auditor's report. Without a reliable auditor's report, managers cannot credibly commit to making a high investment. As a result, the manager chooses low investment and reports a high asset value because he or she knows that the investors know that the auditor will shirk. The investors ignore the joint auditor/manager report and bid a low asset value. This single-period equilibrium remains one possible equilibrium in the multiple-period game.

A multiple-period repeated game allows the potential for numerous alternative equilibria, including the Reputation equilibrium. In the Reputation equilibrium, managers create incentives for auditors to perform high-quality auditing by hiring those auditors who have built reputations for high quality. Auditors form reputations for providing high-quality audits over multiple periods by investigating and honestly reporting their audit results. This behavior enables managers to select the high investment and hire a reputable auditor, and investors to incorporate the joint report into their bids ([48]; [46]).

The Lemons and Reputation equilibria represent the two endpoints on the continuum of multi-period equilibria in the repeated game. The Reputation equilibrium provides the maximum surplus in the market, which is generally captured by the manager. However, neither of these equilibria are stable. To illustrate, consider a perfectly honest manager who always reports the true value of their asset. The auditor's best response to such a strategy is to exert low audit effort. In turn, the manager has an incentive to save investment costs and try to

"rip off" investors because the auditor is not investigating. This basic circular best response shows that there is not a single pure-strategy equilibrium in the repeated game.[19]

Further, while the Reputation equilibrium provides maximum market surplus, prior research finds that managers do not always prefer the highest audit quality available. For example, research shows that the Reputation equilibrium often does not form when there is accounting or auditing uncertainty in the market. [48] find that in settings with uncertainty, managers reward auditors who impair their independence. They find that auditors impair their independence in 95.5 percent of opportunities to do so. Similarly, [47] find that managers continue to hire incumbent auditors despite average objectivity violations ranging from 69 to 82 percent across their two measures. Archival studies provide similar evidence of managers not always preferring high audit quality. [2] find that 55.7 percent of managers whose auditors receive severe audit deficiencies in PCAOB inspections do not switch auditors. Their evidence suggests that some managers do not view a regulatory assessment of deficient audit quality to be sufficient to switch auditors.

Finally, in a similar setting to the current study, [33] examine the effects of adding a guaranteed high-quality auditor into existing audit markets. They find evidence that managers' behavior contradicts game-theoretic predictions that managers prefer high-quality auditing. Specifically, a subset of managers appears to forgo costless gains from hiring the best auditor to hire a lower-quality auditor. For example, "non-best" auditors are hired between 41 and 49 percent of the time in [33] setting, and the guaranteed high-quality auditor is hired significantly less than 50 percent of the time, on average. These prior research findings consistently show that managers often demand lower-quality auditing. It is important to note that this is distinct from demanding low-quality auditing in an absolute sense. Rather, there is substantial evidence that managers do not seek the highest quality available. Due to a lack of a stable equilibrium and the spectrum of demand for audit quality, we leverage accountability theory to refine our predictions.

Accountability Theory

Accountability theory has been extensively researched in the psychology literature (e.g., see [43] for a review) and applied to accounting research (e.g., [50]; [40]; [13]; [53]; [32]; [65]; [7]; [55]; [51]). Accountability relationships are typically described as situations in which one party is, implicitly or explicitly, accountable to a separate party who observes and/or judges their actions and potentially—but not necessarily—can reward or punish the accountable party ([43]). In conducting an audit, auditors potentially feel accountable to: client management, colleagues, their audit firm, their profession (e.g., [38]), regulators, and investors.

Many accountability studies use an expectation that individuals will need to justify their beliefs, feelings, or actions to another to induce accountability ([40]; [13]; [53]; [32]; [65]; [7]; [51]). However, [43], 255) note that requiring justification is sufficient, but not necessary, to induce accountability, which can be induced in various ways. For example, [43], 255) state that the mere presence of another—an audience that can observe an individual's performance—can induce accountability ([29]; [71]; [72]), and individuals often seek approval from their audiences, regardless of whether their audience's views are known or unknown ([9]). As described in our experimental design, we operationalize accountability through increasing the salience of investors as an audience to auditors' decisions. Theory supports that this is sufficient to induce accountability. This approach also provides an external validity advantage because auditors are supposed to be accountable to investors, with whom they do not typically meet face-to-face and to whom they are not required to provide justifications for their actions.

When an accountable party is aware of an audience's views, the accountable party tends to conform their actions and beliefs to the audience's views to seek approval and potential rewards ([62]; [63]). Further, when

an accountable party has to justify their behavior, they engage the acceptability heuristic, which entails strategic compliance with the party to whom they are accountable ([53]; [63]). When managers are involved in the auditor's appointment, the auditor is economically accountable to managers and is explicitly or implicitly aware of management's preference for the auditor to support their reporting choices. As a result, auditors hired by management will face potential rewards based upon outcome-based accountability and thereby likely conform to management's monitoring preferences ([55]). When a subset of managers demands lower audit quality, we expect that auditors will satisfy this demand by exerting less audit effort.[20]

Prior accounting literature finds that auditors are susceptible to biased decision making in management's preferred direction, often through motivated reasoning ([42]; [31]; [35]). Further, archival research finds that auditors' judgments are negatively impacted by the perceived risk of losing a client ([26]; [11]) and client retention incentives ([44]; [64]; [16]). This research indicates that when auditors are more economically accountable to management, they are likely to cater to management's reporting preferences.

If auditors' accountability can be shifted from managers to investors, it will likely influence auditor behavior, as auditors will view investors as an audience to their actions, and conform their actions to be better aligned with investors' preferences. Because investors are interested in accurate auditing judgments that reduce information asymmetry, shifting auditors' accountability from management to investors will result in auditors devoting greater resources to achieve higher-quality audits.

Hypotheses

We present four hypotheses. H1 and H2 set up our main test in H3 and examine whether the main effects of random assignment and investor accountability are sufficient individually to significantly change auditor behavior. H3 then examines when these two main effects are combined. H4 builds upon H3 by predicting that when the assignor conveys a preference for high audit quality through hiring decisions, audit quality will increase even further.

Due to the multiple periods and strategic players in our markets, game theory does not provide a stable Nash equilibrium. Based on the prior research discussed earlier, we generally do not expect the Reputation equilibrium to form in these markets (e.g., [48]; [47]; [2]; [33]). Instead, we expect that managers—when they are responsible for hiring auditors—will demand and auditors will supply lower than the highest-quality audits. Prior research does not necessarily predict a complete collapse in audit quality, but generally shows much less than the highest possible audit quality. Accountability theory reinforces this expectation. Auditors are directly accountable to managers when managers have a role in the auditor hiring decision. When managers demand lower audit quality, then accountability theory supports the expectation that auditors will provide the quality demanded by managers. However, breaking the auditor's accountability to management opens the possibility that auditors will provide higher-quality audits. The economic accountability auditors have to managers is broken by completely removing manager influence in the auditor hiring decision.

While we expect that some managers will demand less than the highest audit quality—and that some auditors will supply this level of quality—we acknowledge that it is premature to conclude that all managers invariably demand less than the highest-quality auditing. There certainly exist managers (auditors) who demand (supply) the highest level of audit quality and representationally faithful financial reporting, a point that recent experimental and archival research supports. For example, [41] find that auditors provide high-quality auditing to the subset of managers who demand high quality in their experimental markets. Further, [60] find that client restatements inhibit audit offices' ability to both attract and retain clients, and that this office "contamination" increases the likelihood of auditor dismissal, even for non-restating clients. This evidence suggests that at least

a subset of managers exists that prefers high-quality auditing, which complements [54] findings regarding subsets of vigilant and compliant audit committee members.

Based on our prediction that managers will demand less than the highest audit quality, we break the economic bond between managers and auditors by randomly assigning auditors to clients ([36]). Accountability theory suggests that breaking the bond with managers can increase audit quality, as the auditor's preference no longer influences the auditor's choices. However, the random assignment approach will not necessarily improve audit quality. Auditors face a moral hazard to supplying high-quality audits due to the higher costs. Absent the ability to be hired based on audit quality by managers, auditors have no incentive to make this higher cost investment. So, while we predict managers will prefer lower audit quality and auditors will respond by providing it when managers hire auditors, simply removing auditors' accountability to managers does not necessarily lead to higher-quality audits. While we cannot make an unambiguous prediction that audit quality will change, our first hypothesis considers whether simply breaking the bond with managers is enough to improve audit quality. We state H1 in null form:

H1: Audit quality will not differ based upon auditors' accountability to the manager.

The accountability literature finds that accountability can improve judgments and critical thinking when an individual is accountable to a party who is interested in accuracy ([43]). Within the auditing context, investors prefer accurate and unbiased auditing judgments that reduce information asymmetry. As a result, when an auditor's accountability relationship is shifted from management to investors, it is more likely that auditors will devote greater resources to making accurate and unbiased judgments, resulting in higher-quality audits. This prediction holds even if investors do not have any control over the appointment decision for auditors. That is, simply knowing investors' preferences allows auditors to feel psychological accountability to the investors and exhibit behavior that satisfies these preferences for accurate and unbiased auditing judgments. Emphasizing investors' preferences also likely shifts auditors from outcome-related accountability (i.e., their audit report) to process-related accountability (i.e., their investigation decision), which potentially increases audit quality ([55]). Our experiments assess whether this psychological accountability increases audit quality in a manner similar to [38], who finds that accountability to a professional group leads to increases in audit quality.

We nudge auditors' accountability toward investors by simply telling the auditors they are hired on behalf of investors. This approach provides psychological accountability to investors by suggesting the auditors' link to investors. By increasing the salience of investors, auditors will be aware that investors are an audience to their actions; following [9], auditors will seek the approval of investors by engaging in higher levels of audit effort. However, investors have no economic influence over auditors' behavior in our design. As a result, it is unclear whether simply suggesting that auditors are accountable to investors is sufficient, especially when the auditor is still economically accountable to the manager. Accountability theory does not provide a hierarchy of accountability. Nonetheless, we believe that economic accountability likely trumps psychological accountability because it more directly rewards the auditors. Similar to H1, we are unable to predict a clear change in behavior when we add investor accountability in the presence of manager accountability. However, most forms of accountability present in the auditing environment (e.g., accountability to one's firm, or accountability to the profession through a commitment to the Code of Professional Conduct) assume that social or psychological accountability can trump economic incentives. We state and test H2 in null form to assess whether psychological accountability can overcome economic accountability directly:

H2: Audit quality will not increase based upon auditors' accountability to investors when auditors are also accountable to managers.

Accountability theory predicts that auditors will conduct more high-quality audits when they are accountable to investors and not accountable to managers. That is, auditors who are not accountable to managers will not attempt to meet managers' preferences for lower-quality audits and will instead strive to provide higher-quality audits on behalf of investors. In contrast to accountability theory, game theory predicts that auditors will not exert costly effort when audit quality has no bearing on their likelihood of being hired in future periods. We predict that removing auditors' economic accountability to managers and replacing it with psychological accountability to investors will increase audit quality. This directional prediction leads to our third hypothesis, which we state in alternative form:

H3: Audit quality will be significantly greater when auditors are accountable to investors and not accountable to managers.

Finally, simply telling auditors that they are assigned randomly on behalf of investors provides only indirect guidance of investor preferences. We expect that assigning auditors based on past accuracy will directly convey the preferences of the assignor. Based on accountability theory, we predict that when auditors are accountable to investors, are not accountable to managers, and are incentivized for accuracy, they will conduct higher-quality audits. Incentivizing accuracy makes accuracy the unambiguous goal for auditors. This aligns their economic and psychological accountability, as well as the predictions under both accountability theory and game theory. This directional prediction leads to our fourth hypothesis, which we state in alternative form:

H4: Audit quality will be significantly greater when auditors are accountable to investors, not accountable to managers, and are incentivized for accuracy.

We do not intend to subordinate other potential accountability relationships. Auditors face accountability to parties interested in judgment accuracy through other avenues, such as accountability to regulators and the profession. However, our manipulations are aimed at altering a potentially conflicting accountability relationship between auditors and managers, and making salient auditors' psychological accountability to investors. For theoretical purposes, the specific party to whom the auditor is psychologically accountable does not matter; what matters is the direction of that party's preference. While we operationalize accountability in the form of psychological accountability to investors, accountability to regulators or the profession (e.g., [38]), among others, would yield the same predictions. Further, we do not alter who *pays* the auditor. In all of our experimental treatments, the manager is responsible for paying the audit fees. Our treatments simply alter the appointment mechanism. Game theory suggests that the appointment decision is the critical component, as this determines whether an auditor will or will not receive audit fees.

IV. RESULTS

Participants, Demographic Information, and Descriptive Statistics

Our participants include 248 undergraduate (82.7 percent) and graduate (12.9 percent) students from a large Midwest public university; 4.4 percent did not indicate their academic standing. Participants' mean and median age is 21, and 34 percent are male.[21]

Table 1 provides descriptive statistics by treatment. Auditors' percentages of high-level investigations are as follows: *Manager* = 32 percent; *ManagerInvestor* = 31 percent; *Assignor* = 33 percent; *AssignorInvestor* = 57 percent; and *AssignorAccuracy* = 84 percent. H1 is a null hypothesis and predicts that reducing manager accountability alone—comparing *Manager* and *ManagerInvestor* treatments to *Assignor* and *AssignorInvestor* treatments—will not significantly impact audit quality. H2 predicts that increasing investor accountability alone—comparing *Manager* and *Assignor* treatments to *ManagerInvestor* and *AssignorInvestor* treatments—will not

significantly increase audit quality. H3 predicts that concurrently reducing manager accountability and increasing investor accountability will lead to significantly greater audit quality, which is preliminarily supported when comparing our *AssignorInvestor* treatment to the *Manager*, *ManagerInvestor*, and *Assignor* treatments in Table 1. Finally, H4 predicts that removing manager accountability, increasing investor accountability, and incentivizing accuracy will significantly increase audit quality. This prediction is preliminarily supported when comparing our *AssignorAccuracy* treatment to all other treatments. In untabulated analyses, we also examine managers' preference for audit quality. We find that in the sessions where managers select their auditors, they do not consistently follow a reputation strategy by selecting the highest-quality auditors. Across these sessions, the highest-quality auditors only receive an average of 23 percent of hires.

Graph: TABLE 1 Descriptive Statistics by Treatment

Hypothesis Tests

This section discusses our hypothesis tests. To formally test H1–H4, we use generalized linear mixed-effects logistic regression models. These models allow us to control for non-independence at both the subject and session levels. Unlike traditional ANOVA approaches, these models provide directional evidence of our treatment effects. Table 2, Column (1) reports the results of the following logistic regression that tests H1–H3:

$$\begin{aligned} & \beta_1 \alpha + \beta_2 \beta + \beta_3 \gamma + \beta_4 \delta + \beta_5 \varepsilon + \beta_6 \zeta + \beta_7 \eta + \beta_8 \theta + \beta_9 \iota + \beta_{10} \kappa + \beta_{11} \lambda + \beta_{12} \mu + \beta_{13} \nu + \beta_{14} \xi + \beta_{15} \omicron + \beta_{16} \pi + \beta_{17} \rho + \beta_{18} \sigma + \beta_{19} \tau + \beta_{20} \upsilon + \beta_{21} \phi + \beta_{22} \chi + \beta_{23} \psi + \beta_{24} \omega + \beta_{25} \alpha + \beta_{26} \beta + \beta_{27} \gamma + \beta_{28} \delta + \beta_{29} \varepsilon + \beta_{30} \zeta + \beta_{31} \eta + \beta_{32} \theta + \beta_{33} \iota + \beta_{34} \kappa + \beta_{35} \lambda + \beta_{36} \mu + \beta_{37} \nu + \beta_{38} \xi + \beta_{39} \omicron + \beta_{40} \pi + \beta_{41} \rho + \beta_{42} \sigma + \beta_{43} \tau + \beta_{44} \upsilon + \beta_{45} \phi + \beta_{46} \chi + \beta_{47} \psi + \beta_{48} \omega + \beta_{49} \Gamma + \beta_{50} \Delta + \beta_{51} \Theta + \beta_{52} \Lambda + \beta_{53} \Xi + \beta_{54} \Pi + \beta_{55} \Sigma + \beta_{56} \Phi + \beta_{57} \Psi + \beta_{58} \Omega \\ & \begin{aligned} & \text{begin{equation} } \text{HighQualityAudit} = \beta_0 + \beta_1 \text{HiringParty} + \beta_2 \text{Accountability} + \beta_3 \text{HiringParty} * \text{Accountability} + \varepsilon \end{equation} \end{aligned}$$

Our mixed-effects model includes by-subject and by-session random intercepts to account for repeated measures at the subject level, and non-independence at the session level. Our dependent variable (*HighQualityAudit*) captures whether the auditor chooses a high- or low-level investigation.[22] We code *HiringParty* as 1 if an assignor hired the auditor, and 0 otherwise; we code our *Accountability* variable as 1 if the auditor is accountable to investors, and 0 otherwise.

Graph: TABLE 2 Audit Quality

Table 2, Column (2) adds the *Accuracy* variable, which captures whether auditor accuracy is incentivized (1 if it is, and 0 if it is not), as in our *AssignorAccuracy* condition. Based upon our predictions, our variables match our hypotheses as follows: *HiringParty* (H1); *Accountability* (H2); *HiringParty* * *Accountability* (H3); *Accuracy* (H4). Our first model allows us to examine H1 through H3, while our second model allows us to also examine H4.

The main effects of *HiringParty* and *Accountability* are not significant. Our data suggest that altering the hiring party alone does not influence audit quality. Furthermore, audit quality does not significantly increase based upon investor accountability alone. As such, we fail to reject H1 or H2 in the null form.

Our results support H3. The interaction of *HiringParty* * *Accountability* is positive and significant at the 0.05 level.[23] As a result, while neither decreasing auditors' accountability to managers nor increasing auditors' accountability to investors alone result in greater levels of high investigations, shifting both accountabilities together significantly increases audit quality. Importantly, this increase occurs despite auditors, under a random assignment system, not having incentives to engage in high-level investigations. This finding also suggests that auditors do not simply require increased accountability to investors, but also an elimination of managers' ability to economically punish them through decreased hiring, to increase audit quality.

Our second model allows us to explore H4, which predicts that incentivizing accuracy while also reducing (increasing) auditors' accountability to managers (investors) will further increase audit quality. Table 2, Column (2) supports H4, as *Accuracy* is positive and significant at the 0.05 level. Further, even when controlling for the effects of our *Accuracy* treatment, our interaction of *HiringParty* * *Accountability* remains positive and significant at the 0.05 level, indicating that incentivizing auditors' accuracy increases audit quality over our other treatments.

To assuage concerns regarding the non-independence of our observations in our primary analysis, we also conduct analyses using each session as one observation. In untabulated analyses, we conduct an ANOVA with percentage of high-level investigations (*%HighInvestigate*) as our dependent variable and *Treatment* as our independent variable. We find that *Treatment* significantly impacts *%HighInvestigate*: $F_{(4,20)} = 6.52$, $p = 0.002$. To determine which treatment(s) are driving this result, we conducted multiple planned contrasts. Our first contrast compares *AssignorInvestor* to *Manager*, *ManagerInvestor*, and *Assignor*; this contrast is significant ($F_{(1,20)} = 5.60$, $p = 0.028$), which provides support for H3. Following [30], we conducted additional contrasts to determine whether the *Manager*, *ManagerInvestor*, and *Assignor* treatments are significantly different from each other; none of these contrasts were significant (all $F_{(1,20)} < 0.05$, all $p > 0.85$). Finally, we compared *AssignorInvestor* and *AssignorAccuracy* and found a significant contrast ($F_{(1,20)} = 4.52$, $p = 0.046$); this provides support for H4, as the marginal effect is incremental to the significant difference of *AssignorInvestor* over all other treatments.

Finally, we use our post-experimental questionnaire to further explore the effects of our treatments on auditors' perceptions of accountability. Responses to the post-experimental questionnaire were collected using seven-

point Likert scales (1 = not at all; 7 = a lot) and were designed to assess how much consideration auditors gave to investors and managers during: (1) their investigation decision; and (2) their reporting decision. First, we examine the effect of our treatments on auditors' consideration of the interests of managers and investors during their investigation decision. For the following tests, we group responses based upon whether the assignor (*Assignor* and *Assignor/Investor* conditions) or manager (*Manager* and *Manager/Investor* conditions) hires the auditor.[24] Auditors report that they consider the interests of managers significantly less when the assignor hires auditors (2.60) compared to when managers hire the auditor (4.43) ($t_{58} = -3.74, p < 0.001$). Similarly, auditors consider the interests of the investors significantly more when the assignor hires auditors (3.73) compared to when managers hire the auditors (2.70) ($t_{58} = 2.12, p < 0.05$). Second, we examine auditors' consideration of the interests of managers and investors during their reporting decision. Auditors considered the interests of managers significantly less when the assignor hires auditors (3.07) compared to when managers hire the auditors (4.20) ($t_{57} = 2.12, p < 0.05$).[25] Further, auditors considered the interests of investors more when the assignor hires auditors (4.30) compared to when managers hire the auditors (3.80); however, this difference is not statistically significant at conventional levels.[26] We also compare auditors' considerations across our investor accountability manipulation during their investigation decision. Auditors considered the interests of investors more in their investigation decision when they are accountable to investors (3.53) than when they are not (2.90). Further, auditors consider the interests of managers less in their investigation decision when they are accountable to investors (3.33) than when they are not (3.70). However, neither of these differences are significant at conventional levels. These results provide indirect support that our manipulations engendered different accountability considerations for auditors during their decision-making process.

While our study focuses on audit quality, we collect data on manager decision making that demonstrates the potential value of higher audit quality. Table 1 reports that manager investment is highest in the *AssignorAccuracy* treatment. This high level of investment generally increases the surplus available in the market.[27] We also note that managers misreport less often and by smaller amounts in the *AssignorAccuracy* treatment, where audit quality is the highest. Interestingly, managerial investment is the lowest in the *Assignor/Investor* condition (25 percent), where audit quality is second-highest in all of our markets. That is, managers seem reluctant to play a reputation strategy in the presence of random assignment of auditors, despite the ability to do so in the presence of higher-quality auditing. From a game-theoretic perspective, however, this is reasonable. Managers infer that auditors will not conduct high-level investigations when they are randomly assigned because these investigations are costly and audit quality does not impact their chance of being hired. By anticipating auditors' behavior in this manner, managers realize that they cannot credibly signal a reputation strategy absent high-quality auditing and, therefore, save costs by making the low-level investment. Alternatively, managers respond to their lack of control by making more conservative investment choices. This is an area for future research.

V. CONCLUSIONS

We use experimental audit markets to examine the impact of shifting auditors' accountability on audit quality. Specifically, we break the economic bond between auditors and their clients to reduce auditors' economic accountability to managers. Furthermore, we replace this economic accountability with psychological accountability to investors by stating that auditors are hired on behalf of investors. We then explore the additional effect of incorporating an auditor accuracy incentive in the hiring process—to reinforce the hiring party's preference for audit accuracy—to further align auditors' accountability with investors' preferences.

We find that replacing auditors' economic accountability to management with psychological accountability to investors significantly increases audit quality. However, neither increasing psychological accountability to

investors nor removing economic accountability to managers significantly increase audit quality individually. Importantly, this increase in audit quality occurs despite a lack (presence) of an economic benefit (cost) to conducting higher-quality audits in random assignment markets. This result suggests that increased auditor accountability to investors without economic accountability to managers significantly increases audit quality and suggests potential benefits to removing managerial influence over the auditor hiring process. In an additional treatment, we show that incentivizing accuracy through the assignment process further accentuates the increase in auditors' investigation levels by further aligning auditors' accountability with investor preferences.

Our design examines changes to audit market structures, not how these structures can be operationalized in practice. We acknowledge that any sort of change to the current system would face significant challenges.[28] However, regulators and professionals seldom have insights from forward-looking research to draw upon when debating policy changes.

Our study is subject to the following limitations. First, we use students with limited audit market experience or socialization to accounting. The experimental design does not require any special expertise or training to participate and the incentives in our market parallel existing audit markets. However, we acknowledge several factors that could singly or jointly work against auditors' accountability to management, including: professional identity and professional groups or guilds ([38]); commitment to professional and ethical standards; and self-selection into a profession that works on behalf of the public interest. We see opportunities for future research to consider the role of these factors on auditor behavior. Second, in order to isolate the impact of the hiring party on market participants' behavior, we abstract from factors that are present in the field, including: price competition, managerial reputation building, litigation risk, reputation risk, and regulation. These other factors potentially play important roles in impacting auditor behavior; however, we do not expect these factors to negatively interact with auditor accountability. Third, auditors are homogeneous in potential quality in our design. Heterogeneous auditors allow the potential for signaling by managers through auditor choice (e.g., [19]; [49]). Such signaling appears difficult in a setting similar to that studied here, where all auditors can provide high quality if they choose. Finally, we argue that we have removed all the economic accountability to managers despite the fact that the audit fee is paid by the managers. We acknowledge that implementing such a system would require designing a fee-setting mechanism with consideration given to any accountability it creates between auditors and managers.

Our study contributes to the accounting literature on auditors' accountability and audit quality, and informs potential policy proposals regarding changes to the current market structure. Our results highlight potential benefits that such an overhaul of the auditing system could produce. A move from managers hiring the auditor to an assignment system would entail numerous challenges, while emphasizing auditors' accountability to investors in the manner we implement appears fairly straightforward. We acknowledge that an assignment system is only a partial solution to the issue of auditors' conflicting accountabilities, and that an arguably preferable solution would entail an environment in which all managers or audit committees prefer high audit quality. Future research can investigate additional factors that influence managers' demand for audit quality to determine under what circumstances managers prefer higher-quality auditors. Future research can also expand on our initial findings to consider further refinements or address implementation issues, such as how auditor fees would be set in an assignment system and/or the role regulators would play in such a regime. Further, future research can examine potential modifications to governance structures that can help to achieve similar results as our experimental market manipulations. Nonetheless, our results suggest that audit quality can be significantly increased under a system that breaks the economic bond between managers and auditors and emphasizes auditors' accountability to investors.

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Footnotes

1 We acknowledge that a lack of auditor independence and corresponding accountability relationships are not the root cause of all of the frauds, scandals, and audit failures. However, we argue that they are significant factors in a number of those cases and have not been fully addressed by reforms.

2 The company includes client management, its audit committee, and the board of directors. In the next section, we discuss the role of the audit committee in hiring the auditor, and recent research calling into question the continued role of management in the auditor hiring process.

3 [21] investigate auditor rotation and retention regimes in an experimental market. They find that auditor rotation lessens auditor bias, suggesting that reducing the economic bond between the auditor and management can improve audit quality. While rotation reduces auditor bias, lower levels of bias were found when the client retained the auditor for three periods before being forced to rotate.

4 Empirical evidence suggests that reduced competition does not necessarily reduce audit quality ([52]).

5 We do not explicitly have auditors assess the risk of material misstatement; they are provided with prior market history throughout the experiment, which allows them to assess the risks associated with managers' reporting tendencies.

6 We choose to focus on auditors' investigation choice, as it is the cleanest measure of audit quality in our setting. Alternatively, we could examine whether the joint financial report is correct. However, this measure is a noisier measure of audit quality. For example, if auditors conduct a low-quality audit in the presence of high risk of material misstatement, but the resulting financial statements do not actually contain any material misstatements, then it will appear to investors as though the auditor conducted a high-quality audit. Further, focusing on investigation choices aligns with the views of [55], who note that many of auditors' current accountabilities are dependent upon audit outcomes and propose changes aimed at shifting toward more process-focused accountabilities.

7 While such a salient and concise measure of audit accuracy does not readily exist in the field, this serves as a proxy for auditors' reputation. It is not possible to replicate the entire audit market. For example, we chose to not include switching costs, litigation risk, and regulation into our market. Adding these market characteristics adds complexity without adding insight. We do not believe these factors would negatively interact with third-party hiring or increased accountability to investors and, as such, we expect that our results would generalize to similar settings. We leave further consideration of these factors to future research.

8 For example, former PCAOB Chairman [22] notes that "one cannot talk about audit quality without discussing independence."

9 Rep. Dennis Kucinich (D-OH) took this suggestion a step further by proposing the creation of a Federal Bureau of Audits that sought to federalize the entire public auditing function. This proposed amendment to the Sarbanes-Oxley Act of 2002 did not pass.

The U.S. government currently uses a form of third-party-based structure, where the Office of Inspector General: (1) assesses the auditing needs of governmental entities; (2) conducts bidding for those entities' audit engagements; and (3) hires, pays, and dismisses auditors. The existence of the Office of Inspector General within the governmental audit market suggests that a third-party or assignment system is feasible.

In effect, this manipulation studies a random assignment regime with varied auditor term length of 20 periods versus one period. We refer to rotation as "rotation" in further discussion of [12] to capture that this is the interpretation of their manipulation that we are discussing.

Our study is distinct from [12]. Their manipulation is unrelated to our manipulations of auditors' accountability and leverages unrelated theory (Support Theory versus Accountability Theory in our study). Moreover, their results are conditional on framing. We use neutral framing in our instructions to auditors. While our participants enter the experiment with their own framing, random assignment to conditions reduces the risk that this framing systematically impacts our reported results.

We use a fixed pairing for the first three periods so that auditors can build a more reliable history of accuracy that is then used to assign auditors in the assignor accuracy sessions.

Auditors are accurate if they issue an Agree Report when the manager honestly reports the asset value, or they are accurate if they issue a Disagree Report when the manager does not honestly report. We use a randomly generated tiebreaker to break ties in ranking.

One could argue that we coningle constructs when comparing our manager-hire conditions to our random assignor conditions; specifically, auditor behavior can impact rehiring in the former, but not in the latter. This comingling of hiring and rehiring implicitly captures the same construct of managers' auditor choice. Manager choice further enforces the auditor's economic accountability to the manager. Further, there is no reasonable method of prohibiting managers from taking auditors' past behavior into account during auditor selection.

Participants are not told the exact number of periods to reduce the chance for end-period effects.

The experiments were programmed and conducted with the z-Tree software ([28]).

Participants are told they will receive a small return on the assets they acquire, but they are not told the return percentage. The purpose of this return is twofold. First, it provides a motivation to purchase assets that, in a competitive equilibrium, provide zero return. Second, it generates additional differences in private expectations that reduce the common value nature of the auction.

This raises the question of mixed strategies. However, in a repeated game with an uncertain end period, almost any equilibrium is possible and, as such, there is not a single mixed strategy equilibrium.

The U.S. audit market incorporates a number of factors that create incentives for auditors to supply high-quality audits, such as auditors' reputation concerns, litigation risks, and regulatory oversight by the PCAOB. However,

all of these mechanisms largely rely on an ex post revelation of audit quality. To the extent that an audit is a credence good that does not provide clear evidence on the quality supplied, these mechanisms are significantly weakened ([15]). Just as importantly, these ex post mechanisms often take years to impact the auditors involved. Under such circumstances, the benefits to auditors supporting management today are more certain than the distant and uncertain potential costs from lost reputation, litigation, or regulatory consequences.

The institutional review board at the university at which we conducted the study approved the study.

We focus our analyses on auditors' investigation choices and not their reporting choices. As we discuss in footnote 4, this is a cleaner measure of audit quality. Further, we expect that participants who select a high-level investigation will choose an audit report that is consistent with their audit results. There were three participants that did not issue an audit report that was consistent with their audit results multiple times within their session (a total of 19 observations). Removing these observations from our sample does not qualitatively alter our results.

While our main dependent variable for audit quality is auditor investigation choice, in untabulated analysis, we also rerun our model using the accuracy of the audit report as our audit quality measure. Using this measure, the interaction *HiringParty * Accountability* is positive and marginally significant ($z = 1.40$, one-tailed $p = 0.08$). However, this measure is noisy, reduces our test's power, and represents outcome-based accountability that [55] caution against due to outcome bias. When measuring the accuracy of the audit report, an auditor can be recognized as providing a high-quality audit even if he or she did not (e.g., the manager reports honestly, the auditor performs a low-quality audit and agrees with the manager's report).

We only analyze post-experimental questionnaire responses for the 2×2 portion of our design (i.e., we exclude our *AssignorAccuracy* condition). The reason for this exclusion is that we are isolating the effect of our manipulations on auditors' perceptions of accountability. In untabulated analyses, including *AssignorAccuracy* does not qualitatively alter any of the results of our tests.

One participant did not respond to this question; as a result, our degrees of freedom are 57 for this test, compared to 58 for the other t-tests.

We also use a contrast analysis to compare the *AssignorInvestor* treatment to the other three base treatments (*Manager*, *Assignor*, and *ManagerInvestor*). We find the contrast to be statically significant for auditors' consideration of investor interests when making investigation choices ($F_{(1,56)} = 6.26$, $p < 0.01$), but not reporting choices. Further, we find marginal significance when examining auditors' consideration of manager interests when making investigation choices ($F_{(1,56)} = 2.43$, $p = 0.062$), but not reporting choices.

We do not formally test the difference in market surplus (e.g., [46]; [58]), as we did not design our experiment to examine that issue. The two components that drive surplus in this setting are the investment choice and the auditors' investigation choice. In our markets, overall surplus does not change significantly across treatments, as the higher investment value is offset by both the cost of the investment and the cost of the audit. This trade-off is a function of our market parameters. More generally, we would expect the higher level of investment and resulting return to dominate the incremental cost of a high-quality audit.

For example, negative reactions to the PCAOB's mandatory firm rotation concept release prompted the U.S. House of Representatives to pass a bill (H.R. 1564, the Audit Integrity and Job Protection Act) "to amend the Sarbanes-Oxley Act of 2002 to prohibit the Public Company Accounting Oversight Board from requiring public

companies to use specific auditors or require the use of different auditors on a rotating basis." This bill was introduced to the Senate and has been referred to the Committee on Banking, Housing, and Urban Affairs.

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