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Can Social Norm Activation Improve Audit Quality? Evidence from an Experimental Audit Market

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Abstract We assert that audit quality can be improved to the extent that social norms for honesty and responsibility are activated in the auditor. To test this assertion, we use an experimental audit market setting found in the literature and manipulate factors expected to activate honesty and responsibility norms in the auditor. We find that auditor misreporting is reduced when the investor is another participant in the experiment rather than computer simulated, and thus, the interests of third-party investors are salient to the auditor. We also find that auditor misreporting is reduced when the auditor is required to sign-off on the audit report, but only when the investor is another participant in the experiment. Consistent with our underlying theory, we find that pre-experimental measures of sensitivity to honesty and responsibility norms help explain the effects of our manipulated variables. Finally, we find that these measures of social norm sensitivity are associated with the moral judgment that auditor misreporting is unethical. Our study helps explain previous anomalous findings in the literature and answers the call in Blay et al. (J Bus Ethics 2017. doi:10.1007/s10551-016-3286-4) for empirical researchers to use social norm theory to develop stronger tests of moral reasoning in the market for auditing services.

Keywords Audit quality · Social norm activation · Moral reasoning · Honesty · Responsibility

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Introduction

By expressing an opinion regarding whether the financial statements provided by management are fairly presented according to GAAP or IFRS, the external auditor performs a valuable service to capital markets and the economy. In particular, an independent audit opinion increases the flow of capital to corporations by protecting investors from managers who would misreport the financial condition of the firm in the financial statements. The effectiveness of the audit function, however, is significantly reduced when the auditor violates independence and acts in the interests of management rather than investors. Thus, auditor independence remains an important aspect of audit quality in the auditing literature. In a review of the auditing literature, King et al. (2012, 52) conclude that there is little research to inform recent efforts by the PCAOB to increase audit quality by requiring engagement partner sign-off or disclosure in the audit report. They identify various theoretical frameworks that might provide useful insights to policy makers, including accountability and the theory of affordances. However, they ignore theory and empirical evidence in business ethics and social norms.

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Schatzberg et al. (2005) argue that auditors may be less inclined to violate independence if they have the moral courage to satisfy their public interest obligations to third-party investors. Thus, moral reasoning or the consideration of right versus wrong behavior may affect auditor independence and audit quality. In an experimental audit market, however, Schatzberg et al. find that auditors and managers who score high on the "defining issues test" (DIT) violate independence more, not less. The DIT is a measure of a person's capacity for moral reasoning based on Kohlberg's (1969, 1976) theory of moral development, which has been challenged on philosophical, psychological, and empirical grounds (Modgil and Modgil 1986; Rest et al. 1999). Blay et al. (2017) argue that Kohlberg's theory is of minimal use to empirical business ethics research because it is a normative theory that is silent regarding the effects of situational cues and information on moral reasoning. Based on insights from Bicchieri's (2006) model of social norm activation, Blay et al. recommend that empirical researchers use alternative measures of moral reasoning based on social norm sensitivity.

We assert that audit quality can be improved to the extent that social norms for honesty and responsibility are activated in the auditor.[1] To test this assertion, we use the experimental audit market setting in Schatzberg et al. (2005) and manipulate factors expected to activate honesty and responsibility norms in the auditor. Calegari et al. (1998) first developed this experimental setting to test predictions of the two-period economic model in Magee and Tseng (1990). Using simulated investors, Calegari et al. manipulated whether the role of the manager was computer simulated or played by other human participants. In audit markets with human managers, a cooperative solution arose whereby managers paid high audit fees in exchange for the auditor misreporting low audit outcomes as high. This cooperative solution transferred wealth from the investor to the auditor and manager, and therefore presented the auditor with a moral dilemma. Calegari et al. called for further research examining factors that might reduce this threat to auditor independence, including moral reasoning on the part of the auditor.

Schatzberg et al. (2005) asserted that the moral dilemma of auditor independence could be solved by moral reasoning or the consideration of right versus wrong behavior in the auditor. To test this assertion, they extended the experimental audit market in Calegari et al. (1998) by using participant (as opposed to computer simulated) investors and by grouping auditor–manager pairs into low- and high-moral reasoning markets as measured by the DIT *P* score (Rest 1979). Individuals who score high on the DIT, however, rely on "Post-conventional" moral reasoning which frames morality in terms of procedural due process and visions of the just society. Auditors, in contrast, must place a high value on laws and professional and social norms in determining right versus wrong behavior. Thus, the DIT is unlikely to capture the type of moral reasoning required by auditors who serve to protect the interests of third-party investors. Further, the DIT measure has been found to primarily capture moral relativism and liberal political views, and the measure often yields "inverted-U" results whereby both low and high scorers exhibit unethical behavior (Ponemon 1993; Fisher and Sweeney 1998). Thus, Schatzberg et al.'s anomalous results may be due to their use of the DIT to capture moral reasoning capacity in the auditor (Blay et al. 2017).

We extend the experimental audit market in Schatzberg et al. in three ways. First, we directly manipulate the presence of a participant investor to examine the effect of making the interests of third-party investors salient to the auditor. In one experimental condition, we use a computer-simulated investor as in Calegari et al., and in another condition, we use participant investors as in Schatzberg et al. Second, we manipulate a sign-off requirement whereby the auditor must sign-off on the audit report by typing their name into the computer.[2] Davidson and Stevens (2013) find that a similar sign-off requirement increases the potential for a code of ethics to activate social norms in managers, and audit partners are required to sign-off on the audit report in many non-US countries. A similar sign-off requirement was also considered in the USA by the PCAOB, but was not implemented in favor of auditor name disclosure. Third, we use Bicchieri's (2006) model of social norm activation to develop our hypotheses and use measures of social norm sensitivity to capture moral reasoning capability on the part of the auditor in place of the DIT.

We find that auditor misreporting is reduced when the investor is another participant in the experiment rather than computer simulated. Auditor misreporting is also reduced when the auditor is required to sign-off on the audit report, but only when the investor is another participant in the experiment. In fact, auditor misreporting essentially disappears when the sign-off requirement is

[1] We choose honesty and responsibility norms because of their importance to professional fields such as auditing, law, and medicine. For example, honesty and responsibility norms have been shown to be two of the primary norms in the medical profession (Bosk 1979). Similarly, honesty and responsibility are primary norms in the auditing profession due to indoctrination into the profession and the potential for severe consequences if these norms are violated.

[2] As we discuss more fully below, the auditor's name remains private and is never disclosed to managers or investors. Thus, we control for external accountability and examine internal accountability or social norm activation in the auditor.

present and the investor is another participant in the experiment. Consistent with our underlying social norm theory, we find that our pre-experimental measures of sensitivity to honesty and responsibility norms help explain the effects of our manipulated variables. Finally, we find that these measures of social norm sensitivity are associated with the moral judgment that auditor misreporting is unethical. These findings suggest that the effects we document are due to the activation of social norms in the auditor, consistent with Bicchieri's (2006) model. These findings also corroborate Blay et al.'s (2017) assertion that social norm sensitivity is a valid measure of a person's capacity for moral reasoning.

This study provides useful theory and empirical evidence for the literatures in auditing and business ethics. In a review of the auditing literature, King et al. (2012, 52) conclude that there is little research to inform recent efforts by the PCAOB to increase audit quality by requiring engagement partner sign-off or disclosure in the audit report. Our study contributes to this literature by providing useful theory and evidence regarding the effect of a sign-off requirement alone, without disclosure, on audit quality. In a review of the empirical literature in auditors' ethical reasoning, Jones et al. (2003) conclude that further experimental research is needed to understand individual and contextual factors on auditors' moral (ethical) judgment. They also conclude that further research is needed to understand individual and contextual factors on moral (ethical) action/behavior (Jones et al. 2003). Our study contributes to this literature by examining individual and contextual factors on auditors' moral judgment regarding misreporting and the effect of such moral judgment on misreporting behavior. Finally, our study demonstrates that social norm sensitivity for honesty and responsibility can be used to capture an individual's potential for moral reasoning in auditing. Thus, our study answers the call in Blay et al. (2017) for empirical researchers to use social norm theory to develop stronger tests of moral reasoning in the market for auditing services.

The remainder of this paper proceeds as follows. In the following section, we present a literature review and develop the hypotheses that we test. In the third section, we describe the experimental method we use to test our hypotheses. In the fourth section, we present the results of our experiment tests, and in section five, we conclude.

Literature Review and Hypothesis Development

Similar to Calegari et al. (1998) and Schatzberg et al. (2005), we use student participants and an experimental audit market based on Magee and Tseng's (1990) two-period economic model.[3] In the audit market, the auditor contracts with the manager for audit services to be provided in exchange for an audit fee. The contracting auditor then observes and publicly reports the asset's value as being either low or high. As per the experimental parameters, there is a 100% probability that the manager is in possession of a low-value asset. Thus, the auditor either truthfully reports to the investor that the manager possesses a low-value asset or misreports the low outcome as high. A high-outcome audit report increases the price that investors must pay the manager for the asset. By misreporting the low outcome as high, therefore, the auditor transfers wealth from the investor to the manager. Further, the auditor incurs a financial penalty for misreporting. Finally, there are costs to the auditor and the manager if the incumbent auditor is not rehired in the second period. Magee and Tseng's model predicts the following: (1) auditors will lowball their fees in the first period; (2) auditors will charge positive-profit fees and be retained in the second period; and (3) auditors will misreport only in the first period when the manager possesses a credible dismissal threat that jeopardizes their future "quasi-rents."

Calegari et al. (1998) conducted the first experimental test of the predictions of Magee and Tseng's (1990) model. Prior to Calegari et al., researchers used experimental audit markets primarily to examine either pricing or reporting behavior, but not both. Calegari et al. provided a test of the price independence relation in Magee and Tseng by conducting audit markets in which student auditors made both pricing and reporting decisions and it was common knowledge that the investor role was simulated by the computer program. In this audit market setting, they manipulated whether the manager role was computer simulated or played by another participant. This allowed Calegari et al. to examine cooperative behavior that yielded an alternative price independence relationship: the manager accepts high audit fees from the auditor (more than covering the penalty for misreporting) and the auditor reciprocates by misreporting low audit outcomes as high outcomes. This cooperative behavior arose in about half of the audit markets in which both the auditor and manager roles were played by student participants.

Schatzberg et al. (2005) extended Calegari et al.'s (1998) experimental study by examining the effects of moral reasoning and economic incentives on auditor

[3] The use of students in experimental tests of economic theory has a long history (See Smith 2008). In their discussion of effective and efficient research design in experimental accounting research, Libby et al. (2002) argue that experimenters should avoid using professional participants unless it is necessary to achieve their research goals. Given the research questions we examine and the fundamental theory we apply in economics (Magee and Tseng 1990) and social norms (Bicchieri 2006), our use of student participants appears appropriate.

reporting and fees. Using the same experimental audit market setting as Calegari et al., they measured the moral reasoning capacity of student participants using the three-story DIT *P* score (Rest 1979) and grouped auditor–manager pairs into low- and high-moral reasoning markets based on their scores.[4] To make the obligation to third-party investors salient to auditors, Schatzberg et al. used participant investors rather than the computer-simulated investors used by Calegari et al. Schatzberg et al. also varied the auditor's penalty for misreporting at three levels rather than holding the penalty for misreporting at the relatively low level used by Calegari et al. Surprisingly, they found that premium fees and auditor misreporting were more likely with high rather than with low-moral reasoning auditor–manager markets as measured by the DIT.

Consistent with Blay et al.'s (2017) call to incorporate social norm theory to generate new insights in the empirical business ethics literature, we supplement Magee and Tseng's (1990) economic model with insights from Bicchieri's (2006) model of social norm activation. According to Bicchieri's model, people have *conditional preferences* for conforming to social norms. A social norm is a behavioral rule that determines right versus wrong behavior in a given social setting. In Bicchieri's model, a social norm is activated when individuals become aware that a behavioral rule is relevant to the current social setting and a combination of empirical and normative expectations give individuals sufficient reason to follow the rule. Empirical expectations are based on the belief that a sufficiently large subset of people conform to the behavioral rule in similar settings, and normative expectations are based on the belief that a sufficiently large subset of people expect conformance to the behavioral rule in similar settings. The choice to follow a social norm, therefore, is conditional upon one's beliefs about the relevance of that norm to the given situation, how many other people follow the norm, and whether one is expected to follow the norm in turn.

In summary, Bicchieri's (2006) model suggests that situational cues can activate social norms by increasing empirical and/or normative expectations for such norms. Consistent with Adam Smith's (1759/1790) moral theory in *The Theory of Moral Sentiments*, Bicchieri's (2006) model also incorporates differential sensitivity to social norms based on different social experiences and internalized social norms (Blay et al. 2017). First, individuals may differ in empirical expectations due to different experiences regarding conformance to the norm in similar settings. Second, individuals may differ in the magnitude and nature of normative expectations required for conformance. For some, it may be sufficient to believe that others expect them to conform to the norm, whereas other individuals may require potential sanctions for noncompliance. While Bicchieri allows social norm sensitivity to vary across individuals and particular social norms, she assumes that an individual's sensitivity to a particular norm is a fairly stable disposition (Bicchieri 2006, p. 116).

Our study incorporates multiple aspects of Bicchieri's (2006) model of social norm activation. First, we use pre-experimental measures of social norm sensitivity from the Jackson Personality Index—Revised (JPI-R; Jackson 1994) rather than the DIT to capture an individual's potential for moral reasoning. Second, we manipulate two aspects of the audit market environment that Bicchieri's model suggests may affect social norm activation in the market for auditing services. In particular, we manipulate the presence of a participant investor and a sign-off requirement whereby the auditor must sign-off on the audit report by typing his or her name into the computer. We assert that such manipulations will reduce auditor misreporting by activating social norms for honesty and responsibility in the auditor. Further, we assert that these effects will be increased by the auditor's sensitivity to such norms, consistent with Bicchieri's model.

Our emphasis on honesty and responsibility norms in auditing has precedence in the medical profession. In a field study over a period of months, Bosk (1979) observed the clinical training of surgeons in a university-affiliated teaching hospital. He observed two primary classes of mistakes for trainees that had very different consequences. From interviews and observations, he concluded that *technical* mistakes were largely forgiven and used for educational purposes. He also concluded, however, that *normative* mistakes were more serious because they reflected a failure of indoctrination into the strong culture of the profession. In particular, normative mistakes reflected violations of honesty and responsibility norms, and violations of these two norms were considered a moral failing with life-and-death implications. Thus, they were treated much more harshly than technical mistakes during the process of training (Miles 2016).

Similarly, we conclude that honesty and responsibility are primary norms in the auditing profession due to indoctrination into the profession and the potential for severe consequences if these norms are violated. To reinforce the indoctrination into the auditing profession, auditing standards emphasize the auditor's responsibility to the public at large, to their clients, as well as to the profession as a whole (AICPA 2017). Auditing standards also require auditors to explicitly consider ethical and professional norms when performing their job duties. Research has shown that exposure to these standards can positively impact ethical decision-making behavior in auditing (Green and Weber 1997).

[4] See Blay et al. (2017) for a detailed discussion of the DIT *P* score.

Our first hypothesis tests the effect of making third-party investor interests salient to the auditor. Schatzberg et al. (2005) asserted that having participant investors rather than computer-simulated investors would increase the potential for moral reasoning in the auditor by making clear that misreporting came at the expense of another participant and not the experimenter. However, they presented no theory on which to base their expectation. This is likely because the Kohlbergian (1969, 1976) framework they used is silent regarding the effects of situational cues and information on moral reasoning (Blay et al. 2017). Further, Schatzberg et al. did not directly test their expectation, but only examined an experimental audit market setting where investors were participants in the experiment rather than computer simulated as in Calegari et al. (1998). Thus, the literature provides no theory or direct empirical evidence regarding the effect of making the investor salient to the auditor.

We provide both theoretical support and direct empirical evidence for the effect of making third-party investor interests salient to the auditor. In one experimental condition, we use computer-simulated investors as in Calegari et al. (1998) and in another condition we use participant investors as in Schatzberg et al. (2005). Bicchieri's (2006) model of social norm activation suggests that making the investor salient to the auditor will increase empirical and normative expectations for honesty and responsibility norms. We expect the activation of these social norms to generate a disutility in the auditor for misreporting at the expense of investors. Thus, we predict that making the investor salient to the auditor will reduce auditor misreporting. We state this prediction formally in Hypothesis 1:

H1 Making the investor salient to the auditor will reduce auditor misreporting.

Our second hypothesis tests the interactive effect of an auditor sign-off requirement and investor salience. Signing a document signals that the signer comes to an agreement on the items in that document. Thus, it turns an implicit or implied form of agreement into an explicit form of agreement that reflects on the honesty and responsibility of the signer. In an experimental study using an investment game, Davidson and Stevens (2013) find that a code of ethics only improves manager behavior when the code comes with a certification choice whereby the manager signs off on the code by typing his or her participant number into the computer.[5] Based on Bicchieri's (2006) model of social norm activation, they conclude that the certification choice increased the potential for the code to improve manager behavior by activating social norms present in the code.

When the third-party investor is not salient to the auditor, we expect the auditor to feel little moral obligation to the investor. Thus, the potential for the sign-off requirement to reduce independence impairment is minimized when the investor is not salient to the auditor. When the third-party investor is salient to the auditor, on the other hand, we expect the auditor to feel a moral obligation to the investor that gives the sign-off requirement the potential to activate social norms for honesty and responsibility. Thus, the salience of the investor creates an environment where a sign-off requirement can activate social norms that reduce independence impairment. Based on this expectation, we predict that the sign-off requirement will reduce auditor misreporting only when the investor is salient to the auditor. We state this prediction formally in Hypothesis 2:

H2 Requiring the auditor to sign-off on the audit report will reduce auditor misreporting only when the investor is salient to the auditor.

We test the underlying theory behind H1 and H2 in our third and fourth hypotheses. Consistent with Adam Smith's (1759/1790) moral theory in *The Theory of Moral Sentiments*, Bicchieri's (2006) model suggests that individuals have differential sensitivity to social norms based on different social experiences and internalized social norms (Blay et al. 2017). We expect that auditors who value honesty in general will exhibit greater potential for our two manipulations to activate a social norm for honesty in the audit report. Further, we expect that auditors who value responsibility in general (i.e., who feel an abstract moral obligation to other people and to society at large) will exhibit greater potential for our two manipulations to activate a social norm for responsibility toward third-party investors. Based on these expectations, we predict that the ability of investor salience and the signature requirement to reduce auditor misreporting will be greater when the auditor has higher social norm sensitivity for honesty and responsibility norms. These two predictions are tested in our third and fourth hypotheses:

H3 The ability of investor salience and the auditor sign-off requirement to reduce auditor misreporting will be greater for auditors who have social norm sensitivity for an honesty norm.

H4 The ability of investor salience and the auditor sign-off requirement to reduce auditor misreporting will be greater for auditors who have social norm sensitivity for a responsibility norm.

[5] To maintain participant anonymity, Davidson and Stevens (2013) had managers certify that they would follow the code of ethics by typing their participant number into the computer. In contrast, we have participants type their name into the computer and maintain anonymity by not disclosing their name to other participants.

Experimental Method

Experimental Audit Market

To test our hypotheses, we use the experimental audit market in Schatzberg et al. (2005) and manipulate our main variables of interest using a 2 × 2 factorial design.[6] The experiment was programmed and conducted in z-Tree (Fischbacher, 2007), and the experimental instructions are given in "Appendix." The experimental audit markets involved 144 undergraduate students from a large southeastern university. Each experimental audit market began with participants being randomly assigned the role of either a seller, a verifier, or a buyer for the duration of the experiment. Each audit market included four sellers, four verifiers, and two buyers. Within each market, the four sellers were designated by colors (green, orange, yellow, and pink), the four verifiers were designated by numbers (1, 2, 3, and 4) and the two buyers were designated by numbers (1 and 2). Each market operated for 10 years, with each year consisting of two trading periods. To mitigate possible end of experiment effects, participants were not informed as to how long the market would be in operation. To maintain independence between years, participants were randomly reassigned to a new market group at the end of each year, but retained their original randomly-assigned role and manipulations throughout the experiment.

The decision-making process each trading period is presented in Table 1, a table included in the experimental instructions provided to participants. At the beginning of each trading period, each of the four sellers was given an asset whose value was unknown. In order to sell the asset to investors, each seller had to hire a verifier to report the asset's value. Each of the four verifiers (1–4) submitted a separate price offer via a sealed-offer auction to each of the four sellers (green, orange, yellow, and pink) to perform this service. Each verifier therefore competed for the right to perform services for every seller in the market in every trading period.[7] Each seller then selected one verifier on the basis of the price offers and paid the selected verifier their price offer.[8] The verifier then observed the value of the asset, which was always low ($2.68), and publicly reported that the asset's value was either low ($2.68) or high ($3.68).[9] In half of the markets, the verifier was also required to type in his or her name as part of the verification report.[10] Each buyer then purchased an asset from two distinct sellers. Each of the green and orange seller's assets was purchased by Buyer 1 and each of the yellow and pink seller's assets was purchased by Buyer 2. The significance of the verifier's report is that the reported value established the price the buyers paid the sellers for their assets.

The payoff table for a year (two trading periods) is presented in Table 2, another table included in the experimental instructions provided to participants. The sellers and verifiers began the experiment with an initial endowment of $10.00, whereas buyers were given an initial endowment of $20.00. At the end of the experiment, all participants received a show-up fee of $10 in addition to their cumulative earnings during the experiment. The seller's per period earnings consisted of the reported value, either $2.68 or $3.68, less the verifier's fee and less a $0.30 hiring fee.[11] The verifier's per period earnings consisted of the fees from each seller with whom he contracted for services less a fixed observation cost of $1.60 per service and a $0.40 learning cost per service in the initial period.[12] Additionally, if the verifier misreported the value of the asset, the verifier was assessed a $0.25 penalty for misreporting.[13] Consistent with Schatzberg et al. (2005), verifiers received $0.20 per period in addition to these payouts. The buyer's per period earnings were equal to the actual value of the assets purchased from the two sellers ($2.68) less the verifier's reported value for each of the two assets (either $2.68 or $3.68). Thus, the payout scheme is identical to Schatzberg et al.'s low penalty condition. After the instructions to the experimental market were read aloud but before the experimental rounds began, participants were

[6] We contacted the lead authors in Schatzberg et al. (2005) and asked for their original set of instructions. Their gracious willingness to provide us with their instructions allowed us to closely replicate their experimental audit market setting in our study.

[7] The verifier's price offers were required to be in the range between $0.00 and $4.00 but could vary from seller to seller. In other words, verifiers could offer different prices to different sellers and could make price offers below their cost if they so chose.

[8] Note that this means that one verifier could be hired by all the sellers in the market.

[9] The observed value was always low in the experiment to ensure the possibility of misreporting the value as high at the expense of investors. This experimental design feature was also present in Calegari et al. (1998) and Schatzberg et al. (2005).

[10] Although the signature manipulation required verifiers to type in their name when presenting their verification report, verifier names were still not disclosed to other participants to avoid external accountability and other potential confounding effects. This lack of disclosure was known to all participants in markets with a signature requirement.

[11] The seller's hiring costs were waived in period two if the incumbent verifier was rehired.

[12] Auditor learning costs were waived in period two if the incumbent auditor was rehired.

[13] Schatzberg et al. (2005) manipulate the size of the auditor's economic penalty across three levels ($0.25, $0.50, and $0.75); however, we hold the penalty constant at $0.25 as in Calegari et al. (1998). Schatzberg et al. (2005) find no evidence of misreporting when the penalty is high enough to prevent profitable collusion by the auditor. Because we are interested in the influence of a signature requirement on reducing misreporting, we choose their lowest penalty because it allows for profitable collusion.

Table 1 Decision-making process each trading period

Step 1: Each verifier submits an offer price to each seller
Each of the four verifiers (1, 2, 3, and 4) submits a price offer to each of the four sellers (green, orange, yellow, and pink) to perform a verification service
Each verifier can submit a different price offer to each seller, but the price offer is restricted to be between \$0 and \$4.00
Step 2: Each seller selects a verifier
Each of the four sellers (green, orange, yellow, and pink) selects one verifier to perform a verification service and pays the selected verifier their offer price
Each verifier observes the actual value of the asset for each seller with whom they have contracted to perform a verification service
The probability that each verifier observes an asset value of \$2.68 is 100%
Step 3: Each verifier submits a verification report
Each verifier who has contracted to provide a verification service reports publicly the value of the asset as either \$2.68 or \$3.68
Each verifier will type in their actual name as part of the verification reporting process, but it will not be disclosed to other participants
Buyers pay the seller the value contained in the verification report
Step 4: Trading period payout for each role
BUYERS: Buyers receive the actual value of the asset less the reported (and paid) value of the asset. Therefore, buyers break even when the verifier reports a value that matches the actual value of the asset, lose \$1.00 if the verifier reports the value as \$3.68 when the actual value is \$2.68
VERIFIERS: Verifiers receive the agreed upon verification fee from the seller less a fixed observation cost of \$1.60. In period 1, verifiers incur a \$0.40 initial learning cost with each seller whom they contract. In period 2, seller–verifier pairs have the option to avoid this cost by recontracting. Additionally, verifiers incur a \$0.25 misreporting penalty if the reported value does not match the observed (actual) value of the asset
SELLERS: Sellers receive the verifier reported value of the asset from the buyer (either \$3.68 or \$2.68) less the agreed upon verification fee paid to the verifier. Additionally, sellers incur a \$0.30 new hire cost in period 1 regardless of the verifier they select. In period 2, seller–verifier pairs have the option to avoid this cost by recontracting
BUYERS, VERIFIERS and SELLERS: At the end of each period 2 (end of each trading year) buyers (1 or 2) and verifiers (1, 2, 3 or 4) are randomly reassigned numbers. Sellers are also randomly reassigned colors (green, orange, yellow or pink). Buyers, verifiers and sellers will maintain their assigned role (buyer, verifier or seller); however, each will be randomly matched with a new group of four verifiers, four sellers and two buyers

required to respond correctly to seven multiple choice questions about the operation of the market. This ensured that all participants correctly understood the operation of the market.

Each participant type was paid in private based on both an initial endowment of \$10 and their cumulative earnings from the experimental trading years. Given the experimental parameters and procedures used, average payouts were \$27.81, \$34.14, and \$25.69 for the buyers, sellers, and verifiers, respectively.

Dependent Variable

Consistent with Calegari et al. (1998) and Schatzberg et al. (2005), the verifier could report that the seller's asset was either a low-value asset (\$2.68) or a high-value asset (\$3.68). Also consistent with these experimental audit market studies, there was a 100% probability that the verifier observed a low-value asset (\$2.68).[14] Thus, auditor misreporting occurred in our markets if the verifier reported that the buyer possessed a high-value asset (\$3.68). Accordingly, the dependent measure throughout our analysis is a dichotomous misreporting variable (Misreport).

Investor Salience and Auditor Sign-Off Manipulations

We manipulated investor salience by using either computer-simulated investors or human participant investors. Additionally, we manipulated the auditor sign-off requirement by requiring verifiers to either report only the value of the asset or report the value of the asset and type in their name as part of the verification report. Two experimental sessions were conducted for each of the four experimental conditions, and each session was conducted with enough participants to allow two markets to operate simultaneously. To eliminate market group confounds and to control for reputational effects, participants were randomly reassigned to a market group at the end of each market year (two trading periods). This allowed us to simulate a repeating, single-period setting to maintain the

[14] If the asset was valued as high, there would be no ability for the verifier to misreport at the expense of the buyer. Therefore, consistent with prior research, the asset value was always low to maintain the potential for misreporting.

Table 2 Payoff table for a year (two trading periods)

VERIFIER[a]	SELLER[b]	BUYER[c]
Period 1		
Add: Verification Fee (0-$4.00 per contract)	Add: Reported Value (Low—$2.68 or High—$3.68)	Add: Actual Value of Assets (Low—$2.68)
Less: Observation Cost ($1.60 per contract)	Less: Verification Fee (0-$4.00)	Less: Reported Value of Assets (Low—$2.68 or High—$3.68)
Less: Initial Learning Cost ($0.40 per contract)	Less: New Hire Cost ($0.30)	
Less: Misreporting Penalty ($0.25 per Misreport)		
Total Earnings for Period 1	Total Earnings for Period 1	Total Earnings for Period 1
Period 2		
Add: Verification Fee (0-$4.00 per contract)	Add: Reported Value (Low—$2.68 or High—$3.68)	Add: Actual Value of Assets (Low—$2.68)
Less: Observation Cost ($1.60 per contract)	Less: Verification Fee (0-$4.00)	Less: Reported Value of Assets (Low—$2.68 or High—$3.68)
Less: Initial Learning Cost[d] ($0.40 per NEW contract)	Less: New Hire Cost[d] ($0.30 for NEW contracts)	
Less: Misreporting Penalty ($0.25 per Misreport)		
Total Earnings for Period 2	Total Earnings for Period 2	Total Earnings for Period 2

[a] In addition to these earnings, verifiers begin the experiment with an initial endowment of $10.00. Verifiers also receive a budget of $0.20 per trading period

[b] In addition to these earnings, sellers begin the experiment with an initial endowment of $10.00

[c] In addition to these earnings, buyers begin the experiment with an initial endowment of $20.00

[d] These costs are only incurred for NEW verifier–seller pairs in period 2. (Since all verifier–seller pairs are new in period 1, all verifiers and sellers incur these costs in period 1.)

important features of Magee and Tseng's (1990) single-period model.

Social Norm Sensitivity Variables

We use measures of social norm sensitivity based on a common framework used by psychologists. The JPI-R (Jackson 1994) is a 300-item instrument that measures 15 personality scales that are relevant to the functioning of a person in a wide range of social settings involving work, organizational behavior, or interpersonal situations. Experimental researchers in accounting have used the JPI-R to examine the effect of social/moral norms in participative budgeting settings (Blay et al. 2017). These studies suggest that personality scales on the JPI-R are useful measures of one's sensitivity to such norms. For example, Stevens (2002) finds that the *Responsibility* scale is negatively associated with budgetary slack. Further, Hobson et al. (2011) find that the *Traditional Values* and *Empathy* scales are positively associated with the moral judgment that budgetary slack is unethical.

To test the underlying theory behind our predictions, we use the *Traditional Values* and *Responsibility* scales of the JPI-R. The *Traditional Values* scale assesses the degree to which an individual values traditional norms and beliefs, and is the opposite of relativism (Jackson 1994). People with higher scores on the *Traditional Values* scale are more likely to value truthful reporting and therefore be sensitive to an honesty norm. The *Responsibility* scale assesses the degree to which an individual feels an abstract moral obligation to other people and to society at large, and is the opposite of negligence (Jackson 1994). People with higher scores on the *Responsibility* scale are more likely to value abstract obligations to other people and therefore be sensitive to a responsibility norm. Each JPI-R scale was measured in a pre-experimental questionnaire by having participants complete 20 true/false questions, resulting in a theoretical range of scores for each personality scale from 0 to 20.

Results

Manipulation Checks

We use responses to items on the exit questionnaire to test the effectiveness of our experimental manipulations.[15] Participants responded to the following question regarding the investor salience manipulation: "The role of the buyer was played by a human participant similar to the roles of the seller and the verifier." The response ranges from 1 = strongly disagree to 7 = strongly agree (4 = neutral). Participants in the human buyer treatment agreed more strongly with this statement than participants in the computer programmed buyer treatment ($t = 8.27$, two-tailed $p < 0.01$). The mean response of 4.65 for participants in the human buyer treatment is significantly above the neutral response of 4 ($p = 0.02$), whereas the mean response of 1.80 for participants in the computer programmed buyer treatment is significantly below the neutral response of 4 ($p < 0.01$). This suggests that our investor salience manipulation was successful.

Participants responded to the following question regarding the auditor sign-off manipulation: "Prior to submitting their verification report, each verifier was required to type their name on their report." Again, the response ranges from 1 = strongly disagree to 7 = strongly agree (4 = neutral). Participants in the sign-off treatment agreed more strongly with this statement than participants in the no sign-off treatment ($t = 18.11$, two-tailed $p < 0.01$). The mean response of 6.39 for participants in the sign-off treatment is significantly above the neutral response of 4 ($p < 0.01$), whereas the mean response of 1.99 for participants in the no sign-off treatment is significantly below the neutral response of 4 ($p < 0.01$). This suggests that our auditor sign-off manipulation was successful.

Descriptive Statistics

Magee and Tseng's (1990) model predicts a lowball fee of \$1.30 in the first period and that incumbents will be rehired in the second period at a premium fee of \$2.30. Figure 1 presents the accepted audit fees across experimental conditions by auditor type (i.e., incumbent versus nonincumbent). The average winning bid in the first period is \$1.97, which is \$0.03 below actual cost but significantly above the equilibrium prediction of \$1.30. The average winning bid in the second period is \$2.43 for incumbents and \$2.07 for nonincumbents, which is much closer to the predictions of the model (\$2.30 for incumbents and \$2.00 for nonincumbents). Incumbent auditors were rehired 75.40% of the time in period two.

Figure 2 displays the total misreporting by experimental condition and period by auditor type (incumbent vs. nonincumbent). The cooperative (strategic) solution predicts misreporting only in period one because reciprocal behavior cannot be enforced in period two. Nevertheless, we observe misreporting in both periods across all experimental conditions. Further, misreporting in the second period is only significantly lower than the first period in the two experimental conditions where the investor is a robot: Robot Investor/No Sign-Off ($p = 0.02$) and Robot Investor/Sign-Off ($p < 0.01$) conditions. Given that the cooperative solution only predicts misreporting in period one, we use period one results exclusively for our hypothesis tests.[16]

Hypothesis Tests

Participants were informed that they would be randomly reassigned each year (two periods) to a new audit market of four verifiers, four sellers, and two buyers. Participants were quizzed on this experimental design feature prior to participating in the competitive audit markets. This random reassignment each year is a departure from previous experimental research using Magee and Tseng's (1990) model, and was chosen in order to reduce the serial correlation observed in prior experimental audit market studies (i.e., Calegari et al. 1998; Schatzberg et al. 2005). Nevertheless, we submit our results to alternative data screens, collinearity diagnostics, and alternative specifications of the model, and our results are robust to these sensitivity tests. Thus, we are confident that randomly rotating the market groups each year affectively addressed the potential for serial correlation in our period one results across time.

Table 3 presents the results of two logistic regression models of auditor misreporting in period one.[17] Model 1 regresses the Misreport dependent variable on the two manipulated variables and their interaction: Investor Salience, Sign-Off, and Sign-Off × Investor Salience. Model 2 adds the two measures of social norm sensitivity from the JPI-R, Traditional Values (TV) and Responsibility (RES)

[15] All participants responded to all manipulation check questions to provide assurance that all market participants understood the setting. Including the responses to these questions from only the verifiers does not change our conclusion that the manipulations were successful.

[16] In addition to the strong theoretical motivation for focusing on misreporting behavior in period one, misreporting in period two is strongly correlated with misreporting in period one because the market group stays the same across the two periods. When both periods are averaged together, our results are generally consistent with our reported results for period one but weaker.

[17] The results reported in Table 3 are inferentially identical if we analyze our dependent variable as a continuous variable.

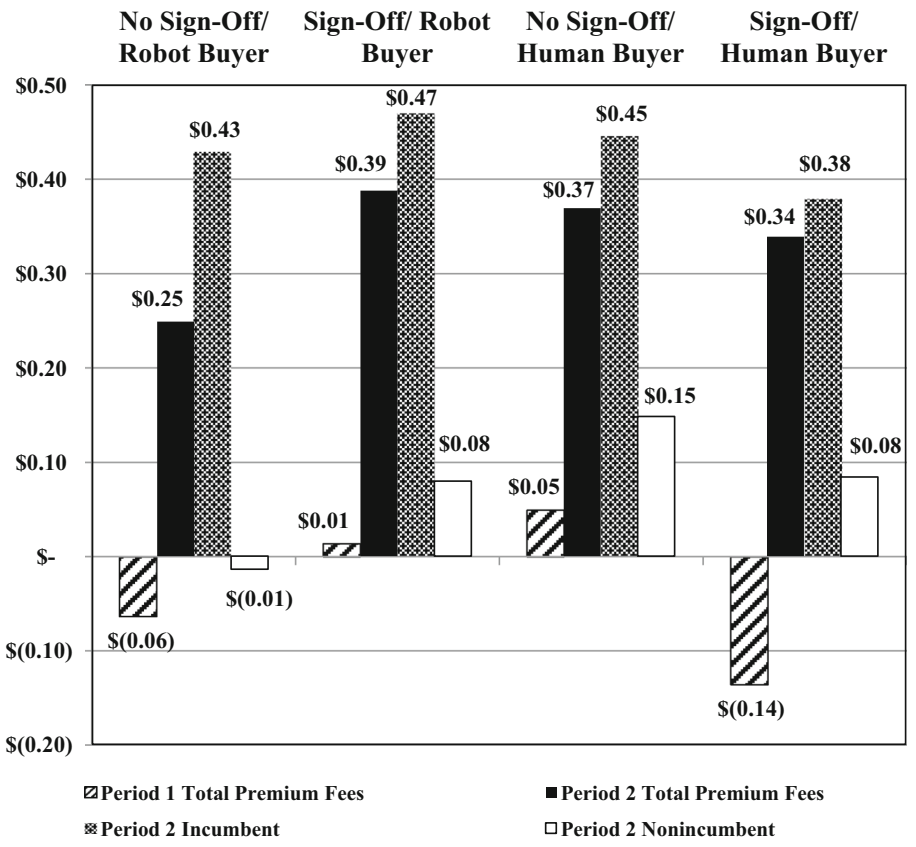

Fig. 1 Accepted fees across experimental conditions: The premium fees for winning bids in periods 1 and 2 by auditor type. Premium fees are based on the auditor's actual fixed cost. In period 1 all auditors are nonincumbents and their fixed cost is $2.00. Accordingly, actual premium fees are calculated as the auditor's actual winning bid less $2.00. In period 2, auditors could be rehired (incumbent) by the same manager or be newly hired (nonincumbent) by a manager. The actual fixed costs for auditors in period 2 are $1.60 for incumbents and $2.00 for nonincumbents. Premium fees are calculated as the auditor's actual winning bid less the actual fixed cost of $1.60 and $2.00 for incumbents and nonincumbents, respectively

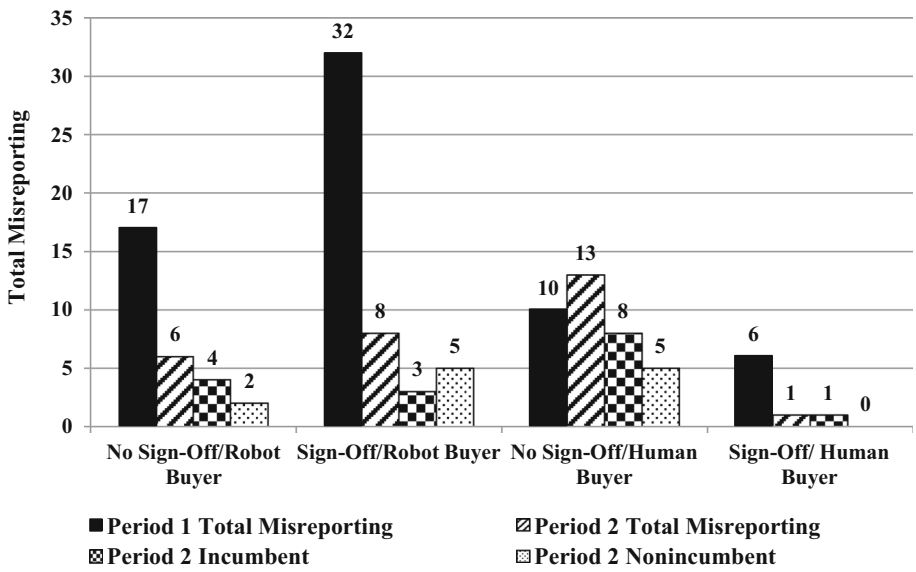

Fig. 2 Total misreporting across experimental conditions: The total misreporting across experimental conditions in period and two by auditor type. Period two is also categorized by auditor type (incumbent versus nonincumbent). The Nash equilibrium reporting strategy is to truthfully report in all periods for all auditors

and the other five two-way interactions: Investor Salience × TV, Investor Salience × RES, Sign-Off × TV, Sign-Off × RES, TV × RES. We also include the Audit Fee variable in order to directly examine cooperative behavior between the auditor and the manager in period one. The negative intercept in both models indicates that the likelihood of misreporting is less than 50%. In fact, misreporting in period one ranges from 23% in the Robot Investor/Sign-Off condition to less than 4% in the Human Investor/Sign-Off condition. Thus, underreporting essentially disappears when the investor is another participant and auditors are required to sign-off on the audit report. In both regression models, the coefficient on Investor Salience is negative and highly significant ($p < 0.01$). Also, the

Table 3 Logistic regression models of auditor misreporting in period one[f]

Model 1: Misreport = $\alpha_0 + \beta_1$Investor Salience + β_2Sign-Off + β_3Sign-Off × Investor Salience + ε

Model 2: Misreport = $\alpha_0 + \beta_1$Investor Salience + β_2Sign-Off + β_3Sign-Off × Investor Salience + β_4Traditional Values + β_5Responsibility + β_6Investor Salience × TV + β_7Investor Salience × RES + β_8Sign-Off × TV + β_9Sign-Off × RES + β_{10}TV × RES + β_{11}Audit Fee + ε

	Predicted	Model 1	Model 2
Intercept		−2.296***	−4.123***
Investor Salience[a] (H1)	−	−1.391***	−4.739***
Sign-Off[b]		0.068	−3.332***
Sign-Off × Investor Salience (H2)	−	−1.157*	−6.367***
Traditional Values[c]			−0.329***
Responsibility[d]			−0.744***
Investor Salience × TV (H3)	−		−0.168
Investor Salience × RES (H4)	−		−0.461***
Sign-Off × TV (H3)	−		−0.279**
Sign-Off × RES (H4)	−		−1.090***
TV × RES			−0.032
Audit Fee[e]	+		0.016***
Nagelkerke R^2		.102	.426

The results of logistic regression models in which Misreport is regressed on Sign-Off, Investor Salience, Traditional Values, Responsibility, Audit Fee, and interactions of the independent variables in the first period

[a] Investor Salience: Coded as 1 if buyers in the market were human and 0 if the buyers were robots

[b] Sign-Off: Coded as 1 if the auditor participants were required to type in their name as part of the verification reporting process and 0 otherwise

[c] Traditional Values: The degree to which an individual incorporates old values, such as honesty, frugality, modesty, respect for authority, and patriotism; measured by the Traditional Values scale of the JPI-R questionnaire, which ranges from 0 to 20

[d] Responsibility: Overall sensitivity to moral obligations to other people and to society at large measured by the Responsibility scale of the JPI-R, which ranges from 0 to 20

[e] Audit Fee: Accepted audit fee bid

[f] Misreport: Is a dichotomous variable, 1 if the auditor misreports and zero otherwise

***, **, * Denote two-tailed significance at the 0.01, 0.05, and 0.10 levels, respectively

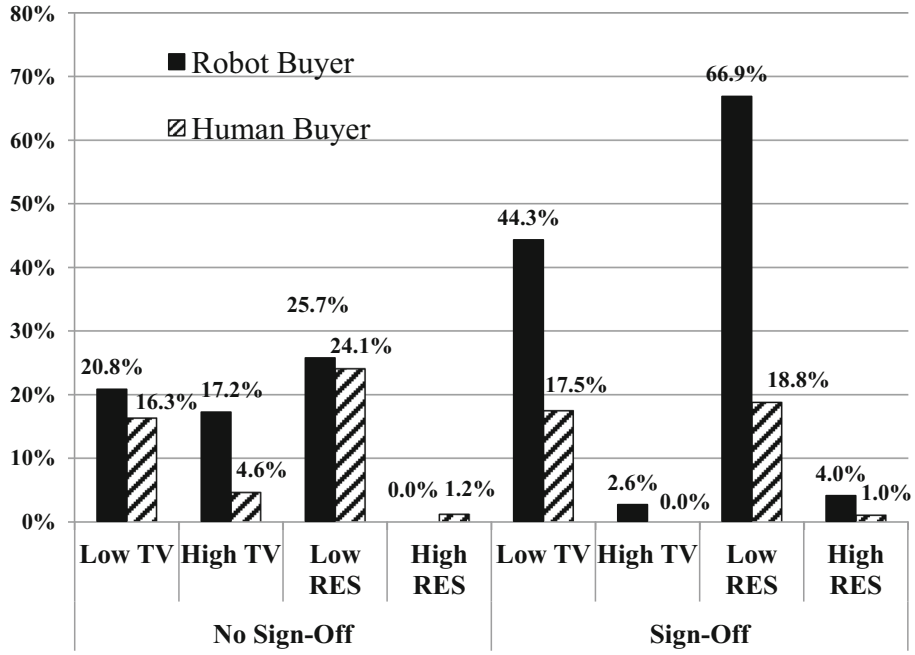

Fig. 3 Average misreporting in period one across experimental conditions based on JPI-R scores: The average misreporting in period one across experimental conditions based on high and low traditional values and responsibility scores. High and low levels were based on a median split of participant scores for traditional values (TV) and responsibility (RES) measures of the JPI-R TV: The degree to which an individual incorporates old values, such as honesty, frugality, modesty, respect for authority, and patriotism; measured by the Traditional Values scale of JPI-R questionnaire, which ranges from 0 to 20. RES: Overall sensitivity to moral obligations to other people and to society at large measured by the Responsibility scale of JPI-R, which ranges from 0 to 20

coefficient on the Sign-Off × Investor Salience interaction is negative in both models and significant at the 10% level in model one ($p < 0.10$) and the 1% level in model two ($p < 0.01$). These results provide strong and consistent support for Hypotheses 1 and 2.

We predict that the ability of investor salience and the sign-off requirement to reduce auditor misreporting will be greater for auditors who have social norm sensitivity for honesty (Hypothesis 3) and responsibility (Hypothesis 4), respectively. To test these predictions, we examine the interactive effects between our two manipulated variables and our two measures of social norm sensitivity. When Traditional Values (TV) and Responsibility (RES) are added in Model 2, the coefficient on both variables is negative and highly significant ($p < 0.01$). Thus, sensitivity for honesty and responsibility norms in general reduced misreporting behavior in auditors. Although the coefficient on the Investor Salience × TV interaction is not significant, the coefficient on the Sign-Off × TV interest is significantly negative ($p < 0.05$). This provides some support for Hypothesis 3. Also, the coefficient on both the Investor Salience × RES and the Sign-Off × RES interactions are negative and highly significant ($p < 0.01$). This provides strong and consistent evidence for Hypothesis 4. As expected, the coefficient on Audit Fee is positive and highly significant ($p < 0.01$) in Model 2. This last result provides direct evidence of cooperative behavior between the auditor and manager in period one.

Figure 3 provides a graphical depiction of misreporting in period one across experimental conditions based on JPI-R scores. This depiction is based on a median split of participants into high and low groups for both Traditional Values and Responsibility scales and the average misreporting for each group.[18] This figure demonstrates that the ability of investor salience or the sign-off requirement to reduce misreporting is significantly greater with high levels of sensitivity to honesty and responsibility norms. This provides further evidence that sensitivity to social norms increased the potential for our manipulated variables to reduce misreporting, consistent with Hypothesis 3 and Hypothesis 4. These results provide strong support for the social norm theory behind our hypotheses.

Based on intuition in Bicchieri (2006), Blay et al. (2017) argue that the difference between a social norm and a moral norm is our attitude toward it, and that moral norms are social norms that come with strong normative

[18] We observe quantitatively similar results if we categorize high and low participants based on ± one standard deviation above the mean rather than using a median split. We also observe similar results if we examine the proportion of auditors who chose to misreport rather than the average misreporting.

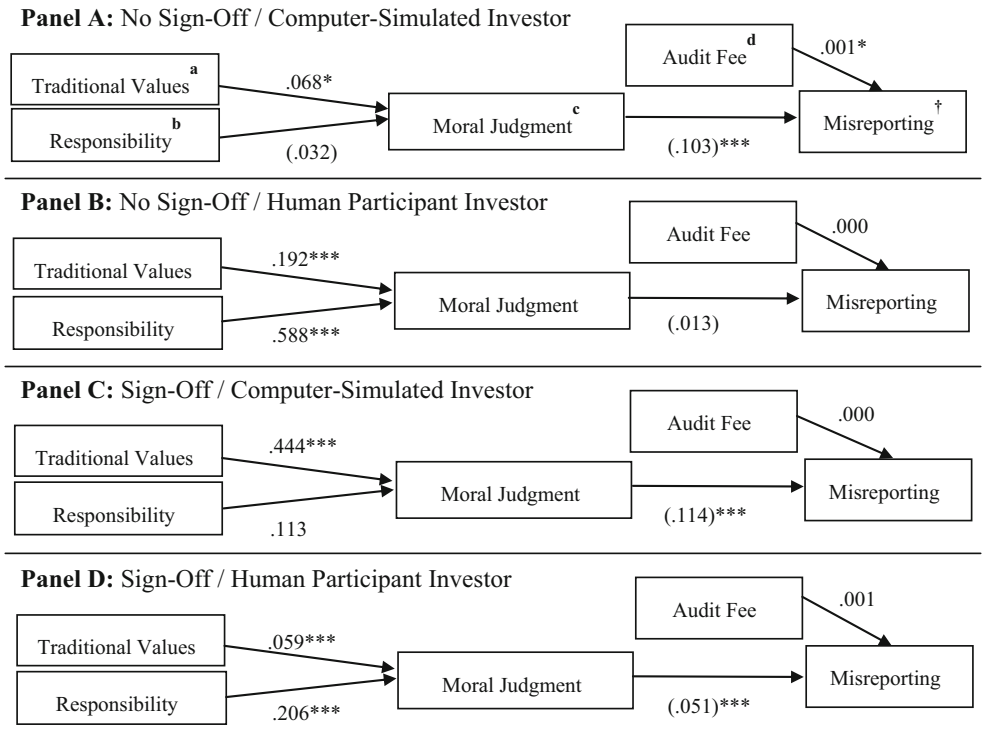

Fig. 4 Process analysis: The standardized regression coefficients for a path analysis used to examine the determinants of moral judgments and the subsequent influence on misreporting decisions. We use a structural equation model to estimate the influence of Traditional Values and Responsibility on Moral Judgment and, in turn, Moral Judgment's influence on Misreporting, while controlling for the audit fee bid for each experimental condition. Parentheses are used to denote a negative relationship. † Misreporting: Dichotomous variable; 1 if the auditor misreported and 0 otherwise. [a]Traditional values: the degree to which an individual incorporates old values, such as honesty, frugality, modesty, respect for authority, and patriotism; measured by the Traditional Values scale of the JPI-R questionnaire, which ranges from 0 to 20. [b]Responsibility: overall sensitivity to moral obligations to other people and to society at large measured by the Responsibility scale of JPI-R, which ranges from 0 to 20. [c]Moral judgment: the average response to the following two statements in the exit questionnaire: "It would have been unethical for a verifier to misreport the value of the asset in a given market period." "It would have been unethical for a seller to rehire a verifier in market period two who they knew had misreported in market period one." The response for each statement ranges from 1 = strongly disagree to 7 = strongly agree (4 = neutral). [d]Audit fee: accepted audit fee bid. ***, **, * Denote two-tailed significance at the 0.01, 0.05, and 0.10 levels, respectively

expectations. To directly examine the relation between social norm sensitivity and moral reasoning, we conduct a path analysis (Kline 1998). This analysis tests whether our measures of social norm sensitivity (Traditional Values and Responsibility) parsimoniously predict moral judgments regarding auditor misreporting and subsequent misreporting behavior while controlling for audit fees. Figure 4 presents the results of this path analysis by experimental condition. Since the decision to misreport represented cooperative behavior between the auditor and the seller to act against the investor, our measure of moral judgment is the average response to two statements on the exit questionnaire—one to capture the moral judgment that misreporting by the auditor (verifier) was unethical and one to capture the moral judgment that rehiring an auditor (verifier) who had misreported in period one was unethical.

The path analysis in Fig. 4 suggests that the JPI-R personality measures we use to capture social norm sensitivity are reliable predictors of moral reasoning potential, consistent with Stevens (2002) and Hobson et al. (2011). Traditional Values is positively associated with Moral Judgment in all four experimental conditions, although only weakly in the control condition: No Sign-Off/Computer-Simulated Investor (Panel A). Intuitively, Responsibility is only positively associated with Moral Judgment in the two experimental conditions where the investor was another participant in the experiment: No Sign-Off/Human Participant Investor and Sign-Off/Human Participant Investor (Panels B and D). The strongest results, however, occur in the setting where we expect social norm activation and behavior to be the strongest: the Sign-Off/Human Participant Investor experimental condition (Panel D). Here we find a strong positive association between our two measures of social norm sensitivity and Moral Judgment, and a strong negative association between that Moral Judgment and Misreporting. These results

support our underlying theory based on Bicchieri's (2006) model of social norm activation. These results also support arguments in Blay et al. (2017) that measures of social norm sensitivity can be used to capture moral reasoning potential in place of the DIT.

Seller Behavior

Consistent with Calegari et al. (1998) and Schatzberg et al. (2005), auditor misreporting in our experimental audit market was a rational, strategic response to the seller offering an abnormally high audit fee. That is, the relatively low misreporting penalty motivated the seller to offer an abnormally high audit fee (high enough to cover the misreporting penalty) to signal an expectation of misreporting to the auditor. Bicchieri's (2006) model suggests that sellers with strong normative expectations for honesty or responsibility may be motivated to offer nonpremium audit fees to the auditor or even punish auditors who misreport in period one by not selecting them in period two. This has implications for Schatzberg et al.'s anomalous results. Recall that Schatzberg et al. grouped experimental audit markets by low- and high-DIT participants. If the DIT captures primarily relativistic values (Ponemon 1993; Fisher and Sweeney 1998; Blay et al. 2017), grouping high-DIT sellers and auditors together would be expected to magnify strategic behavior characterized by premium audit fees and auditor misreporting. Schatzberg et al.'s decision to keep seller–auditor pairs together *throughout* the experiment would also magnify this strategic behavior, further driving their result.

Given the potential for social norm sensitivity to affect the fee selection, hiring, and retention choices of the seller, we examine factors that may have affected seller behavior. In untabulated results, we find that none of our manipulations or measures of social norm sensitivity in the seller are significant with regard to premium audit fee selection and retention decisions. In particular, sellers did not punish auditors who misreported in period one by not selecting them in period two. Incumbency rates after an auditor had misreported (77.3%) did not differ significantly from overall incumbency rates (75.4%). Similarly, after controlling for other factors we do not find that accepted premium audit fees were statistically significantly different between experimental conditions. Overall, fee selection, hiring, and retention behavior by the seller were driven predominately by strategic considerations in our experimental audit market. Our choice to rotate seller–auditor pairs after each year (two trading periods) may have contributed to this result as punishing the auditor for misreporting had limited economic consequences.

Conclusion

Schatzberg et al. (2005) argue that auditors may be less inclined to violate independence if they have the moral courage to satisfy their public interest obligations to third-party investors. In an experimental audit market, however, Schatzberg et al. find that auditors and managers who score high on the DIT measure of moral reasoning violate independence more, not less. Blay et al. (2017) recommend that researchers use social norm theory to develop stronger tests of moral reasoning in the market for auditing services. In this study, we use the experimental audit market setting in Schatzberg et al. and manipulate factors expected to activate honesty and responsibility norms in the auditor. We find that auditor misreporting is reduced when the investor is another participant in the experiment rather than computer simulated, and thus the interests of third-party investors are salient to the auditor. We also find that auditor misreporting is reduced when the auditor is required to sign-off on the audit report, but only when the investor is another participant in the experiment. Consistent with our underlying theory, we find that pre-experimental measures of sensitivity to honesty and responsibility norms help explain the effects of our manipulated variables. Finally, we find that these measures of social norm sensitivity are associated with the moral judgment that auditor misreporting is unethical.

This study provides useful theory and empirical evidence for the auditing literature. Blay et al. (2017) recommend that researchers use measures of moral reasoning capacity based on social norm sensitivity and investigate alternative social norms that might be activated in an auditing setting. Further, they recommend that researchers vary aspects of the audit environment that may differentially activate such social norms. By demonstrating that a sign-off requirement reduces independence impairment only when the concerns of the investor are salient, and that this affect is driven by the activation of social norms for honesty and responsibility, this study answers the call in Blay et al. for empirical researchers to use social norm theory to develop stronger tests of moral reasoning in the market for auditing services. By using the experimental audit market in Schatzberg et al., our results also help explain their anomalous result that auditors and managers who score high on the "defining issues test" (DIT) violate independence more, not less. We find that their result is not robust to measures of moral reasoning capacity based on social norm sensitivity rather than the DIT. Given that the moral reasoning of auditors is based on laws as well as professional and social norms, we believe that our measure of moral reasoning capacity is a more appropriate measure in the market for audit services.

This study also provides useful theory and empirical evidence for the business ethics literature. Jones et al. (2003) conclude that further experimental research is needed to understand individual and contextual factors on auditors' moral (ethical) judgment. They also conclude that further research is needed to understand individual and contextual factors on moral (ethical) action/behavior. Our study contributes to this literature by examining individual and contextual factors on auditors' moral judgment regarding misreporting and the effect of such moral judgment on misreporting behavior. Finally, our study demonstrates that social norm sensitivity for honesty and responsibility can be used to capture an individual's potential for moral reasoning in auditing. Thus, our study identifies honesty and responsibility as two primary norms in the auditing profession, which is similar to the medical profession (Bosk 1979; Miles 2016). Further research appears warranted regarding the importance of social norms in business professions and their role in moral reasoning.

To the extent that our highly controlled audit market captures important aspects of the actual market for audit services, we believe that our results also provide useful insights for policy makers such as the PCAOB (King et al. 2012). For example, our finding that increasing the salience of the investor reduces auditor misreporting provides strong impetus to regulators to focus on increasing the ties between auditors and third-party investors to increase auditor independence and audit quality. Recent regulations—such as auditor rotation, reducing the provision of nonaudit services, and cooling-off periods—focus on reducing the ties between auditors and their clients. None of these regulations increases the ties between auditors and investors, which our research suggests may be a key to increasing auditor independence and audit quality. Our finding that an auditor sign-off requirement is only effective at reducing auditor misreporting when the third-party investor is salient indicates that reducing boundaries between the auditor and investors may be as important as increasing boundaries between the auditor and client managers.

Given our results, future experimental research should further investigate the role of investor salience on auditor reporting. For example, are other regulations designed to increase auditor independence (e.g., auditor rotation) effective when investor salience is low, and would an increase in investor salience improve the effectiveness of these regulations? In our audit markets, managers could only choose auditors for up to two periods prior to market rotations. The ability to build longer-term relationships and reputations could have a significant influence on the market outcomes we document. Also, markets where investors are active rather than passive participants could be studied. In our markets, as well as in prior experimental market research on auditor judgments (e.g., Calegari et al. 1998; Schatzberg et al. 2005), investors do not play an active role. Whether the ability of an investor to strategically influence the market outcome would influence auditor misreporting is an empirical question that warrants further investigation.

Although the sign-off requirement involved having auditor participants type their name into the computer, the name of the participant was not disclosed to other participants so as to maintain anonymity and to isolate moral reasoning effects. Whether disclosure of an auditor's name would induce further reductions in auditor misreporting is an empirical issue that should be addressed in future research. There are other potential benefits of a sign-off requirement that can be studied both experimentally and archivally, such as investor judgments of financial statement credibility and the willingness to rely on financial statements with and without the auditor sign-off. Our sign-off results, combined with the experimental finding in Davidson and Stevens (2013) that signing off on a code of ethics improves manager behavior and investor confidence, suggest that sign-off requirements can be an effective form of corporate governance. We find Bicchieri's (2006) model of social norm activation a useful theoretical framework to predict such sign-off effects.

The results and implications of this study are subject to the normal caveats associated with experimental research. In particular, this experimental study contains a stark audit market setting that is designed to provide a strong test of relevant theory. Although this setting incorporates important features of audit markets as captured by the model in Magee and Tseng (1990), it still abstracts significantly from audit settings in practice. To the extent that our experimental design captures important aspects of these settings and our underlying theory, however, we believe that our results provide useful insights that may generalize to such settings. We also gave participants portions of the JPI-R at the beginning of the experiment to solicit measures of social norm sensitivity. Although prior experimental studies have used this method of soliciting social norm sensitivity (Stevens 2002; Hobson et al. 2011), this may have primed the participants and affected their decision-making behavior during the experiment.

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audit market setting in Schatzberg et al. (2005). The experimental audit markets reported here were conducted at the experimental lab at FSU and funded by a research grant from the FSU Department of Accounting. Lastly, we would like to thank Philip Brookins for helping us program and administer the experimental sessions.

Funding The experimental audit markets reported here were funded by the Department of Accounting at the academic institution where the experiments were conducted.

Compliance with Ethical Standards

Conflict of interest Allen Blay declares that he has no conflict of interest. Eric Gooden declares that he has no conflict of interest. Mark Mellon declares that he has no conflict of interest. Douglas Stevens declares that he has no conflict of interest.

Appendix

Experimental Instructions

Combined Instructions—four unique versions used for experiment (computer-simulated investor/no sign-off, computer-simulated investor/sign-off, human participant investor/no sign-off, human participant investor/sign-off)
Version Key:

[Bold in Brackets]—only contained in computer-simulated investor condition instructions

Italics—only contained in human participant investor condition instructions

Bold italics—only contained in sign-off condition instructions

(NOTE: The no sign-off condition did not have any unique instructions)

Instructions

Thank you for participating in today's experiment. I will be using this script to ensure that all sessions of this experiment receive the same information. Please read along on your copy and feel free to ask questions as they arise. I ask that you please refrain from talking with other participants or looking at their monitors during the experiment. If you have a question or problem, please raise your hand and one of us will come to assist you. We will begin by having you complete a questionnaire comprised of 80 statements. Respond "TRUE" to a given statement if it describes you or your beliefs, and respond "FALSE" otherwise. Answer as accurately and honestly as you can. Your first inclination, however, is usually the correct one. It should only take you about 15 min to complete this 80-statement questionnaire. At the end of the experiment, you will be paid, by check and in private, the sum of your earnings plus $10 for carefully completing this questionnaire and for showing up on time for the experiment today. When you have completed the questionnaire, please wait quietly for further instructions.

[ALLOW APPROXIMATELY 15 MINUTES FOR THE QUESTIONNAIRE]

Thank you for completing the questionnaire. I will now read through the instructions to the experiment. If you follow these instructions carefully, you may be able to significantly add to your $10 payment. As I read these instructions, feel free to ask any questions that may arise. You will take a short quiz over these instructions before we proceed with the experiment.

This experiment considers the economics of decision making and is conducted via a computer program on networked computers. I will first describe the economic setting and the roles in the experiment.

ECONOMIC SETTING AND ROLES IN THE EXPERIMENT

The economic setting in this experiment is an asset market that includes three roles. *You will be randomly assigned the role of seller, verifier, or buyer for the duration of the experiment. You will be assigned to only one of these three roles during the experiment, but it is important for you to understand how each role functions to maximize your earnings.* **[You will be randomly assigned the role of seller or verifier for the duration of the experiment. The role of buyer will be mechanically played by the computer program in this experiment. You will be assigned the role of either a seller or verifier during the experiment, but it is important for you to understand how each role functions to maximize your earnings.]** In each asset market, there are four sellers designated by color (green, orange, yellow, and pink), four verifiers designated by number (1, 2, 3, & 4), and two buyers. Each buyer purchases an asset from two sellers. Buyer 1 buys an asset from the green and orange seller and Buyer 2 buys an asset from the yellow and pink seller**. [Again, Buyer 1 and Buyer 2 will be mechanically played by the computer program in this experiment.]**

Each year consists of two trading periods. At the beginning of each trading period, each of the four sellers is given an asset whose value is unknown. In order to sell and obtain value from the asset, each seller must hire a verifier to perform a verification service. Each of the four verifiers (1–4) submits a price offer to each of the four sellers (green, orange, yellow, and pink) to perform a verification service. A verifier's price offer can vary from seller to seller. Each seller selects one verifier to perform a verification service and pays the selected verifier their price offer. The selected verifier then provides a verification service that determines the price the seller receives from the buyer for the asset.

[PAUSE] Are there any questions regarding the economic setting and roles in the experiment? [ANSWER QUESTIONS] I will now explain the decision-making process each trading period.

DECISION-MAKING PROCESS EACH TRADING PERIOD

Table 1, which has been attached to these instructions, contains a summary of the decision-making process each trading period. Please pay close attention to these instructions, so you will have a better understanding of how to maximize your earnings.

At this time, please turn to Table 1. I will now read through the decision-making process each trading period. As I read, please feel free to ask any questions that may arise.

[READ THROUGH Table 1]

[PAUSE] Are there any questions regarding the decision-making process each trading period? [ANSWER QUESTIONS] I will now explain the payout process for the experiment.

PAYOUT PROCESS

Table 2, which has been attached to these instructions, contains a summary of the payout process for the experiment. At this time, please turn to Table 2. I will now read through the summary of the payout process. As I read, please feel free to ask any questions that may arise.

[READ THROUGH Table 2]

[PAUSE] Are there any questions regarding the payout process for the experiment? [ANSWER QUESTIONS] At the conclusion of trading period 1, trading period 2 will immediately commence. At the end of trading period 2, a new year will commence and both verifiers and sellers will be randomly reassigned numbers (1, 2, 3, and 4) and colors (green, orange, yellow, and pink), respectively. Buyers are paired with the same two seller labels (green, orange, yellow, and pink) throughout the experiment. After an unspecified number of years you will be asked to fill out a post-experimental questionnaire. After everyone has completed the post-experimental questionnaire you will each be paid your cumulative earnings in another room. We will now take a short quiz on the instructions for the experiment. Feel free to reference the instructions and Tables 1 and 2 as you complete this quiz.

QUIZ ON THE EXPERIMENT INSTRUCTIONS:

(1) In this experiment, will the role of seller be played by humans (participants)?
(a) Yes (b) No

(2) In this experiment, will the role of buyer be played by humans (participants)?
(a) Yes (b) No

(3) In this experiment, will the role of verifier be played by humans (participants)?
(a) Yes (b) No

(4) If a selected verifier submits a verification report stating that the value of the asset is $2.68 and the actual value of the asset is $2.68, what is the gain or loss to the buyer?
(a) $1 gain (b) $0 break-even (c) $1 loss

(5) If a selected verifier submits a verification report stating that the value of the asset is $3.68 but the actual value of the asset is $2.68, what is the gain or loss to the buyer?
(a) $1 gain (b) $0 break-even (c) $1 loss

(6) In addition to receiving their offer price, verifiers who are selected by a seller in Period 1 pay $1.60 observation cost, $0.40 initial learning cost, and $0.25 misreporting penalty if they report a value for the asset other than the actual value. What amount does a verifier save in period 2 if the seller who hired them in period 1 hires them again in period 2?
(a) $0.40 (b) $0 (c) $0.30

(7) At what time are both verifiers and sellers randomly reassigned numbers (1, 2, 3, and 4) and colors (green, orange, yellow, and pink), respectively?
(a) At the end of each period (b) At the end of period 2 (each trading year) (c) Verifiers and sellers are not randomly reassigned

[WAIT FOR PARTICIPANTS TO COMPLETE QUIZ]

The experiment will now be conducted via a computer program on networked computers. The computer will first randomly assign you your role for the rest of the experiment. I ask that you please refrain from talking to other participants or looking at their experimental materials or computer screens throughout the experiment. If you have a question or problem during the experiment, please raise your hand and one of us will come and assist you.

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