Are Independent Audit Committee Members Objective? Experimental Evidence

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ABSTRACT: We use experimental markets to examine stock-based compensation’s impact on the objectivity of participants serving as audit committee members. We compare audit committee member reporting objectivity under three regimes: no stock-based compensation, stock-based compensation linked to current shareholders, and stock-based compensation linked to future shareholders. Our experiments show that student participants serving as audit committee members prefer biased reporting when compensated with stock-based compensation. Audit committee members compensated with current stock-based compensation prefer aggressive reporting, and audit committee members compensated with future stock-based compensation prefer overly conservative reporting. We find that audit committee members who do not receive stock-based compensation are the most objective. Our study suggests that stock-based compensation impacts audit committee member preferences for biased reporting, suggesting the need for additional research in this area.

Keywords: audit committee; experimental economics; stock compensation.

Data Availability: The data and instructions from this study are available from the authors upon request.

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I. INTRODUCTION

We use experimental markets to explore whether stock-based compensation affects the objectivity of participants acting as audit committee members (ACMs). We examine ACM objectivity under three specific regimes: no stock-based compensation, stock-based compensation tied to the earnings of current shareholders, and stock-based compensation tied to the earnings of future shareholders. These regimes correspond with common compensation packages observed in practice (e.g., cash, stock options, restricted stock, and unrestricted stock), allowing us to examine the effect of different stock-based incentives on ACM preferences for biased reporting.

Our motivation to examine ACM objectivity arises from three sources. First, the emphasis of the Sarbanes-Oxley Act of 2002 (SOX, U.S. House of Representatives 2002) on the audit committee’s role suggests an increased need for a theory about the impact of ACM incentives on ACM objectivity. SOX requires that audit committees appoint, compensate, and oversee the external auditor (Section 301). It is particularly important to study the impact of stock-based compensation, as the National Association of Corporate Directors (NACD) currently encourages stock-based compensation for directors (Archambeault et al. 2008), and some companies are embracing such schemes to compensate directors. For example, Coca-Cola recently decided to compensate its board of directors, including the audit committee, with only performance-based bonuses. A columnist criticized the new Coca-Cola director compensation program because the program creates incentives for board members to prefer aggressive reporting (Myerson 2006). Our experimental design specifically measures biased ACM reporting in order to explore this criticism.

Second, our experimental setting enables us to directly observe ACM objectivity, and to explore the impact of clearly defined incentive schemes on ACM reporting decisions. Prior archival research focuses on the association between observable ACM or board of director characteristics and proxies for financial reporting quality (Klein 2002; Abbott et al. 2004; Carcello and Neal 2003; DeZoort et al. 2002; Cullinan et al. 2008; Du and Jiang 2007; Archambeault et al. 2008). Our ability to observe objectivity directly provides stronger tests than are possible using archival measures of independence such as inside versus outside directors (Klein 1998, 2002) and proxies for bias such as restatements (Archambeault et al. 2008). Furthermore, the prior archival research does not consider the impact of ACM compensation on audit quality with the notable exception of Archambeault et al. (2008) who document a positive correlation between ACM stock incentives and restatements.

Finally, we extend the work of Mayhew and Pike (2004), who examine how investor selection of auditors impacts auditor objectivity. We modify their design to consider ACM objectivity, extending their research by separately considering how incentives tied to current versus future investors impacts decision-makers’ preferences for biased reporting. Neither archival nor experimental research has separately examined incentives tied to the interest of current and future investors.

We employ three treatments in our experiment. In the Baseline treatment, the ACM receives only cash compensation. The other two treatments include cash compensation plus

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1 Coca-Cola implemented a new incentive plan for board of director members. The board members’ annual $175,000 in equity share units are only payable if the company meets the midpoint of its three-year target for earnings growth; if not, they get nothing (Myerson 2006). This type of compensation creates incentives for biased financial reporting that are very similar to those of management.
contingent compensation that parallels stock-based incentives. In the second treatment (i.e., Current treatment), the ACM receives a bonus based upon the current investors’ gains from selling their assets. Essentially, we link the ACM’s incentives to current shareholders in a manner similar to owning unrestricted stock or vested stock options that can be sold immediately. In the third treatment (i.e., Future treatment), the ACM receives a bonus based upon future investors’ gains from purchasing assets for less than their fundamental value, which is analogous to owning unvested stock options or restricted stock.

We observe the highest objectivity levels when ACMs receive no stock-based compensation. This result differs from prior research where participants in similar roles tend to bias reports toward the party that hires them (Mayhew et al. 2001; Mayhew and Pike 2004). ACMs do not bias reports toward current investors in the Baseline treatment. In contrast, when we tie ACM compensation to the earnings of current or future investors, the ACMs bias their reports. Specifically, when ACM earnings are tied to current investors’ earnings, they aggressively bias reports in an apparent attempt to increase selling prices and the resulting earnings of current investors. In a similar sense, when we link ACMs’ compensation to future investors’ earnings, ACMs conservatively bias their reports to reduce selling prices that potentially increases the future investors’ earnings at the expense of current investors. Subsequent analysis suggests current investors try to counteract the ACMs’ bias toward future investors by hiring ACMs who agree with their reports more often in the Future treatment. It appears that ACM compensation that is not contingent on current or future shareholder returns leads to the highest level of ACM objectivity. This result appears to contrast with the prescriptions for effective monitoring under agency theory that call for linking the monitors’ incentives with shareholders.

This research makes three important contributions. First, we aid ACM theory development, providing evidence that suggests stock-based compensation can impact ACM objectivity. Second, we provide evidence consistent with parallel archival research (Archambeault et al. 2008) that finds ACM stock options are associated with restatements. This triangulation strengthens the theoretical basis for questioning the impact of stock-based compensation on ACM objectivity. We show this not only applies to compensation tied to current investors like vested stock options, but also to compensation tied to future investors like restricted stock. Compensation tied to current investors leads to more aggressive reporting preferences and compensation tied to future investors results in more conservative reporting preferences. Third, we extend the existing experimental literature on biased reporting. Mayhew and Pike (2004) find that auditors hired by future investors are more objective than when hired by management. Their research suggests tying reporting responsibilities more closely to investors enhances objective reporting. The current paper shows that audit committee members are less objective when their compensation is linked to the returns of either current or future investors.

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2 In half the sessions across all three treatments, the cash compensation is based upon competitive bidding by ACMs for the right to serve current investors. Based on comments during the review process, in the other half of the sessions the ACMs receive fixed cash compensation. This difference in the determination of cash compensation does not affect the results. We describe the difference in more detail in the experimental design section.

3 We assume that current shareholders prefer good news now, as delayed announcement means some will sell their stock to future investors who will reap the benefits of the stock price (asset value) increase in response to the good news. While restricted stock and options will also increase in value given current good news, holders of restricted stock or unvested options cannot capture the increase immediately. We expect they will have a slight preference for delaying good news until the restriction lapses or the options vest.
In the next section, we outline the background and motivation, followed by a section describing the experimental design and explaining how our design choices capture the key constructs of interest. We then present and discuss the results of the experiment followed by the conclusion.

II. BACKGROUND AND MOTIVATION

In a 1998 speech, the then Chair of the Securities and Exchange Commission (SEC) Arthur Levitt stated, “qualified, committed, independent and tough-minded audit committees represent the most reliable guardians of the public interest” (Levitt 1998). In this same vein, Johnstone et al. (2001) claim, “ Appropriately functioning boards of directors and audit committees should provide a neutral, well-informed buffer between auditors and management.” Both statements implicitly express the idea that an independent audit committee can help external auditors remain independent and enhance the probability of objective financial reporting.

The Sarbanes-Oxley Act incorporates the above logic by placing responsibility for appointing, compensating, and overseeing the auditor on the audit committee’s shoulders (Section 301). Proponents of the law argue that auditors cannot be independent from management if they are hired and fired by management (Bazerman et al. 1997). Consistent with this view, prior experimental research suggests that auditor independence is sensitive to whether investors or managers hire the auditor (Mayhew and Pike 2004). However, there has been relatively little theoretical attention to ACM objectivity.

A theory of ACM objectivity is nontrivial. There appears to be a logical inconsistency between what is considered optimal to maintain auditor independence and what is considered optimal for the audit committee that oversees the auditor. Professional standards ban auditors from owning stock in the companies they audit to preserve their independence (AICPA 2007). Some theorists also suggest that directors, including ACMs, should hold stock in the companies they oversee to align their incentives with shareholders (Fama and Jensen, 1983; Williamson 1984; Monks and Minow 2001). However, given the logic for auditors not owning stock, it seems rational to apply the same logic to the ACM. If owning stock can bias the auditor and management, it seems reasonable to infer that it can also bias an ACM.

The inconsistency arises because ACMs have potentially conflicting responsibilities. As members of the board of directors, ACMs oversee (1) the broad direction, strategy, and operation of the corporation, as well as (2) its compliance with laws, regulations, and standards, including financial reporting. The incentives that optimize one responsibility can conflict with incentives that optimize the other responsibility. The current study employs an experimental setting that focuses on ACM objectivity in monitoring reporting, toward

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4 We assume in our experiments that the ACM has sufficient influence over the auditors to affect financial reporting. SOX specifies that the auditor report to the audit committee all critical accounting policies, all alternative accounting principles discussions between the auditor and management, and all written communications between management and the auditor (SOX 2002, section 204). The Act’s requirements clearly provide opportunity for the audit committee to significantly influence both financial reporting and the audit. As a result, we do not model the auditor separately from the ACM in our research design.

5 Mayhew and Pike (2004) looked at the objectivity of the auditor when they were hired by management versus hired by investors. That paper took managerial preferences for biased reporting as given and was silent as to investor preferences. This paper looks at the preferences of investor representatives (independent audit committees who now explicitly have responsibility to hire and fire auditors) under various types of compensation.
the end of establishing empirical regularities to assist theorists in developing a more complete theory of ACM objectivity.\(^6\)

Given the reinstated emphasis on audit committee responsibility for managing the audit, we believe research that assesses the impact of different incentive schemes on ACM objectivity is needed. We examine whether differences in ACM compensation create preferences for objective, unbiased financial reporting. Like managers, ACM compensation typically consists of two forms of compensation: direct cash compensation and stock-based compensation.

ACM compensation can affect financial reporting preferences, and those preferences can influence the audit.\(^7\) Direct cash compensation does not create direct incentives to prefer biased reporting. However, it can have an indirect effect if audit committee members under fixed compensation contracts believe that future appointments to the audit committee depend on biased financial reporting. It is less clear whether stock-based compensation leads to a preference for biased reporting. Some studies suggest that providing stock-based compensation to board members improves the firm’s performance (Fich and Shivdasani 2005). However, stock-based compensation also has the potential to bias ACM preferences in the same way that stock-based compensation provides incentives for managers to report biased information. For example, Byard and Li (2005) find that boards of directors compensated with higher levels of stock options are less likely to constrain managers’ opportunistic timing of news around stock-option grant dates.

III. EXPERIMENTAL DESIGN

Our study expands upon Mayhew and Pike’s (2004) experimental design. Unlike Mayhew and Pike, who focus on auditor decisions, we treat the auditor as a fixed (but imperfect) technology. Our design focuses on observation and measurement of the individual ACM’s preference for biased reporting. We intentionally focus on preferences for biased reporting and omit decisions related to overseeing management’s operating and investing decisions.\(^8\) Our design captures the essence of the ACM’s decision process with respect to the objectivity of financial reporting (Swieringa and Weick 1982).\(^9\) The use of markets similar to those studied in prior research (e.g., Dopuch et al. 1989; Mayhew 2001; Mayhew et al. 2001; Mayhew and Pike 2004) strengthens our inferences.

Our design incorporates four key strengths that facilitate building a better understanding of ACM objectivity. First, we employ multiple player types (i.e., ACMs, current investors, and future investors) who strategically interact in the experiment. Analytical approaches are

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\(^6\) We do not explore the potential gains that might arise from more competence in overseeing management to obtain greater long-term profitability. Klein (1998) provides evidence that insider directors who are generally considered less independent are associated with better firm performance when they are included on the BOD’s investment and finance committees. Future research can consider the joint responsibility for overseeing financial reporting and overseeing operating performance.

\(^7\) Bhagat et al. (1999) find, in a study of the S&P 500, the S&P Mid-Cap 400, and the S&P Small-Cap 600 that the majority of companies paid both base cash compensation and per meeting/committee fees. The mean amount in 1996 was $18,300 base and $1,000 per meeting. Many also offered equity compensation. Mean annual share grants in 1996 were 120 shares per director, but mean option grants were 2,220 per director. Williams (2005) finds, in a smaller sample of 200 S&P firms and 114 smaller firms, that 96 percent used stock or stock options to compensate their directors, and that the audit committee members were the most highly compensated.

\(^8\) As members of the board of directors, ACMs in practice need to monitor both financial reporting and operations and investment. These two jobs may not always be compatible. In fact, some European countries require dual boards: one that oversees compliance and one that oversees operations and investment. There have been calls for adopting the two-board model in this country (Abdel-khalik 2002).

\(^9\) Our experiment can be criticized for not fully capturing the decision context. But, it is important to note that our goal is to observe whether the fundamental incentives linking the ACM compensation via stock-based incentives creates an incentive to prefer biased reports.
generally unable to provide unique solutions to such complex settings. Our experiment enables us to document empirical regularities from these complex interactions that can facilitate theory building. Second, we directly observe ACM objectivity violations. Archival work must employ noisy proxies to infer ACM objectivity violations. Moreover, the proxies employed, such as discretionary accruals and restatements, are the joint product of managers, auditors, and ACMs such that it is difficult to assign responsibility for the observed outcomes. Third, we employ a multiple period experiment to allow for participant learning and market dynamics to form. Finally, we manipulate stock-based incentives to separately consider linkages to current and future shareholder returns. Such comparisons are difficult in archival settings in which it can be difficult to identify and measure the ACM’s stock-based incentives.

We conduct two multiperiod markets in each session and six independent sessions within each treatment. Participants are paid for both markets, but we only use the second market in our analyses, although the first market leads to the similar inferences. The first market enables participants to fully learn the setting. The Baseline treatment follows the sequence outlined below for each period. Each step includes a brief explanation of the experimental purpose in italics. We tell participants the market will last 20 periods with certainty, with a 20 percent chance that any subsequent period will be the last period, but that the end period was determined prior to the experiment. We randomly select and pre-sequence the end period using the probabilities described, in a manner similar to King (1996). The audit committee in our study is a single individual decision-maker. We discuss this decision’s implications in the results section.

1. Three individual ACMs submit prices to each of three current investors (i.e., Sellers) for serving as that investor’s audit committee. An ACM can serve more than one current investor each period. ACMs bid from 0 to 1,000 and can bid differently across investors.¹⁰ We revise this step in independent sessions 4, 5, and 6 of each treatment. In sessions 4–6, the ACM is paid a fixed fee of 60 when selected by a current investor. An ACM who is not selected receives 10. Multiple bids to each current investor create competition among potential members in both compensation and quality. The payment to members not selected creates controlled opportunity costs and the resulting potential for participants to earn accounting profits (Mayhew and Pike 2004). We believe bidding for the committee position is a reasonable, although not exact, interpretation of how audit committee members obtain their positions. The fixed fees used in sessions 4–6 map directly to a posted offer market where firms offer audit committee positions to individuals. In the experiment, the ACM’s reputation based on past objectivity represents a measure of quality that can influence the current investor’s hiring decision.¹¹

2. Each of the current investors owns the result of a costly production process that they sell to future investors (i.e., buyers). The process produces an asset with a value of 1,000 50 percent of the time, and a value of 400 the other 50 percent of the time at a cost of 120. In Mayhew and Pike (2004), a manager makes an

¹⁰ The currency of trade in the markets is experimental dollars, which we convert directly to U.S. dollars at experiment end. We report all amounts in the paper in experimental dollars.

¹¹ We acknowledge that individuals do not necessarily bid to become ACMs. Technically, shareholders elect directors, but directors often run unopposed, suggesting the firms essentially select and compensate directors. Based on our own review of proxy statements, it appears that companies do not pay board members differentially unless the members serve on important committees such as the audit committee. To address potential criticism about bidding for the ACM position, we implemented sessions 4–6 where ACMs are selected and paid a fixed fee rather than bid for jobs.
investment decision at this step. We are modeling this player as a current investor who does not control the investment decision, but may have preferences about the report value. The uncertain return to investment creates risk and information asymmetry among participants.

3. Each current investor selects an ACM. Each current investor can hire any one (and only one) of the available ACMs, and there is no switching fee for changing from the prior period’s choice. An ACM can serve more than one current investor. The current investor discloses the asset’s value as 1,000 to the four future investors. All asset values are reported as 1,000 based on the assumption that current investors always have at least a weak preference to report the value as high as possible. By misrepresenting low values as high, we create a role for ACM to monitor the information supplied to the market.

4. ACMs incur a cost of 40 for reviewing the audit results. The robot auditor reports High (e.g., 1,000) or Low (e.g., 400) to the ACM. The auditor’s report is correct (wrong) 80 percent (20 percent) of the time for each asset. This cost proxies for the marginal effort necessary to oversee the auditor and expected litigation exposure. The probability that the information received by the ACM is correct provides a proxy for audit risks and accounting uncertainty.\textsuperscript{12}

5. Each selected ACM determines the report the robot auditor will issue. The report either agrees or disagrees with the current investor’s 1,000 disclosure. We assume that an ACM, in monitoring the auditor, can influence the report’s objectivity. Mayhew and Pike (2004) show the auditor often biases his report toward the preference of the party that hires him. The ACM’s report choice proxies for the ACM’s influence on the auditor, as well the possibility of opinion shopping. This decision creates our observation of the ACM’s objectivity.

6. All potential future investors simultaneously receive the following information for each asset: the disclosure (always 1,000), identification of the ACM serving that current investor, whether the audit report agrees or disagrees with the disclosure, and the fee paid to the committee member. The future investors can use this information to develop a bid for the asset. The ACMs identification number enables the ACM to form a reputation for objective reports with the pool of potential future investors.

7. Each potential future investor bids for each current investor’s asset in a first-price sealed-bid auction. Potential future investors bid from 0 to 1,000 and can bid differently across the three current investor assets sold each period. Winning bidders earn the difference between their bid and the asset’s actual value. For each period, potential future investors who do not purchase any assets earn 40. We use the first-price auction for simplicity. It approximates a demand-revealing auction due to the number of bidders (4) and the common value of the asset. The payment of 40 to potential future investors who do not purchase assets creates controlled opportunity costs and the resulting potential for participants to earn accounting profits. The potential future investors’ bids provide information about the credibility supplied by the ACM.

\textsuperscript{12} In our research design, we base accounting uncertainty on both the inherent uncertainty of GAAP and the imprecise evidence received by the auditor. Analytically the concepts have an equivalent effect. It does not matter whether the source of the uncertainty is the result of some imprecision of GAAP, of GAAS, or of the audit evidence. All that is necessary is that the construct creates a degree of uncertainty in the proper accounting treatment. See Magee and Tseng (1990) for the analytical structure of the uncertainty and Calegari et al. (1998) and Mayhew et al. (2001) for experimental implementation of the construct.
8. All ACMs, current investors, and future investors observe the following information for each asset: the winning future investor’s bid, the disclosed value, the auditor’s report chosen by the ACM (agree or disagree), the ACM’s identification number, and the asset’s actual value. In addition, each period we provide a summary of how many times each ACM has served and how many times each ACM has been associated with an incorrect report. *All players receive the same set of information.*

Summary information about ACM performance simplifies record keeping for current and future investors. The information received by both current and future investors about the accuracy of the ACM’s report, can be used to assess the ACM’s reputation for objectivity. The ACM’s reputation can then be used by current investors when hiring an ACM, and by future investors when bidding on assets reported upon by the ACM.

We privately communicate exchange rates that are fixed within but vary across player types. Exchange rates range from $3.33 to $16.00 per E$1,000 to balance dollar payments across treatments and player types. We endow current investors and ACMs with E$400 and future investors with E$3,600 to start each market.

The Baseline treatment establishes the base case in which ACMs receive the accepted bid or fixed compensation for serving as an ACM but no stock-based compensation. We report two different treatments that modify the Baseline design, a current shareholder treatment (*Current*), and a future shareholder treatment (*Future*). We design the two stock-based compensation treatments to capture basic incentives faced by independent ACMs. The differences are outlined below:

*Current.* Same as Baseline except that in addition to the cash compensation, the ACM receives a bonus equal to 25 percent of the current investor’s end-of-period profits for which s/he is the ACM. This bonus aligns the ACM’s incentives with the interests of current investors.

*Future.* Same as the Baseline except that the ACM receives a bonus equal to 25 percent of the purchaser’s (i.e., future investor) profits on assets for which s/he is the ACM. This bonus aligns the ACM’s incentives with the interests of future investors.

In our design, ACMs monitor and issue the financial reports. Agency theory suggests that such monitoring is most effective when the incentives of the monitor are aligned with shareholders (Archambeault et al. 2008). This agency-based view suggests stock-based compensation should increase objective reporting. While the agency view suggests stock-based compensation should enhance objective reporting, prior research with related research designs suggests other potential outcomes.

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13 We provide all the information at each period end. We believe that such information is also available in field settings. However, in field settings, users receive audit failure information with some time lag. The quicker feedback on information quality in our setting should make it harder for participants to take advantage of accounting uncertainty, or stated differently, should enable audit committee members to remain profitably objective. The increased time lag in field settings would likely lead to a greater lack of objectivity due to the delay in feedback about information quality.

14 We do not discount future returns to keep the experiment simple. The incentives in the experiment are therefore stronger than they would be in practice where the present value of future returns based on future shareholder wealth would be lower than the undiscounted value. The 25 percent bonuses are paid to the ACM by the experimenter and do not reduce the earnings of the current or future investors directly. In practice, the payment of stock-like incentives to directors does reduce the wealth of current and future investors, however stockholdings of ACMs in practice are typically very small (i.e., less than 1 percent) resulting in little direct impact on investors’ earnings.
Prior research has examined objectivity violations in similar settings (Mayhew et al. 2001; Mayhew and Pike 2004). The multiperiod setting combined with an uncertain end period precludes the identification of a unique Nash equilibrium; however, prior research has established some empirical regularities. The two most common pure strategy equilibria observed in prior research are (1) a lemons equilibrium in which the report issuer (i.e., ACM) has no credibility with potential future investors and thus the report does not affect bidding or final prices; and (2) a reputation equilibrium in which the reporter objectively issues reports revealing his information about the current investor’s asset; and prices reflect the value implied by both the ACM issued auditor report, and the known uncertainty of the audit/reporting process (see Mayhew et al. [2001] for a more complete specification).

Institutional and contextual factors appear to drive which equilibrium is more likely to evolve. Mayhew et al. (2001) find that common knowledge of the auditor’s lack of perfect information about asset values leads to lemons equilibrium formation. Mayhew and Pike (2004) find that future investor hiring leads to more objective reporting, consistent with a reputation equilibrium, than when managers hire the auditor. Similar to these two prior studies, the current experiments include common knowledge that the ACM does not receive perfect information about asset value from the auditor. Hence, investors are not able to perfectly interpret ACM reporting errors as bias. The main differences in the current study are the inclusion of stock-based compensation and replacing the auditor role with an ACM who is hired by current investors.

We briefly discuss the potential strategies and beliefs of each player type to provide some insight into the potential impact of our treatments. First, future investors bid for assets in a first price auction. Future investors evaluate whether the ACM’s report contains unbiased information about asset value and the extent to which they will rely on or ignore the report. When future investors ignore the ACM report, their bid will reflect the underlying expected value of the asset less their opportunity cost. In our setting, the expected value of the asset is 700 and opportunity costs are 40 (i.e., 660).

A completely objective ACM report will be correct 80 percent of the time. As a result, future investors who fully rely on the report will bid 840 for an asset with a High (i.e., agree) report and 480 for an asset with a Low (i.e., disagree) report. Failure to incorporate the accuracy of the ACM’s report can result in over- or under-bidding relative to others who correctly assess the expected accuracy of the report. In general, the competitive bidding process should result in winning bids that approximate the expected value of the asset, conditional on the ACM’s report and past accuracy. The winning bids provide a measure of the future investors’ perception of ACM objectivity.

Second, current investors look to maximize profits by maximizing the selling prices of their assets. In our setting, each current investor must report the asset value as 1000, so the only way for current investors to influence the selling price is via the ACM who is hired. A more objective ACM produces future investor bids that more accurately reflect the asset’s value. While report accuracy impacts the bids, it also impacts the probability a High or Low report is issued, which also impacts the bids. That is, we expect future investor bids to respond to both the report type and accuracy. As a result, it is unclear how current investors will seek to use ACMs to influence bidding. Attempts to hire biased (i.e., aggressive) ACMs can lead to more High reports being issued, but at the same time will generally result in less reliance on the High reports and therefore lower bids on High reports.

We purposefully select different incentives for current investors than prior research. Mayhew and Pike (2004) model this player as a manager who also has an investment
decision. The investment decision creates an incentive for the manager to hire more reputable auditors to separate themselves from managers who make low value investment decisions. The manager captures the surplus of higher investment through the increased reliability of the manager’s report provided by a reputable auditor (Mayhew 2001). However, prior research suggests that despite the increased incentive to hire reputable auditors, managers often demand biased auditors (Mayhew 2001; Mayhew et al. 2001). In our setting, current investors parallel the manager player in prior research, but the current investors do not control the investment decision. They only control audit committee selection. The current investors do not have incentives to hire an ACM with a reputation for objectivity to separate themselves from other current investors. This design choice enables us to focus on the ACM’s reporting decision.

The removal of the investment decision also creates tension with respect to expected behavior. By removing the investment decision, we reduce current investors’ motivation to prefer objective reporting. We expect this to increase the current investors’ motivation to hire biased ACMs. However, current investors do not choose between low and high cost investment to generate the asset held for sale. As a result, they have less strategic reason to try to mislead future investors in an effort to reduce investment costs.

Third, ACMs face potentially conflicting incentives. That is, the actions that get ACMs hired do not necessarily maximize the ACMs’ current-period payoffs. ACMs cannot earn profits without being hired. However, once hired, ACMs can choose to maximize their current-period wealth (resulting from current-period stock-based compensation) by making reporting decisions that reduce the likelihood of getting hired in the future. In the treatments where ACM compensation includes stock-based compensation, the ACMs’ current earnings depend on the earnings of current or future investors. ACMs can choose to bias their reports in a manner that increases the potential earnings of investors they are aligned with through the stock-based incentives.

In the Baseline treatment, the ACMs’ primary objective is to get hired by the current investors. ACMs in the Baseline have an indirect incentive to bias reports toward current investors based on the current investor’s choice to hire the ACMs. ACMs in the Current treatment have both a direct and indirect incentive to bias reports toward current investors. Each ACM is hired by a current investor and receives an additional payment based on the current investor’s profit. ACMs in the Future treatment have conflicting incentives. The ACMs have an indirect incentive to bias reports toward current investors who hire the ACMs and a direct incentive to bias reports toward future investors based on the additional payment tied to future investor profit. Our initial expectation is that these two conflicting incentives will offset, thereby producing the highest level of ACM objectivity.

While the above discussion suggests a directional hypothesis, we hesitate to make such a strong prediction because there is no unique equilibrium and the current investors’ incentives when hiring the ACM are not clear. Instead, we investigate the general assertion that the treatments will produce differences in the ACMs’ objectivity.

IV. RESULTS

We conduct six independent sessions in each of the three treatments. Each session utilizes unique participants in a between-subject design. We analyze the second market of each session. We treat the market-level data for each treatment as independent, while we treat the individual data within a market as non-independent. We adjust for clusters in our

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15 Current investors in modern corporations have little say over the investment choices of the corporations they own. At most, current investors can influence corporate investments via the election of the board of directors.
analysis to account for the lack of independence between individual ACMs in a given market.\textsuperscript{16} Sessions 1, 2, and 3 in each treatment employ competitive bidding by ACMs to become a current investor’s ACM. In sessions 4, 5, and 6, the current investors select any of the three available ACMs for a flat E$60 fee. This difference does not affect any of our results, so we do not account for it in our analysis.

All participants receive a $5 show-up fee and up to an additional $2.50 for correctly answering ten quiz questions on the instructions to motivate careful attention. When recruiting subjects, we suggest to participants that they can expect to earn, on average, $10 to $12 per hour. Sessions lasted approximately 2-1/2 hours. Participants earned, on average, $34.73 per session. Participants in the fixed-fee sessions earn slightly less ($32.32) than the overall average and in the bidding sessions slightly more ($37.14).

Our primary question is whether, and to what extent, objectivity violations differ by treatment. Table 1 summarizes, by treatment, the objectivity violations for each session. Each session consists of three ACMs participating in 23 periods, for a total of 69 observations. We classify an observation as a violation if the ACM issues a report that differs from the audit result observed by the ACM. We separate violations into two types—aggressive and conservative. Both represent biased reporting. An aggressive violation occurs when the ACM agrees with the 1,000 report when the audit result shows Low. A conservative violation occurs when the ACM disagrees with the 1,000 report when the audit result shows High. When the ACM agrees or disagrees with the 1,000 report to reflect the observed audit result, there is no violation.

The descriptive statistics in Table 1 suggest variation in behavior across treatments. The Baseline markets average 6.04 percent violations and all but one are aggressive violations. Aggressive violations potentially benefit current investors by reporting asset values as High when the audit result says Low. The Current markets average 29.47 percent violations. All but two of the 122 violations are aggressive and benefit current investors. Finally, Future markets average 24.64 percent violations. Consistent with our discussion above about conflicting incentives for ACMs in the Future treatment, we observe both aggressive and conservative violations in these markets. The number of conservative violations in each Future session is greater than in any session within the other two treatments.

Aggressive and conservative violations can only occur under specific conditions. Aggressive violations can only occur when the robot auditor signals to the ACM that the asset is Low. We measure aggressive violations/chances as the number of aggressive violations divided by the number of Low audit signals. Conservative violations can only occur when the auditor signals the asset is High, so conservative violations/chances equal the number of conservative violations divided by the number of High audit signals. We calculate the violation rate based on the chances to commit each violation type in the last two columns of Table 1. This adjustment increases the aggressive violations to 60 percent in the Current treatment, and the conservative violations in the Future treatment to 29.26 percent.

Table 2, Panel A reports on analysis of variance, and Panel B provides tests of differences in means across treatments. We compare aggressive, conservative, and total violation rates separately. First, in the Baseline, we see fewer total violations than either the Current

\textsuperscript{16} The market-level data in our analysis consists of the individual ACM choices within that market (three ACMs per session). The individual ACM choices within a market are not independent of each other as each ACM can observe and react to the decisions of other ACMs. We treat each market as a cluster in our regression analysis to account for the non-independence of individual ACM decisions within that market. The net affect of clustering is to adjust the standard errors of the coefficients for the lack of independent observations within a market. See Stata 7 (Stata Corporation 2000, Reference Q-St, page 87) for details. Similar results can be obtained using PROC SURVEYREG in SAS.
<table>
<thead>
<tr>
<th>Treatment(^a)</th>
<th>Periods</th>
<th>Aggressive Violations(^b)</th>
<th>Conservative Violations(^b)</th>
<th>Total Violations</th>
<th>Total % Violations</th>
<th>Test Shows High</th>
<th>Test Shows Low</th>
<th>Aggressive(^c) Violations/Chances</th>
<th>Conservative(^c) Violations/Chances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline 1</td>
<td>69</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1.45%</td>
<td>43</td>
<td>26</td>
<td>3.85%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Baseline 2</td>
<td>69</td>
<td>11</td>
<td>0</td>
<td>11</td>
<td>15.94%</td>
<td>28</td>
<td>41</td>
<td>26.83%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Baseline 3</td>
<td>69</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>4.35%</td>
<td>27</td>
<td>42</td>
<td>7.14%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Baseline 4</td>
<td>69</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2.90%</td>
<td>29</td>
<td>40</td>
<td>2.50%</td>
<td>3.45%</td>
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<tr>
<td>Baseline 5</td>
<td>69</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
<td>39</td>
<td>30</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Baseline 6</td>
<td>69</td>
<td>8</td>
<td>0</td>
<td>8</td>
<td>11.59%</td>
<td>34</td>
<td>35</td>
<td>22.86%</td>
<td>0.00%</td>
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<tr>
<td>Baseline Mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.04%</td>
<td></td>
<td></td>
<td>11.21%</td>
<td>0.50%</td>
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<tr>
<td>Current 1</td>
<td>69</td>
<td>17</td>
<td>0</td>
<td>17</td>
<td>24.64%</td>
<td>40</td>
<td>29</td>
<td>58.62%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Current 2</td>
<td>69</td>
<td>30</td>
<td>0</td>
<td>30</td>
<td>43.48%</td>
<td>34</td>
<td>35</td>
<td>85.71%</td>
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<tr>
<td>Current 3</td>
<td>69</td>
<td>15</td>
<td>0</td>
<td>15</td>
<td>21.74%</td>
<td>37</td>
<td>32</td>
<td>46.88%</td>
<td>0.00%</td>
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<tr>
<td>Current 4</td>
<td>69</td>
<td>9</td>
<td>2</td>
<td>11</td>
<td>15.94%</td>
<td>34</td>
<td>35</td>
<td>25.71%</td>
<td>5.88%</td>
</tr>
<tr>
<td>Current 5</td>
<td>69</td>
<td>11</td>
<td>0</td>
<td>11</td>
<td>15.94%</td>
<td>39</td>
<td>30</td>
<td>36.67%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Current 6</td>
<td>69</td>
<td>38</td>
<td>0</td>
<td>38</td>
<td>55.07%</td>
<td>30</td>
<td>39</td>
<td>97.44%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Current Mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>29.47%</td>
<td></td>
<td></td>
<td>60.00%</td>
<td>0.93%</td>
</tr>
<tr>
<td>Future 1</td>
<td>69</td>
<td>2</td>
<td>17</td>
<td>19</td>
<td>27.54%</td>
<td>37</td>
<td>32</td>
<td>6.25%</td>
<td>45.95%</td>
</tr>
<tr>
<td>Future 2</td>
<td>69</td>
<td>9</td>
<td>17</td>
<td>26</td>
<td>37.68%</td>
<td>33</td>
<td>36</td>
<td>25.00%</td>
<td>51.52%</td>
</tr>
<tr>
<td>Future 3</td>
<td>69</td>
<td>0</td>
<td>6</td>
<td>6</td>
<td>8.70%</td>
<td>26</td>
<td>43</td>
<td>0.00%</td>
<td>23.08%</td>
</tr>
<tr>
<td>Future 4</td>
<td>69</td>
<td>11</td>
<td>6</td>
<td>17</td>
<td>24.64%</td>
<td>34</td>
<td>35</td>
<td>31.43%</td>
<td>17.65%</td>
</tr>
<tr>
<td>Future 5</td>
<td>69</td>
<td>0</td>
<td>6</td>
<td>6</td>
<td>8.70%</td>
<td>31</td>
<td>38</td>
<td>0.00%</td>
<td>19.35%</td>
</tr>
<tr>
<td>Future 6</td>
<td>69</td>
<td>25</td>
<td>3</td>
<td>28</td>
<td>40.58%</td>
<td>27</td>
<td>42</td>
<td>59.52%</td>
<td>11.11%</td>
</tr>
<tr>
<td>Future Mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24.64%</td>
<td></td>
<td></td>
<td>20.80%</td>
<td>29.26%</td>
</tr>
</tbody>
</table>

\(^a\) Baseline ACM compensation is comprised of a contracted fixed fee only; the Current-treatment ACM compensation is comprised of a contracted fixed fee plus a bonus based on sellers’ profits; and Future-treatment ACM compensation is comprised of a contracted fixed fee plus a bonus based on buyers’ profits.

\(^b\) An aggressive violation is defined as an ACM report of 1,000, agree after observing test results showing Low (400), and a conservative violation is defined as an ACM report of 1,000, disagree after observing test result showing High (1,000).

\(^c\) The Violations/Chances is potentially more informative than the percentage of violations based on the raw number of violations. It equals the violations as a percentage of the opportunities to commit a violation. The ACM only has a chance to reveal his/her bias toward current shareholders (i.e., aggressive reporting) when the ACM received information that the value is Low (i.e., 400) or his/her bias toward future shareholders (i.e., conservative reporting) when the ACM received information that the value was High (i.e., 1,000).
### TABLE 2
Audit Committee Member Objectivity: Analysis of Variance

**Panel A: Analysis of Variance**

<table>
<thead>
<tr>
<th>Treatment(^b)</th>
<th>(\beta_{0.1})</th>
<th>(\beta_{0.2})</th>
<th>(\beta_{0.3})</th>
<th>Mean (\beta_{0.1})</th>
<th>(\beta_{0.2})</th>
<th>(\beta_{0.3})</th>
<th>(t)-stat (\beta_{0.1})</th>
<th>(\beta_{0.2})</th>
<th>(\beta_{0.3})</th>
<th>(p)-value (\beta_{0.1})</th>
<th>(\beta_{0.2})</th>
<th>(\beta_{0.3})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline (\beta_{0.1})</td>
<td>0.112</td>
<td>0.005</td>
<td>0.293</td>
<td>2.49</td>
<td>1.03</td>
<td>6.23</td>
<td>0.024</td>
<td>0.036</td>
<td>0.000</td>
<td>0.024</td>
<td>0.036</td>
<td>0.000</td>
</tr>
<tr>
<td>Current (\beta_{0.2})</td>
<td>0.600</td>
<td>0.009</td>
<td>0.293</td>
<td>5.18</td>
<td>1.05</td>
<td>6.23</td>
<td>0.000</td>
<td>0.009</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Future (\beta_{0.3})</td>
<td>0.208</td>
<td>0.208</td>
<td>0.208</td>
<td>2.16</td>
<td>2.16</td>
<td>2.16</td>
<td>0.045</td>
<td>0.293</td>
<td>0.293</td>
<td>0.293</td>
<td>0.293</td>
<td>0.293</td>
</tr>
</tbody>
</table>

Number of observations and overall significance

- \(n = 18\)
- \(F = 12.57\)
- \(F = 7.33\)
- \(F = 16.92\)
- \(p = 0.000\)
- \(p = 0.002\)
- \(p = 0.000\)

R\(^2\) 40.90% 26.44% 38.79%

**Panel B: Significance Tests**

<table>
<thead>
<tr>
<th>Comparison</th>
<th>(p)-value(^d)</th>
<th>(p)-value(^d)</th>
<th>(p)-value(^d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline (\beta_{0.1}) = Current (\beta_{0.2})</td>
<td>0.112 = 0.600</td>
<td>0.001</td>
<td>4.10E-02</td>
</tr>
<tr>
<td>Baseline (\beta_{0.1}) = Future (\beta_{0.3})</td>
<td>0.112 = 0.208</td>
<td>0.380</td>
<td>0.550</td>
</tr>
<tr>
<td>Current (\beta_{0.2}) = Future (\beta_{0.3})</td>
<td>0.600 = 0.208</td>
<td>0.019</td>
<td>9.70E-02</td>
</tr>
</tbody>
</table>

\(^a\) We use clustering to analyze the results because there are three subjects within each market, whose decisions are not independent of each other, and repeated decisions by each subject. We use a regression to analyze the variance, with robust estimation of the variance and a correction for the number of independent clusters. See Stata 7 (Stata Corporation 2000, Reference Q-St, page 87) for details.

\(^b\) Baseline ACM compensation is comprised of a flat fee; the Current-treatment ACM compensation is comprised of a flat fee plus a bonus based on sellers’ profits; and Future-treatment ACM compensation is comprised a flat fee plus a bonus based on buyers’ profits.

\(^c\) The Violations/Chances equals the violations as a percentage of the opportunities to commit a violation. The ACM only has a chance to reveal his/her bias toward current shareholders (i.e., aggressive reporting) when the ACM received information that the value is Low (i.e., 400) or his/her bias toward future shareholders (i.e., conservative reporting) when the ACM received information that the value was High (i.e., 1,000).
(p = .003) or the Future (p = .005). This finding suggests that stock-based compensation produces more biased reporting than straight cash compensation. Second, we see the most violations in the Current. The Current aggressive violations rate is significantly more than either the Baseline (p = .001) or the Future (p = .019). It appears that tying ACM compensation to current shareholders results in a preference for biased aggressive reporting. The difference in aggressive violations between the Baseline and the Future (p = .380) is not significant. Finally, the Future produces the vast majority of conservative violations. The percentage of conservative violations is statistically greater than either the Baseline or Current treatments (p < .001). We also examine whether violations vary over time within a session. We find no evidence of significant variation across the 23 periods.

In summary, our treatments document that stock-based compensation results in ACMs who bias their reporting in the direction of the stock-based compensation. Incentives tied to current investors increase preferences for aggressive financial reporting, while incentives tied to future investors increase ACMs’ preferences for overly conservative reporting. Somewhat surprisingly, cash compensation produces objective reporting even though current investors hire the ACM.

**Group versus Individual Decision Making**

Our experiments focus on the preferences of individual decision makers for biased financial reporting. However, audit committees are groups of individuals who make audit-related decisions. There is a large body of literature (for summaries, c.f., Isenberg 1986; Myers 2002) on how group decisions systematically differ from the individual preferences of their members. The literature refers to this phenomenon as “risky shift” or more generally, “group polarization” since the shift may be toward more caution. Essentially, the literature suggests that group discussions often strengthen individuals’ initial preferences or beliefs leading to group decisions that are more polarized or extreme than would be suggested by taking the average of the individuals’ preferences. This literature suggests we are likely to underestimate the differences across treatments by looking at individuals instead of groups. If biased reporting represents a risk, then groups made up of individuals with a preference for biased reporting will be more likely to bias their reports than the individuals that make up the group.17

We observe widespread biased reporting in the Current and Future treatments. Untabulated individual decisions show that in the Current and Future treatments, 29 out of 36 ACMs exhibit bias and 16 of the 29 bias their reports more than 50 percent of their opportunities. In contrast, in the Baseline treatment ten of 18 ACMs never exhibit bias, and of the eight that do, only one exceeds 50 percent of his opportunities. This suggests that in the Current and Future treatments, group polarization would increase the amount of biased reporting, while in the Baseline it would likely decrease the bias. Thus, we believe the use of committees would produce even stronger results than our individual-based approach.

**Comparison to Mayhew and Pike (2004)**

This section briefly connects this research to Mayhew and Pike (2004). We design the current experiments specifically to capture the essence of ACM decisions and preferences, while the Mayhew and Pike design captures the key aspects of auditor decisions. However, ACMs in our treatments face risk of current investors not hiring the ACM in subsequent periods. We give the current investors who hire the ACMs information about the ACMs’ prior reporting; therefore, the ACMs’ reporting decisions involve risk.
the key construct in both papers is the decision-makers’ preference for biased financial reporting, as represented by objectivity violations. Based on the similarity of that construct across studies, we offer a couple of observations.

First, the conversion from the manager selection of auditors in Mayhew and Pike (2004) to the current investors’ selection of ACMs changes the ACMs’ actions compared to the choices by auditors in Mayhew and Pike. It appears that the strategic investment choice in Mayhew and Pike that we remove is key to differentiating between modeling the hiring decision as one by a manager versus a current investor. The result is that the Baseline rate of violations in this paper (6.04 percent) is essentially identical (7.25 percent) to the Investor Selection NMH treatment in Mayhew and Pike (2004). Both papers suggest that hiring by investors increases objectivity as long as there is no stock-based compensation. Second, Mayhew and Pike (2004) observed only three individual conservative violations, and those violations occurred in two different treatments. In contrast, we observe three or more conservative violations (total of 55) in each of the six Future sessions. This evidence strengthens the inference that tying ACM compensation directly to future shareholders increases their preference for conservatively biased financial reporting.18

Market Participant Behavior and Sensitivity

In this section, we examine the behavior of the individual market participants. We specifically consider the implications of the current and future investors’ actions on the ACMs’ behavior, as well as how the ACMs’ behavior impacts investors. The purpose of these analyses is twofold. First, we want to better understand the market dynamics across treatments. Second, we want to evaluate whether the other players’ behavior impacts ACM decision making in unexpected ways. This helps ensure the treatments cause differences in ACM behavior rather than some unusual behavior on the part of current or future investors.

The ACM maximizes earnings in our setting by getting hired by a current investor. We examine whether the ACMs’ prior reporting decisions influence hiring decisions. Srinivasan (2005) provides evidence that following financial statement restatements, audit committee members are less likely to remain on the restating firm’s board, and they are more likely to leave other boards especially when the restatement is severe. This finding suggests that in extreme cases of biased financial reporting, ACMs are punished by the audit committee labor market. However, we are unaware of any evidence on the impact of less severe earnings management (such as abnormal accruals) on ACMs’ job opportunities.

We assess the probability of an ACM getting hired based on his/her past record of accuracy and agreement in the market by estimating Equation (1):19

\[
Prob(Hired) = f(\phi_1 + \phi_2 \%Accuracy_{t-1} + \phi_3 \%Agree_{t-1} \\
+ \phi_4 \%Accuracy_{t-1} \cdot Current_t + \phi_5 \%Accuracy_{t-1} \cdot Future_t \\
+ \phi_6 \%Agree_{t-1} \cdot Current_t + \phi_7 \%Agree_{t-1} \cdot Future_t + u_t) 
\]

where:

- \(Hired = 1\) if the ACM is hired in the current period, and 0 otherwise;
- \(\%Accuracy = \) percentage of accurate reports issued by the ACM through the prior period;

18 Mayhew and Pike (2004) indirectly tie auditors’ incentives to future investors by requiring future investors to make the hiring decision.
19 We delete the first ten periods of every market to allow reputations for each ACM to form.
%Agree = percentage of agree reports issued by the ACM through the prior period;
Current = 1 if the ACM is paid a bonus based on current-investor profits, and 0 otherwise; and
Future = 1 if the ACM is paid a bonus based on future-investor profits, and 0 otherwise.

We pool data from all three treatments and use interaction terms to separate the effects of the two stock-based incentive treatments. This approach allows us to evaluate hiring differences across treatments. We include measures of both accuracy and agreement in the same model. This approach allows us to consider both the ACMs’ reputation for accuracy as well as their willingness to agree with current investors. The two measures are negatively correlated (r = −0.27). That is, high levels of agreement generally will cause the ACM to be less accurate. A positive coefficient on %Accurate suggests current investors prefer to hire ACMs who report accurately. We use accuracy rather than total violations because current investors cannot observe violations directly due to the imperfect information received by ACMs. Accuracy is negatively correlated with total violations (−0.85). We will observe a positive coefficient on %Agree when current investors prefer to hire ACMs who agree with their reports. We control for the lack of independence within individual market sessions by clustering at the market level.

Table 3 reports the results from estimating Equation (1). The %Accurate measure is positively associated with being hired in the Baseline. However, the interactions between %Accurate and the two treatment variables suggest that accuracy is not as important when hiring ACMs in the Current or Future treatments. The %Accurate * Current interaction term is not significant at conventional levels (p = 0.115, two-tailed). The %Accurate * Future interaction is significantly negative (p = 0.063), suggesting a lower preference for accurate ACMs in the Future treatment. In contrast, %Agree is insignificant in the Baseline and the Current treatment (p = 0.186, two-tailed) but is significant in the Future treatment (p = 0.018). The positive coefficient on %Agree * Future suggests that current investors try to create incentives for ACMs to not bias toward future investors by hiring ACMs who agree with the current investors reports.

The difference in hiring preferences across treatments may reflect the choices available to current investors. In the Baseline treatment, current investors appear to prefer accurate ACMs rather than ACMs who agree. As we describe earlier, this result may be due to the lack of strategic investment choice faced by current investors in prior research. However, in the Baseline, very few ACMs regularly violate their objectivity, so current investors have little choice when searching for a biased ACM. In the stock-based treatments, current investors have the opportunity to hire biased ACMs and do so, but do not have much choice of unbiased ACMs. Consistent with prior experimental research, we allow the ACMs’ choice to be objective to arise endogenously in our design. The current investor’s hiring preferences could be explored further in research designed to specifically evaluate the hiring choices with exogenously determined ACM reputations for agreement and accuracy.21

Our interpretation of the interactions in Equation (1) is robust to the concerns raised by Ai and Norton (2003).20 Our result may appear to contrast with Srinivasan’s (2005) finding that ACMs appear to lose board positions after revelations of biased reporting in the form of restatements. However, it is important to note that Srinivasan’s (2005) finding only applied to the most severe and public cases of bias. In our setting, the bias is less severe, especially given the fact that the ACM can be wrong due to incorrect information from the robot auditor. We think it would be helpful to investigate this finding further with archival data especially with respect to less severe forms of earnings management. The exploration of demand for reporting objectivity can also be explored using the auditor-manager setting employed in prior research.
**TABLE 3**

Analysis of Verifier Reputations for Accuracy and Agreeing with Seller in Prior Periods on the Seller’s Hiring Decision

\[
\text{Prob}(\text{Hired}) = f(\phi_1 + \phi_2 \%\text{Accuracy}_{i,t-1} + \phi_3 \%\text{Agree}_{i,t-1} + \phi_4 \%\text{Accuracy}_{i,t-1} \times \text{Current},
+ \phi_5 \%\text{Accuracy}_{i,t-1} \times \text{Future}, + \phi_6 \%\text{Agree}_{i,t-1} \times \text{Current},
+ \phi_7 \%\text{Agree}_{i,t-1} \times \text{Future}, + v_i)
\]

<table>
<thead>
<tr>
<th>Variables</th>
<th>Prediction</th>
<th>Coefficient Estimate</th>
<th>z-statistic</th>
<th>p-value(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td>-2.258</td>
<td>3.36</td>
<td>0.001</td>
</tr>
<tr>
<td>%Accuracy</td>
<td></td>
<td>2.276</td>
<td>2.52</td>
<td>0.012</td>
</tr>
<tr>
<td>%Agree</td>
<td></td>
<td>0.225</td>
<td>0.27</td>
<td>0.790</td>
</tr>
<tr>
<td>%Accuracy * Current</td>
<td></td>
<td>-1.032</td>
<td>-1.58</td>
<td>0.115</td>
</tr>
<tr>
<td>%Accuracy * Future</td>
<td></td>
<td>-1.300</td>
<td>-1.86</td>
<td>0.063</td>
</tr>
<tr>
<td>%Agree * Current</td>
<td></td>
<td>1.115</td>
<td>1.32</td>
<td>0.186</td>
</tr>
<tr>
<td>%Agree * Future</td>
<td></td>
<td>2.469</td>
<td>2.37</td>
<td>0.018</td>
</tr>
</tbody>
</table>

\(^a\) We use clustering to analyze the results because there are three subjects within each market, whose decisions are not independent of each other, and repeated decisions by each subject. We use a regression to analyze the variance, with robust estimation of the variance and a correction for the number of independent clusters. See Stata 7 (Stata Corporation 2000, Reference Q-St, page 87) for details.

\(^b\) p-values are based on two-tailed tests.

Variables Definitions:
- \(\text{Hired} = 1\) if the verifier is hired in the current period, and 0 otherwise;
- \(\%\text{Accuracy}\) = ratio for all periods prior to the current period of verifier \(i\) issuing an accurate report to the total number of times verifier \(i\) was hired;
- \(\%\text{Agree}\) = ratio for all periods prior to the current period of verifier \(i\) issuing a report that agrees with seller to the total number of times verifier \(i\) was hired;
- \(\text{Current}\) = indicator variable equal to 1 if ACM compensation is comprised of a bonus based on sellers’ profits, and 0 otherwise; and
- \(\text{Future}\) = indicator variable equal to 1 if ACM compensation is comprised of a bonus based on buyers’ profits, and 0 otherwise.

We delete the first ten trading periods from this analysis to allow reputations for verifier accuracy to form (i.e., we use data from the last 13 periods of trading only).

We assess future investors’ reliance on the ACM’s report based on the ACM’s past history at both the market level and individual level in Tables 4 and 5. Table 4, Panel A shows the market-level mean winning bids by report type and treatment. Across the three treatments, bids for High and Low reports are significantly different from the expected asset value if future investors ignored reported values (i.e., 660).\(^{22}\) Future investors pay significantly more for High reports compared to Low reports within each treatment. This evidence suggests that future investors rely on the information provided by the ACMs in all three treatments. There are two significant differences between treatments. First, future investors pay less for High reports (1,000; agree) in the \(\text{Current}\) treatment than the Baseline, consistent with future investors discounting the ACMs’ reports because of higher levels of aggressive objectivity violations in the \(\text{Current}\) treatment. Second, future investors pay more

\(^{22}\) If investors do not rely on ACM reports at all, then acquirers would bid the asset’s expected value (700) less their opportunity cost (40) (i.e., 660).
### TABLE 4
Analysis of Winning Buyer Bids

#### Panel A: Mean Winning Buyer Bids by Treatment and Report Type

<table>
<thead>
<tr>
<th>Treatment</th>
<th>High Report</th>
<th>Low Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>839</td>
<td>478</td>
</tr>
<tr>
<td>Current</td>
<td>760</td>
<td>523</td>
</tr>
<tr>
<td>Future</td>
<td>815</td>
<td>568</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tests of Means</th>
<th>Comparison</th>
<th>p-value&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline versus Current</td>
<td>839 versus 760</td>
<td>0.059</td>
</tr>
<tr>
<td>Baseline versus Future</td>
<td>839 versus 815</td>
<td>0.571</td>
</tr>
<tr>
<td>Current versus Future</td>
<td>760 versus 815</td>
<td>0.256</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Winning Bid When Report is High</th>
<th>Comparison</th>
<th>p-value&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline versus Current</td>
<td>478 versus 523</td>
<td>0.281</td>
</tr>
<tr>
<td>Baseline versus Future</td>
<td>478 versus 568</td>
<td>0.001</td>
</tr>
<tr>
<td>Current versus Future</td>
<td>523 versus 568</td>
<td>0.234</td>
</tr>
</tbody>
</table>

#### Panel B: Tests of Mean Winning Buyer Bids versus Expected Winning Buyer Bid if Audit Committee Member is Always Honest (assuming opportunity costs are fully incorporated into each bid)

<table>
<thead>
<tr>
<th>Winning Bid When Report is High</th>
<th>Treatment</th>
<th>p-value&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline (839) versus 840&lt;sup&gt;e&lt;/sup&gt;</td>
<td>0.480</td>
<td></td>
</tr>
<tr>
<td>Current (760) versus 840</td>
<td>0.011</td>
<td></td>
</tr>
<tr>
<td>Future (815) versus 840</td>
<td>0.243</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Winning Bid When Report is Low</th>
<th>Treatment</th>
<th>p-value&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline (478) versus 480&lt;sup&gt;e&lt;/sup&gt;</td>
<td>0.932</td>
<td></td>
</tr>
<tr>
<td>Current (523) versus 480</td>
<td>0.238</td>
<td></td>
</tr>
<tr>
<td>Future (568) versus 480</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Baseline ACM compensation is comprised of a flat fee bid; the Current-treatment ACM compensation is comprised of a flat fee bid plus a bonus based on sellers’ profits; and Future-treatment ACM compensation is comprised a flat fee bid plus a bonus based on buyers’ profits.

<sup>b</sup> p-values are based on two-tailed tests.

<sup>c</sup> p-values are based on one-tailed tests.

<sup>e</sup> Expected value of asset if verifiers are always honest and investors incorporate opportunity cost: High Report = 840 = (1,000 × 80% + 400 × 20%) – 40; Low Report = 480 = (400 × 80% + 1,000 × 20%) – 40.

for Low reports (400; disagree) in the Future treatment than the Baseline, consistent with conservatively biased Low reports in the Future treatment.

Table 4, Panel B compares market-level winning bids to the expected winning bid if ACMs reported objectively. Future investors who believe the ACM is fully objective should bid 880 less their opportunity cost (i.e., 840) for High reports. Future investors submit
winning bids that are not significantly different than 840 in the Baseline (p = .480) and Future (p = .243) treatments. In the Current treatment, winning bids are significantly less than 840 (p = .011). Future investors who believe the ACM is fully objective should bid 480 for a Low report. Investors in the Future treatment bid significantly greater than 480 (p < .001), while their bids do not differ from 480 in the Baseline and Current (p = .932 and p = .238). Future investors appear to bid greater than 480 in the Future treatment because conservatively biased Low reports result in future investors receiving high assets more often than expected based on objective reports.

We explore the impact of individual ACM reputations for accurate reporting in Table 5. We examine whether the high bid for each asset is a function of the ACM’s prior history of accuracy and type of report issued. This information provides insight into whether bidding by future investors has an influence on ACM behavior. We estimate the following regression:

$$Highbid_i = \phi_1 + \phi_2 High Report_i + \phi_3 %Accuracy_i + \phi_4 %Accuracy \times High Report_i + \kappa_i$$

where $Highbid$ equals the winning bid for asset $i$ in period $t$, $High Report$ equals 1 for High reports issued by the ACM, and 0 for Low reports, and $%Accuracy$ is as previously defined.

We begin by pooling data across all three treatments. This gives us more variation in observed levels of ACM accuracy than when we segregate the data by treatment. The results in Panel A of Table 5 suggest that future investors bid very close to expectations and appear to take into account both the observed report type and ACM accuracy. First, we note that the intercept of 658.5 is very close to the expected value of the asset (660) independent of report type, or accuracy, less opportunity costs. This suggests that overall bidding approximates expectations. Second, it appears that future investors take into account ACM accuracy and report type when bidding on assets. The $%Accuracy \times High Report$ interaction is significantly positive (p = 0.001), suggesting that Agree reports by accurate ACMs result in higher bids. Also, $%Accuracy$ is significantly negative (p = .011), suggesting that future investors bid less for more accurate Low reports.

Panel B of Table 5 reports the bidding within each treatment. In general, the patterns are similar to the overall analysis, but there are some exceptions. First, the Baseline does not appear to assign a significant weight to $%Accuracy \times High Report$. At first glance, this finding suggests that future investors did not care about ACM accuracy in the Baseline. We think this interpretation is incorrect. In the Baseline, there is little variation in ACM accuracy, and ACM accuracy is generally very high. As a result, the small variation in ACM accuracy has little impact on bids. Second, the Current treatment appears to have no significant association between bids and either report type or accuracy. Hence, future investors appear to largely ignore the reports consistent with the high rate of objectivity violations in this treatment. Third, the Future treatment shows a significant reaction to High reports interacted with accuracy. This result is consistent with the overall result. However, it appears that future investors place more faith in High reports, possibly because Future treatment ACMs have incentives to bias toward Low reports. The bias toward Low reports potentially makes High reports more believable, especially when issued by more accurate ACMs.

Limitations

Our study has the following limitations. First, audit committees typically make decisions as a group rather than a single individual. There is a large literature that documents
TABLE 5
Analysis of Verifier Reputation for Accurate Reporting on Winning Buyer Bids

Panel A: Winning Bids with Pooled Reports (n = 702)

\[ \text{Highbid} = \phi_1 + \phi_2 \text{High Report} + \phi_3 \% \text{Accuracy} + \phi_4 \% \text{Accuracy} \times \text{High Report} + \kappa, \]

<table>
<thead>
<tr>
<th>Variables</th>
<th>Prediction</th>
<th>Coefficient Estimate</th>
<th>t-statistic</th>
<th>p-value(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>+</td>
<td>658.5</td>
<td>14.88</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>High Report</td>
<td></td>
<td>-84.4</td>
<td>-1.64</td>
<td>0.120</td>
</tr>
<tr>
<td>%Accuracy</td>
<td></td>
<td>-169.7</td>
<td>-2.87</td>
<td>0.011</td>
</tr>
<tr>
<td>%Accuracy \times High Report</td>
<td></td>
<td>489.8</td>
<td>7.75</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Panel B: Winning Bids by Treatment

<table>
<thead>
<tr>
<th>Variables</th>
<th>Prediction</th>
<th>Coefficient Estimate</th>
<th>t-statistic</th>
<th>p-value(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline (n = 234)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>+</td>
<td>498.5</td>
<td>7.03</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>High Report</td>
<td></td>
<td>258.2</td>
<td>3.58</td>
<td>0.016</td>
</tr>
<tr>
<td>%Accuracy</td>
<td></td>
<td>-31.7</td>
<td>-0.29</td>
<td>0.784</td>
</tr>
<tr>
<td>%Accuracy \times High Report</td>
<td></td>
<td>150.6</td>
<td>1.67</td>
<td>0.155</td>
</tr>
<tr>
<td>Current (n = 234)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>+</td>
<td>745.2</td>
<td>3.54</td>
<td>0.017</td>
</tr>
<tr>
<td>High Report</td>
<td></td>
<td>-135.8</td>
<td>-0.59</td>
<td>0.584</td>
</tr>
<tr>
<td>%Accuracy</td>
<td></td>
<td>-302.4</td>
<td>-1.16</td>
<td>0.297</td>
</tr>
<tr>
<td>%Accuracy \times High Report</td>
<td></td>
<td>529.5</td>
<td>1.73</td>
<td>0.145</td>
</tr>
<tr>
<td>Future (n = 234)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>+</td>
<td>647.9</td>
<td>14.43</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>High Report</td>
<td></td>
<td>-102.1</td>
<td>-1.48</td>
<td>0.200</td>
</tr>
<tr>
<td>%Accuracy</td>
<td></td>
<td>-86.0</td>
<td>-1.24</td>
<td>0.270</td>
</tr>
<tr>
<td>%Accuracy \times High Report</td>
<td></td>
<td>462.8</td>
<td>4.22</td>
<td>0.008</td>
</tr>
</tbody>
</table>

\(^a\) We use clustering to analyze the results because there are three subjects within each market, whose decisions are not independent of each other, and repeated decisions by each subject. We use a regression to analyze the variance, with robust estimation of the variance and a correction for the number of independent clusters. See Stata 7 (Stata Corporation 2000, Reference Q-St, page 87) for details.

\(^b\) p-values are based on two-tailed tests.

Variables Definitions:

- Highbid = winning buyer bid;
- High Report = 1 if verifier i issued a report that agreed with the seller’s report, and 0 otherwise; and
- \%Accuracy = percentage of time ACM reported accurately in the periods prior to the current period.

We delete the first ten trading periods from this analysis to allow reputations for verifier accuracy to form (i.e., we use data from the last 13 trading periods only).

differences between group and individual decisions. Based on theories on group decision making and our individual data, we believe a group-based design would be unlikely to produce different results.

Second, we suppress liability-based incentives that are present in field settings. ACMs have a fiduciary responsibility to shareholders that makes them liable for their actions. This liability may offset the preference for biased financial reporting that we observe. However, ACMs are often covered by directors and officers insurance that may mitigate the liability threat. Srinivasan (2005) reports little evidence of board members being named in lawsuits.
associated with restatements and less evidence of payouts by board members for such lawsuits.

Third, we suppress the interaction between the audit committee and auditor. While we believe the audit committee can exert substantial influence over the auditor, the PCAOB also has influence on auditors of public companies. PCAOB oversight reduces the auditors’ incentive to facilitate biased financial reporting even if preferred by the audit committee. Future research can examine this interaction.

Fourth, we do not investigate the potential trade-offs of removing stock-based compensation from board members. While stock-based incentives can increase an ACM’s preference for biased reporting, such incentives may also produce more value-enhancing operating and investing decisions by board members. Finally, other factors such as wealth and reputation may impact ACM objectivity in field settings. To the extent ACM wealth far exceeds the value of their audit-committee-related holdings, they have less incentive to demand biased reporting. We also do not manipulate the impact of ACM reputation. We allow ACM reputations to form, but do not manipulate incentives for reputation formation.

V. CONCLUSION

We use experimental markets to study the impact of stock-based compensation on ACM objectivity. We assume that through its monitoring role, the audit committee can influence auditors and thereby encourage or discourage biased financial reporting. Our experiments show that ACMs prefer biased reporting when paid with stock-based compensation. ACMs paid with stock-based compensation similar to unrestricted stock or vested stock options appear to prefer aggressive financial reporting. ACMs paid with stock-based compensation similar to unvested options or restricted stock appear to prefer overly conservative financial reporting. We find ACMs with fixed compensation have the lowest overall level of biased reporting.

Our study contributes to the literature in three ways. First, we provide empirical evidence that stock-based compensation influences ACM objectivity. This evidence should aid researchers in developing theories about ACM objectivity. Second, our evidence complements and extends contemporaneous archival evidence that finds an association between audit committee stock options and restatements (Archambeault et al. 2008). Our study goes further by showing that both current and future stock-based incentives can impact ACMs. Third, we build on Mayhew and Pike (2004) to show that incentives linked to current and future shareholders have differing effects on preferences for biased reporting. While Mayhew and Pike (2004) show that investor selection of auditors reduces the auditor’s bias as compared to management selection, we show that preferences created by aligning interests with current investors are different from preferences when incentives align interests with future investors. Future archival research can explore whether similar differences are observable in field data.

Our research provides a starting point for further experimental research into the impact of ACM incentives on reporting. We believe a couple of paths deserve specific mention. Our setting could be expanded to examine group decisions about biased financial reporting. Also, we suppress board oversight of operating decisions that could be incorporated into a future experimental design, as well as consideration of monitoring under dual boards. Finally, future studies can examine the role of ACM reputation in mitigating the impact of stock-based compensation on biased financial reporting.
REFERENCES


Are Independent Audit Committee Members Objective?

1981
