

An Experimental Investigation of Non-Audit Service Fees and Investors' Perceptions of Auditor Independence: Post-Enron Era

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Abstract

In this study, we use experimental markets to examine the disclosure of non-audit service fees on investors' perceptions of auditor independence. The SEC justified the disclosure of non-audit services fees rule by stating that: "Investors will be able to evaluate for themselves whether the proportion of non-audit service fees causes them to question an auditor's independence" (SEC, 2000). Recent studies, like Dopuch et al. (2003), provide evidence that disclosures of non-audit service fees reduced investors' beliefs of auditor independence. When investors' formed inaccurate beliefs of auditor independence, their forecasts of asset values and asset prices deviated from the economic predictions and investors' profits were less uniformly distributed.

Consistent with Dopuch et al. (2003), we find that the disclosure of non-audit service fees reduced investors' perceptions of auditor independence. Second, we document that the level of non-audit service fees has a varying impact on investors' perception of auditor independence, market efficiency, and wealth distributions. Moreover, our findings suggest that financial markets are less efficient when greater levels of non-audit service fees are disclosed and that the relative level of non-audit service fees does impair auditors' objectivity from the investors' viewpoint. This study provides a first-hand account of the impact of the proportionate level of non-audit service fees to total fees on investors' perceptions of auditor independence in the post-Enron era.

Key Words: *Non-Audit Service Fees, Disclosures, Investors' Perceptions, Market Efficiency, Belief Persistence.*

I. Introduction

The purpose of this study is to examine whether the proportionate level of non-audit service fees affect investors' perceptions of auditor independence and market behavior (e.g., market prices and wealth distributions). If investors believe the provision of non-audit services compromise auditor objectivity and reduces the probability of credible reporting, then they will bid down share values of firms disclosing greater levels of non-audit fees. In our experimental design, we control for independence in appearance by varying the manipulation of the disclosure of the proportionate levels of non-audit service fees (i.e., 0%, 25%, 50% or 75%). We also control for the presence of auditor independence in fact through the issuance of imperfect but unbiased auditor's reports.

The Securities Exchange Commission (SEC) believes that non-audit services impair auditor independence because of the significant revenues generated from these services, and the consulting nature of these services often lead the auditor to identify himself with the interests of management rather than with those of the public (SEC, 2000). In addition, independence in appearance may be compromised, as the public may perceive the auditor to lack independence because of such services (Panel on Audit Effectiveness, 2000). The SEC justified the disclosure rules by stating that: "Investors will be able to evaluate for themselves whether the proportion of fees for audit and non-audit services causes them to question the auditor's independence...we continue to believe that disclosures that shed light on the independence of public companies' auditors assist investors in making investment and voting decisions" (SEC, 2000).

The Sarbanes-Oxley Act (2002), the most significant piece of legislation in the last decade, has also brought about fundamental changes for auditing firms and their audit clients regarding auditing and non-audit services. The Sarbanes-Oxley Act (SOA) includes a provision

prohibiting audit firms from providing certain non-audit services to their audit clients¹. Except for three newly banned services (i.e., large-scale, big-fee financial information systems design and implementation or information technology work, internal audit outsourcing, and expert services), the Sarbanes-Oxley Act's list of prohibited services is essentially identical to that in the already existing Security and Exchange Commission's (SEC's) independence rule (AICPA, 2002). The SEC's rule also requires listed companies to disclose non-audit service fees paid to incumbent auditors (SEC, 2000). The provisions of the Sarbanes-Oxley Act and SEC were enacted due to the growing concern over auditor independence, and to ultimately rebuild investor confidence in U.S. financial markets, which were overcome by corporate wrongdoings and failures in corporate governance. Therefore, it is no longer sufficient that financial statements of public companies are accurate – the public must also perceive them as being accurate. Public faith in the reliability of a corporation's financial statements depends upon the public's perception of the outside auditor as an independent professional. If investors were to view the auditor as an advocate for the client, the value of the audit function itself might well be lost" (SEC, 2001).² The former chief accountant of the SEC, Lynn Turner, states that "auditor independence is really about only one thing – investors' confidence in the numbers" (Turner 2000). These SEC provisions and Turner's conjecture emphasize the importance of obtaining a capital markets' perspective of non-audit service fees, as the potential jeopardy to auditor independence appears to exist. Recent allegations and Congressional investigations related to the

¹ See Section 201 of the Sarbanes-Oxley Act (2002) and the SEC's final rule (2003), *Strengthening the Commission's Requirements Regarding Auditor Independence*, which prohibits a registered accounting firm from performing specified non-audit services for audit clients.

²The SEC's concept of independence states that 'a basic test for auditor independence is whether a *reasonable investor*, knowing all relevant facts and circumstances, would perceive an auditor as having neither mutual nor conflicting interests with its audit client and as exercising objective and impartial judgment on all issues brought to the auditor's attention,' (SEC 2003).

accounting and auditing practices of the Big 4 CPA firms and other auditor-client relationships may also lend additional support for evaluating non-audit service fees. As such, this study takes a first-hand look at the impact of proportionate levels of non-audit fees on investors' perceptions, market pricing efficiencies and wealth distributions in the post-Enron era.

Consistent with Dopuch et al. (2003), our findings suggest that non-audit service fees reduced investors' perceptions of auditor independence. These findings are also consistent with prior studies that find non-audit service fees significantly impair investors' perceptions of auditor independence (e.g., Lowe and Pany 1995, Lowe and Pany 1996, Dopuch et al. 2003, Church et al. 2003) and reduce share values (e.g., Frankel et al. 2002, Dopuch et al. 2003.)

Secondly, we find when investors' (e.g., study participants) formed inaccurate perceptions of auditor independence, their forecasts of asset values and asset prices deviated from the economic predictions and investors' profits were less uniformly distributed. Hence, our results suggest that financial markets are less efficient when greater levels of non-audit service fees are disclosed. Our findings may shed additional light on whether the guidelines and restrictions imposed by the Sarbanes-Oxley Act and the SEC to improve external auditor independence are germane to investor decision-making in financial markets. Furthermore, our findings may play a vital role in determining whether auditor independence in appearance or in fact impacts investors' beliefs and overall market efficiency, an on-going issue of concern for many stakeholders.

The remainder of this paper is organized as follows. A review of the related literature is presented in Section II. Section III describes the hypotheses development, followed by a presentation of the experimental design and procedures in Section IV. Section V presents our empirical findings. A summary of our findings and concluding comments appear in Section VI.

II. Prior Related Literature

The extant literature has explored issues related to non-audit services fees and market reactions. Prior research examining the effects of non-audit service fees generally find that although there are market-based incentives for the auditors to remain independent, providing such services may actually impair auditor independence in appearance.³ Lowe and Pany (1995) find that material levels of consulting fees, representing approximately 12% of the audit firm's office revenues and client revenues, significantly affected financial statement users' perceptions and decisions. Specifically, loan officers perceived greater auditor independence and higher financial statement reliability to exist when the auditor received an immaterial level of fees (i.e., less than 1% of revenues) from an audit client. Sixty-seven percent of the loan officers in the immaterial condition approved the loan as compared to only 45 percent of loan officers in the material condition. In a subsequent study, Lowe and Pany (1996) find similar results for financial analysts. Their results indicate that immaterial levels of consulting fees did not decrease analysts' perceptions when compared to a control group in which the auditor received no consulting fees.

Frankel et al. (2002), using the magnitude of discretionary accruals and the likelihood of meeting earnings benchmarks as evidence of biased financial statements, find that high fees for non-audit services significantly impair auditor independence and reduce the quality of earnings. They also find evidence of a negative association between the disclosure of non-audit fees and share values. Reynolds, et al. (2004) replicate these results and find a significantly positive association between the relative level of non-audit fees and discretionary accruals, but no evidence that the relative level of non-audit service fees impairs an auditor's objectivity.

³ Loss of reputation and litigation cost are commonly cited as the market-based incentives for which the auditor is not likely to jeopardize his independence.

Somewhat contradictory to the results in Frankel et al. (2002), are the findings of Ashbaugh et al. (2003). Ashbaugh et al. (2003) document a positive association between the absolute value of firms' discretionary current accruals and fee ratio (i.e., ratio of non-audit fees to total fees), and find no evidence that total fees are associated with current discretionary accruals, consistent with Frankel et al. (2002). However, in contrast to Frankel et al. (2002), they find no association between the fee ratio and income-increasing discretionary accruals or the likelihood that firms beat analysts' forecasts, and no evidence that the market reacts to the magnitude of non-audit fees relative to total fees.

Also contradictory to the results in Frankel et al. (2002), are the findings of Reynolds and Francis (2001) and DeFond et al. (2002). The discretionary accruals analysis in Reynolds and Francis (2001) shows evidence that financial dependency does not impair auditor independence and no evidence that auditors are more lenient in issuing going concern reports to larger clients. DeFond et al. (2002) find no significant association between non-audit service fees and impaired auditor independence, where auditor independence is surrogated by auditors' propensity to issue going concern audit opinions, and no association between going concern opinions and either total fees or audit fees. However, these studies primarily deal with auditor independence in fact (auditor quality) and therefore, ignore market implications.

Nevertheless, more recent evidence by Dopuch, et al. (2003) document that disclosures of non-audit services reduced the accuracy of investors' beliefs of auditors' independence in fact when independence in appearance was inconsistent with independence in fact. This caused prices of assets to deviate more from their economic predictions (lower market efficiency) in the inconsistent settings relative to the no-disclosure and consistent settings. The disclosure of fees for non-audit services could reduce the efficiency of capital markets if such disclosures result in

investors forming inaccurate beliefs of auditor independence in fact. Notwithstanding, Church and Zhang (2003) find that the frequency of auditor lawsuits is significantly higher when the auditor provides non-auditing services, regardless of the fees generated from such services.

These prior research results of the implications of non-audit service fees disclosures on users' perceptions of auditor independence and market outcomes are somewhat inconclusive, pointing towards the need for further research in this area. Our study extends the extant literature by examining the relationship between auditor independence (in fact and in appearance) and non-audit services.⁴ This study uses variant levels of non-audit service fees to examine the impact of these fees on investors' behavior, an approach not undertaken in prior studies. Market study evidence of whether these relationships lead to the perception of impaired auditor independence by investors is relevant to policymakers.⁵

III. Hypotheses Development

Research in cognitive psychology has shown that in making predictions and judgments under uncertainty, individuals may use heuristics instead of the statistical theory of prediction. For example, Kahneman et al. (1982, 2000) reveal that individuals may have substantial and systematic biases that cause them to use information insufficiently. If these individual biases are systematic and the majority of the investors hold similar biases, market outcomes may reflect the biased perceptions (Ganguly et al. 1994). More specifically, our study focuses on the theory of belief persistence. According to the belief persistence theory (BPT), people tend to retain

⁴ Consistent with archival empirical work related to auditor independence (e.g., Frankel et al. 2001; DeFond et al, 2002), we operationalize auditor independence as the proportionate level of non-audit service fees to total fees.

⁵ If investors believe the provision of non-audit services compromise auditor objectivity and reduces the probability of credible reporting, then they will bid down share values of firms disclosing unexpectedly large non-audit fees (Simunic 1984; Teoh and Wong 1993) However, if investors believe the provision of non-audit services to audit clients increases the audit firm's investment in reputational capital, thereby increasing the probability of credible reporting, then share prices will increase for firms disclosing unexpectedly large non-audit fees (Frankel et al, 2002).

erroneous beliefs even after they observe evidence discrediting their beliefs (Lord et al. 1979, Dopuch et al. 2003).

In our setting, this bias is applicable as investors receive two types of information: Investors receive information about the correspondence between the auditor's report, which is imperfect but unbiased, and the true asset value. This market feedback reveals that the auditor is independent in fact. Investors also receive information about independence in appearance – the proportionate level of non-audit service fees to total fees. If investors perceive that the proportionate level of non-audit service fees to total fees impairs independence, then regardless of the market feedback that the auditor has historically behaved independently, these erroneous beliefs may become systematic and lead to prices that reflect these biases. In addition, such biases may lead to an uneven distribution of profits across investors, as investors that have biases may earn lower profits even though overall biases do not affect asset prices (Dopuch et al. 2003).⁶

We develop three sets of hypotheses based on the theory of belief persistence. The first addresses investors' perceptions about auditor type (whether independent in fact or not) and the accuracy of forecasts; the second deals with market prices for shares of the asset; and the third focuses on investors' distribution of profits across settings, an issue of concern to the SEC. In the steady state and under the theory of belief persistence, the hypotheses in alternate form are:

⁶ Contrary to the BPT, the individual rationality hypothesis (IRH) predicts that investors' perceptions of the auditor's type will not differ across settings. The IRH assumes that investors are statistically rational and therefore, make judgments and decisions without bias.⁶ Hence, investors are predicted to only focus on the correspondence between the true asset values and auditor's report, causing investors to form accurate beliefs about the auditor type. Additionally, the efficient market hypothesis (EMH), asset prices will not differ across settings. The EMH predicts that asset prices will be efficient and reflect predicted outcomes even though some investors may exhibit biases, holding incorrect perceptions (Camerer 1987, 1992; Jamal and Sunder 1996). The assumption is that investors with correct perceptions will mediate any price discrepancies, causing the price to reflect the correct beliefs. Hence, steady-state prices should reflect the underlying economics and investors should be able to adjust for any systematic biases, if they exist.

Investors' Perceptions

H₁: *Investors' perceptions of auditor independence will differ across the proportionate levels of non-audit fees.*

Market Prices

H₂: *Market prices resulting from investors' perceptions of auditor independence will differ across the proportionate levels of non-audit fees.*

The third hypothesis focuses on the distribution of investors' profits across these settings.

Like many experimental market studies, we examine the distribution of payouts to determine whether our settings of identical endowments and symmetric information result in different payout distributions. This leads us to hypothesis three in alternative form:

Investors' Wealth Distributions

H₃: *The distribution of individual investors' profits will differ across the proportionate levels of non-audit fees.*

The underlying prediction is that trading profits should not reflect a systematic bias in these settings of fixed resources. However, under the BPT, investors that have biases may earn lower profits even though overall biases do not affect asset prices, yielding less uniformly distributed profits.

IV. Experimental Design and Procedures

This study uses experimental asset markets to investigate whether investors perceive non-audit service fees to impair auditor independence. We measure non-audit service fees as the ratio of non-audit service fees to total fees, as the SEC is concerned with the proportion of non-audit fees to total client fees – requiring disclosures of the ‘dollar amount’ of audit and non-audit fees

(SEC 2000). Moreover, this ratio has been widely used as a proxy for auditor independence in prior archival empirical research.

Our experimental markets consist of three players: a computerized company, a computerized auditor, and a group of investors. The company produces an asset with a known distribution of payout values, but unknown actual value. The auditor produces a report that provides an estimate of the asset's value. The auditor's report is imperfect but unbiased, reflecting that the auditor is independent in fact. The investors receive the auditor's report and information related to independence in appearance – the proportionate level of non-audit service fees to total fees. Investors then make a judgment about the auditor's type (biased or unbiased) and a related confidence level judgment about their assessment of the auditor's type. Next, all investors' forecasts of the asset value based on the auditor's report and related information are elicited. The forecast serves as a proxy for each investor's reservation price. Investors then participate in a computerized market to buy and sell shares of the asset among themselves.⁷ At the end of the trading period, the true value of the asset is reported and all shares are redeemed at the true value.

Experimental Design

The experimental design and parameters are summarized in Table 1. We employ a 1x4 between-subjects design where we control for two variables, reflecting whether the auditor is independent in appearance or not: (1) imperfect but unbiased auditor report and (2) the

⁷ The trading mechanism, a computerized continuous double auction, was developed by Dopuch, et al. (2001) and Davis (2002) to investigate auditor independence in appearance and in fact and the extent to which public disclosure of auditor materiality thresholds affects both investors' perceptions of the auditor's report and market behavior., respectively. The trading mechanism have been modified to meet specification requirements of this study.

proportionate level of non-audit service fees to total audit fees (0%, 25%, 50% or 75%). The combination of the two variables creates 4 market settings as follows:

Proportionate Level of Non-Audit Service Fees (NAF)			
Treatment			
<i>0% Non-Audit Fees</i>	<i>25% Non-Audit Fees</i>	<i>50% Non-Audit Fees</i>	<i>75% Non-Audit Fees</i>
<i>0%NAF</i>	<i>25%NAF</i>	<i>50%NAF</i>	<i>75%NAF</i>

As an example, investors in the *50%NAF* setting receive the following information:

‘Auditor’s Report: The asset’s value is estimated to be 183.’

‘News: The auditor will receive 20 in total firm fees. 10 of the total firm fees are related to the auditors’ performance of non-audit services.’

Table 1 provides a list of the values assigned to the auditor’s report, non-audit fees, total fees, and the true share values of the assets for each of the 12 trading periods.

{Insert Table 1 about here}

Experimental Procedures

Eight experimental sessions were conducted, two for each of the four proportionate levels of non-audit services fees settings (e.g., 0%NAF, 25%NAF, 50%NAF, 75%NAF). Six investors participated in each session; in total 48 subjects participated in the experiment. Subjects are graduate students recruited from Master of Business Administration and Master of Science in Business Administration programs. Students earn an average of \$30, which includes trading earnings and earnings from a quiz designed to assess the subjects’ overall understanding of the experiment.

Subjects receive a copy of the instructions that are read aloud by the experimenter at the beginning of each market session.⁸ Each market session consists of 12 trading periods, lasting approximately two minutes. Each period, shares of a different asset are traded. The true value of the shares is unknown to all investors during trading. This true value is uniformly distributed and is independent of the true value of shares in any other period. Before trading begins each period, all investors receive the auditor's report of the asset's value and information related to independence in appearance. Then investors' responses to the following questions below are elicited:

1. What type of error do you think is in the auditor's report? Error with bias or Error without bias?
2. How confident are you in your answer to the above question? Very Confident, Somewhat confident, or Not Confident?⁹
3. What is your best estimate of the true share value?

After all investors have submitted their forecasts of the true share value, investors trade shares of the asset among themselves. Investors are endowed with eight shares and ¥2000 (the yen is used as the experimental monetary unit) at the start of trading. Subjects are informed that the ¥2000 is an interest-free loan that must be repaid at the end of the trading period. Investors can submit bids to buy and/or offers to sell that are constrained by their cash endowments. Since short selling is permitted; supply is not fixed.¹⁰ Investors are informed that they can hold a short position of up to eight shares at any given time in a trading day, but they must pay for the shares'

⁸ A copy of the instructions is available from the authors upon request.

⁹ Investors respond on a scale of "very confident", "somewhat confident," or "not confident", indicating their confidence levels as 1, .80, and .60, respectively. This scale is adapted from Dopuch, et al. (2001) where investors' perception of auditor's independence in appearance and in fact is examined.

¹⁰ The interest free loan and short selling provisions are similar to naturally occurring markets where investors both borrow cash from financial institutions and sell securities they do not own with a promise to buy them in the future.

true value to cover any short position at the end of the trading period. Trading ends after two minutes. Uncertainty regarding the true values remains throughout each trading day until period-end when the true value is announced. All investors within in a session receive the same liquidating dividend, equal to the true values for each share held at the end of the trading period. The setting is reinitialized – investors’ responses to the above questions based on a new and unrelated asset are elicited and shares of the new asset are traded and redeemed in the next period. To allow all the investors to assess the usefulness of the reports, they are provided with a report history. The history details the accuracy of the auditor’s report values and the true share values in all prior periods, which is diagnostic of independence in fact. At the end of the experimental session, subjects are asked to complete a post-trading experience questionnaire, and paid privately their earnings in cash. The main purpose of this questionnaire is to obtain subjects’ background information, understand how participants made their decisions in the experiment, and determine whether participants were adequately compensated.

V. Experimental Empirical Findings

Our results are based on eight experimental sessions with six investors in each session trading shares for 12 periods. The following analyses examines: (1) investors’ perceptions of the auditor’s type (whether independent or not); (2) the extent to which investors’ perceptions affect the efficiency of market prices; and (3) investors’ wealth distributions.

Investors’ Perceptions

Two types of information are used by the subjects to form perceptions of the auditor’s type: 1) information about independence in appearance: the proportionate level of non-audit service fees to total fees, which may or may not be indicative of independence in fact, and 2)

market outcomes regarding the correspondence between the auditor's reports and underlying asset values, which is indicative of independence in fact.

To gauge investors' perception of the auditor's type, two measures are used: a perception index (PI) and an assessment of estimate bias (i.e., whether investors' forecasts are closer to the auditor's report). The PI is computed using the following two items elicited from investors each period: (1) the accuracy of the investor's perception of the type of error (i.e., error with bias or error without bias) in the auditor's report (1 if correct and 0 if incorrect) and (2) the investor's confidence judgment about his or her assessment (1 if Very Confident, 0.8 if Somewhat Confident, and 0.6 if Not Confident).¹¹ The PI is 1.0 (0.8, 0.6) for an investor who is Very Confident (Somewhat Confident, Not Confident, respectively) and correct in perception of error type. The PI is 0.0 (0.2, 0.4) for an investor who is Very Confident (Somewhat Confident, Not Confident, respectively) but incorrect in perception of error type.

{Insert Table 2 and Figure 1 about here}

The PI results are summarized in Panel A of Table 2. The results are arranged in five-trading period groupings to account for learning, if any, in initial periods. A learning period does appear to exist during the first trading period group (sessions 1 through 3). Therefore, we also provide additional analysis by excluding what seems to be a learning curve in sessions one through three in our grouping of trading periods four through twelve.

0%NAF

In the setting where there are no non-audit services fees reported, the mean PI for the twelve investors was 0.84 for the initial periods 1-3. However, the mean PI was effectively 1.0 in

¹¹ This PI is based on the perception index used in the experimental study conducted by Dopuch, King, and Schwartz (2003) to examine auditor independence in appearance and fact.

all subsequent periods, 4-6, 7-9, and 10-12, indicating that 100% of the investors were very confident and had correct perceptions of the auditor's type (unbiased) in periods 4-12. Thus, investors relied completely on the market feedback regarding the correspondence between auditor's reported values and the underlying asset values, which is diagnostic of auditor independence in fact.

25%NAF

In the setting where a firm reports a proportionate level of non-audit service fees of 25%, investors had a PI of 0.34 for the first three periods, and 0.65, 0.60, 0.71, for the next three-period groupings. This resulted in an average PI over periods 4-12 of 0.68. We find that only 29% of the subjects had a PI of 1.0. Thus, the information about the proportionate level of non-audit service fees considerably reduced the accuracy of the investors' perceptions of auditor independence.

50%NAF

In the setting where a firm reports a proportionate level of non-audit service fees of 50%, the mean PI for the 12 investors was 0.35 for periods 1-3. For periods, 4-6, 7-9, and 10-12 the mean PI was 0.51, 0.61, and 0.56, respectively. We find that only 18% of the subjects in this setting had a PI 1.0 and more than 50 percent had a PI of 0.4 or less. Thus, investors had incorrect beliefs on auditor independence with relatively high levels of confidence.

75%NAF

In the setting where a firm reports a proportionate level of non-audit service fees of 75%, the average PI in this setting ranged between 0.44 and 0.66 for the three-period groupings, after the initial periods 1-3 with an overall average of only 0.53. Only 14% of the subjects had a PI of 1.0. Consistent with the 25%NAF and 50%NAF, investors in this setting failed to rely

completely on the market feedback of the auditor's prior reporting errors but instead viewed the level of non-audit services fees as diagnostic of the auditor's independence, which is consistent with the theory of belief persistence.

Estimate Bias

In Panel B of Table 2, we provide evidence of the subjects' abilities to forecast asset value relative to the auditor's reports. This estimate bias is computed as the difference between the investor's forecast of the asset value and the auditor's reported value (F-R). The mean difference in the 0%NAF setting was 0.49, which is not significantly different from 0 (using approximate randomization) at $p < 0.01$.¹² The mean difference was significantly different from zero in the 25%NAF, 50%NAF, and 75%NAF settings at $p < 0.10$, $p < 0.01$, and $p < 0.05$, respectively¹³. The large mean forecast biases in these three settings are not surprising since these settings had low mean PIs. The results also reveal that the mean estimate bias in the 0%NAF setting is significantly lower than the mean estimate bias in the 25%NAF, 50%NAF, and 75%NAF settings at $p < 0.05$, $p < 0.01$, and $p < 0.05$, respectively. However, the mean difference is not significant across the 25%NAF, 50%NAF, and 75%NAF settings.

{Insert Figure 2 about here}

Overall, the PIs in the 25%NAF, 50%NAF, and 75%NAF settings are significantly lower than the PIs in the 0%NAF setting at $p < 0.01$. However, the PIs in the 50%NAF and 75%NAF settings, which are not significantly different from each other, are significantly lower than the PIs in the 25%NAF setting at $p < 0.05$. This finding was reinforced using approximate randomization

¹² See Edginton (1980) for a discussion of randomization test. The p-values are determined using approximate randomization and each transaction as a data point. First, a test statistic is generated using all data points; then the data is repeatedly divided and combined and a different statistic is generated for each of these random combinations. The p-value is the percentage of times the statistic of the random combinations is less than the test statistic from the test statistic from the entire data set using 1,000,000 replications.

¹³ Results are based on relative mean values instead of absolute mean values.

and suggests that non-audit service fees disclosures at the 25%, 50%, and 75% levels cause investors to retain incorrect beliefs of auditor independence even after they receive market feedback that these beliefs are erroneous, which is consistent with H_1 and the theory of belief persistence (BPT). Moreover, material levels of non-audit service fees, representing approximately 50% or 75% of the audit firm's revenues, significantly affected investors' perceptions relative to the other two settings.

Investors' Asset Prices

Our second hypothesis focuses on asset pricing efficiencies. First, we test whether asset prices reflect the underlying economic predictions. Next, we examine the difference between asset prices and investors' forecasts of asset values across settings. H_2 (BPT) asserts that investors' biases may aggregate to bias asset prices, 'if subjects with the incorrect beliefs take a dominant role in price-setting'

Table 3 presents the price errors (P-R) and forecast errors (P-F) across the 0%NAF, 25%NAF, 50%NAF, and 75%NAF experimental settings.

{Insert Table 3 and Figure 3 about here}

Price Errors

Focusing on investors' abilities to set asset prices, the price error is computed as the mean deviation of price from the auditor's reported value (P-R). The price error should be 0.00 if investors had accurate perceptions when setting prices. Panel A of Table 3 shows that mean price error for the twelve investors in the 0%NAF setting was 1.00 for the first three periods, and 2.00, 0.33, 0.67, for the next three-period groupings. This resulted in mean price error over periods 4-12 of 0.99. The mean price error of 0.99 in the 0%NAF setting does not differ significantly from 0.00, using approximate randomization. The relative mean price errors are significantly greater

than 0.00 in the 25%NAF (-3.33), 50%NAF (-6.22), and 75%NAF (-6.56) settings at $p < 0.01$, consistent with H_2 . Note that the relative mean price errors in the 50%NAF and 75%NAF settings are significantly greater than the mean price error in the 25%NAF setting at $p < 0.01$, while the relative mean price error in the 50%NAF and 75%NAF settings are not significantly different. This finding is not surprising as investors in these settings had low perception indices relative to the 25%NAF setting.

The results indicate that investors in 0%NAF setting had relatively accurate perceptions and were able to set prices closer to the economic prediction. However, investors' biases in the 25%NAF, 50%NAF, and 75%NAF settings strongly aggregated to biased asset prices in the same direction as their perception indices, resulting in prices lower than the economic prediction. These empirical findings are consistent with our second hypothesis that asset prices show evidence of bias in the 25%NAF, 50%NAF, and 75%NAF settings, the investors' forecasts of asset values show evidence of bias.

Forecast Errors

The forecast error in each of the four settings is computed as the mean deviation of price from the investor's forecast (P-F). The forecast errors should be zero if investors had accurate perceptions. Referring to Panel B in Table 3, we see that for periods 4-12, the mean deviation (P-F) was 0.50, -0.62, -1.33, and -2.38 for the 0%NAF, 25%NAF, 50%NAF, and 75%NAF settings, respectively. The largest mean deviations occurred in 50%NAF and 75%NAF settings, with prices below forecasted prices. The results were expected as investors in the 50%NAF and 75%NAF settings had relatively low mean perception indices. The investors' incorrect beliefs in these settings biased their forecasts and prices in that same direction, consistent with H_2 .

However, the low mean deviation in the 25%NAF setting is not consistent with the low perception index in that setting. Evidently, subjects in this setting “completely” relied on their incorrect beliefs in forecasting actual prices.

In summary, the mean forecast errors of 0.50 (-0.62) in the 0%NAF (25%NAF) settings are not significantly different from 0.00 at $p < 0.01$. However, the mean forecast errors are significantly greater than 0.00 in the 50%NAF (-1.33) and 75%NAF (-2.38) settings at $p < 0.05$ and $p < 0.01$, respectively, using approximate randomization. In addition, the mean forecast errors in the 25%NAF setting is significantly lower than the mean forecast errors in the 50%NAF ($p < 0.05$) and 75%NAF ($p < 0.01$). The mean forecast errors in the 50%NAF and 75%NAF are not significantly different.

Investors' Wealth Distribution

The theory of belief persistence predicts that the trading profits may reflect a systematic bias in these settings of fixed resources. The assumption is that investors that have biases may earn lower profits even though overall biases do not affect asset prices, yielding less uniformly distributed profits. The profit measures used to evaluate H_3 consist of an analysis of the standard deviation of trading profits across the experimental settings.

{ Insert Table 4 about here }

Table 4 shows that the lowest overall mean standard deviation of trading profits occurred in the 0%NAF setting (37.66), indicating a more uniform distribution of gains and losses. The next lowest average occurred in the 25%NAF setting (55.86). The highest mean occurred in the 50%NAF and 75%NAF settings (81.36 and 89.77, respectively), revealing a wider distribution of gains and losses. The results are consistent with our hypothesis (H_3) that there should be higher

dispersal of profits in the 25%NAF, 50%NAF, and 75%NAF settings. The mean standard deviation of trading profits in these settings are statistically higher than the mean standard deviation in the 0%NAF setting, using approximate randomization. In addition, the means in the 50%NAF and 75%NAF settings are statistically higher than the mean in the 25%NAF setting at $p < 0.05$, consistent with the larger forecast errors and price errors in these settings. These findings reveal that when investors receive information about non-audit service fees, investors tend to undergo systematic wealth transfers, yielding less uniformly distributed profits.

Figure 4 provides a graphical view of the overall results for the PIs, estimate errors (F-R), price errors (P-R) and forecast errors (P-F) across the 0%NAF, 25%NAF, 50%NAF, and 75%NAF experimental settings.

{Insert Figure 4 about here }

VI. Summary and Conclusions

This study is germane to examining the Sarbanes-Oxley Act and SEC's mandated changes in corporate governance. The provisions' emphasis on auditor independence through restrictions on non-audit services in securities markets should play a critical role in capital formation. Investors are more likely to invest more confidently, and pricing is likely to be more efficient, if investors' perceive that the auditors' client's financial information is more reliable and auditor independence is not impaired. This study specifically examines the effect of proportionate levels of non-audit services fees on investors' perceptions and market behavior. This is particularly important in light of our experimental findings, which suggest that the levels of non-audit service fees reduce investors' beliefs of auditors' independence and in turn, lower the efficiency of financial markets.

Consistent with Dopuch et al. (2003), we find that the disclosure of non-audit service fees reduced investors' perceptions of auditor independence. Second, we document that the level of non-audit service fees does have a varying impact on investors' perception of auditor independence, market efficiency, and wealth distributions. Moreover, our findings also suggest that financial markets are less efficient when greater levels of non-audit service fees are disclosed and that the relative level of non-audit service fees does impair auditors' objectivity in the investors' mind. Our findings may play a vital role in shedding additional light as to whether auditor independence in appearance or in fact impacts investors' beliefs and overall market efficiency.

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Figure 1
Mean Perception Index Across the Twelve Trading Periods

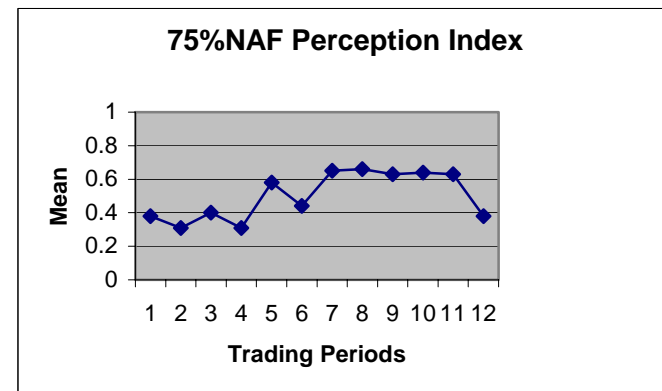
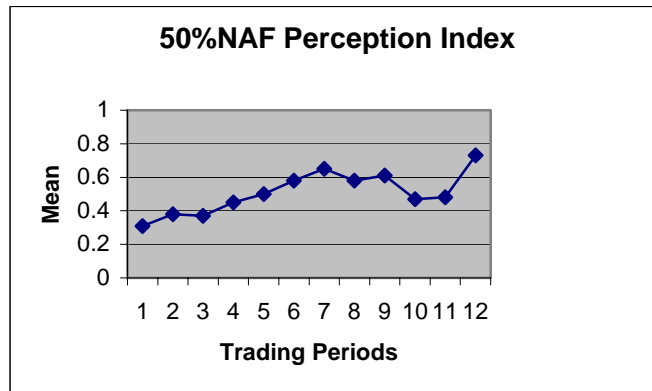
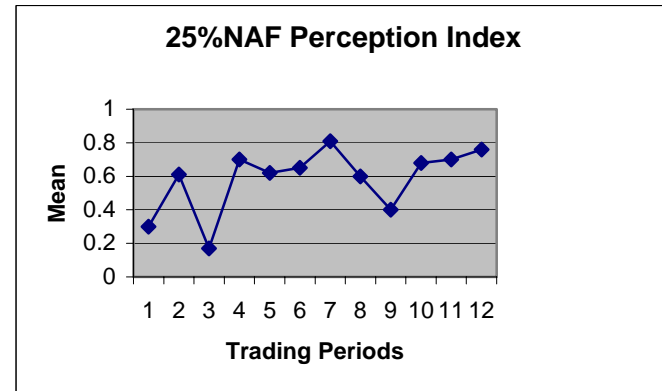
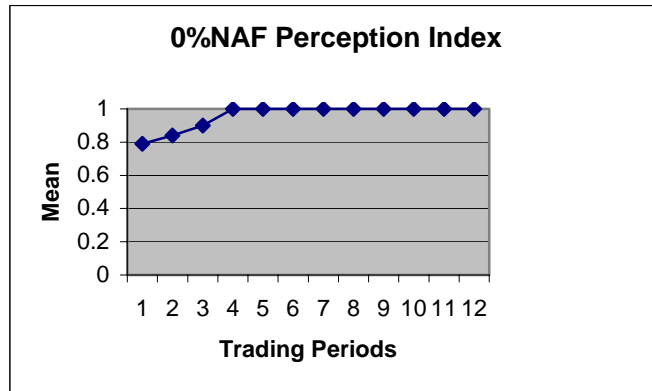


Figure 2
Mean Deviation of Forecasts from the Auditor's Report Across the Twelve Trading Periods

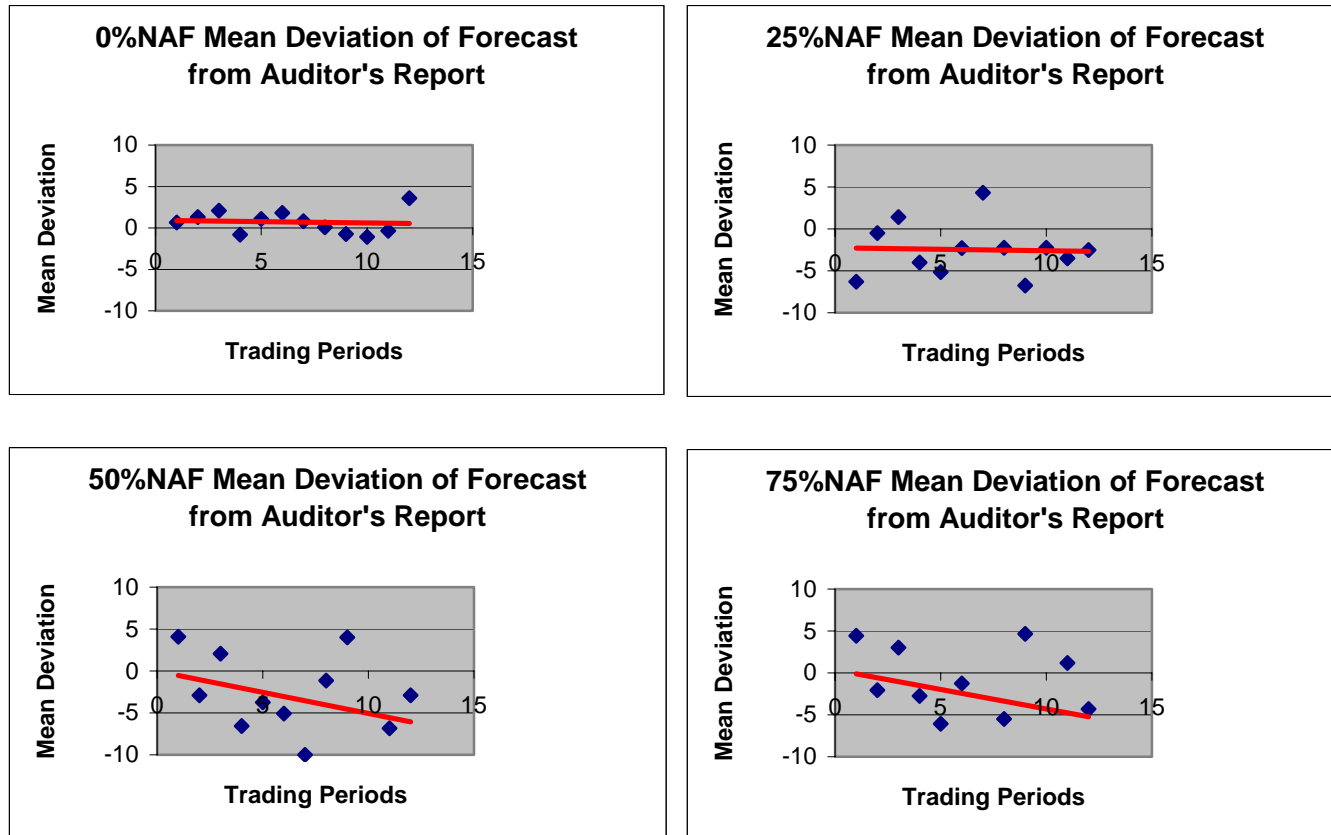


Figure 3
Mean Price Errors and Forecast Errors Across the Twelve Trading Periods

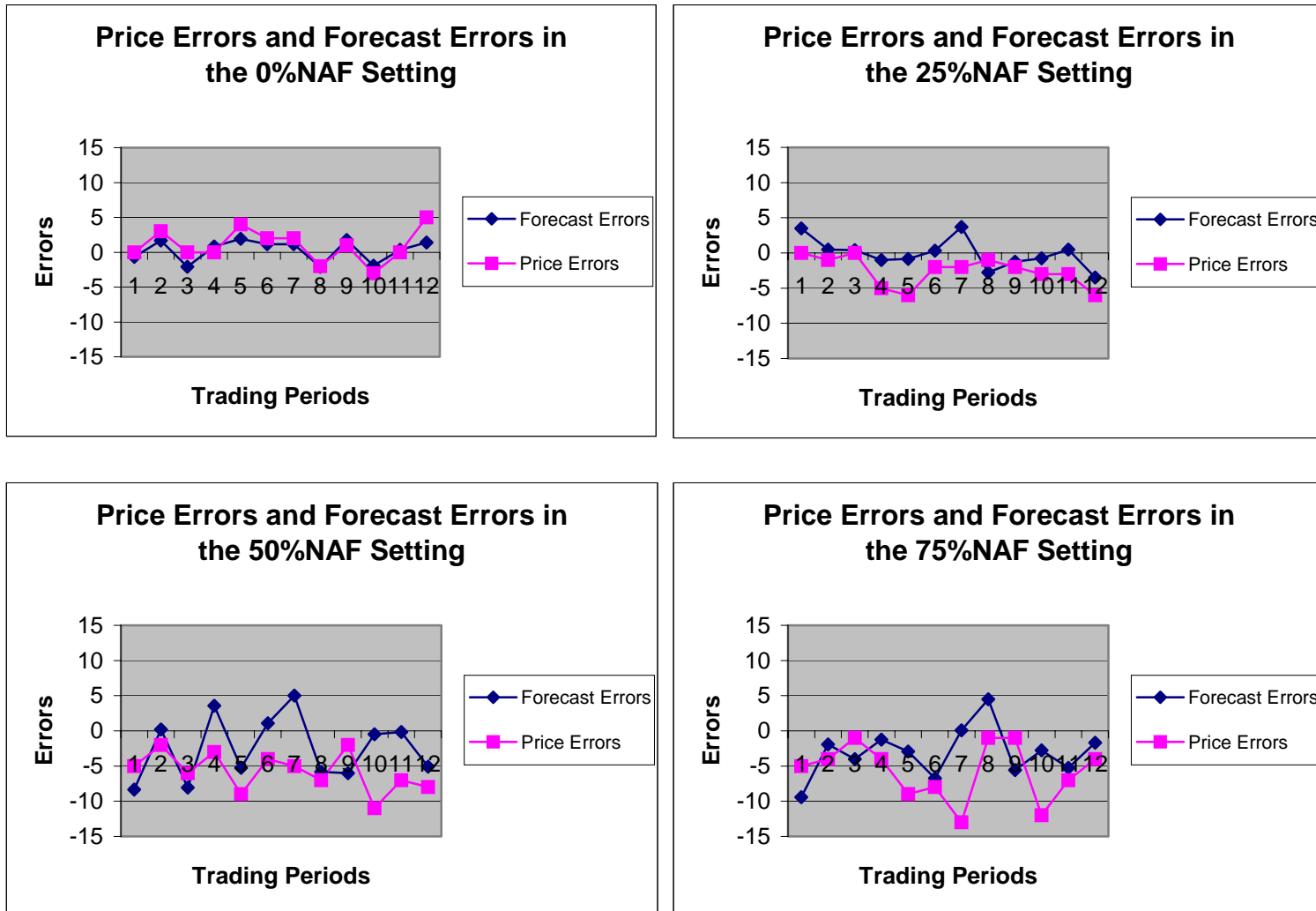


Figure 4
Recap of Experimental Results Across the Twelve Trading Periods

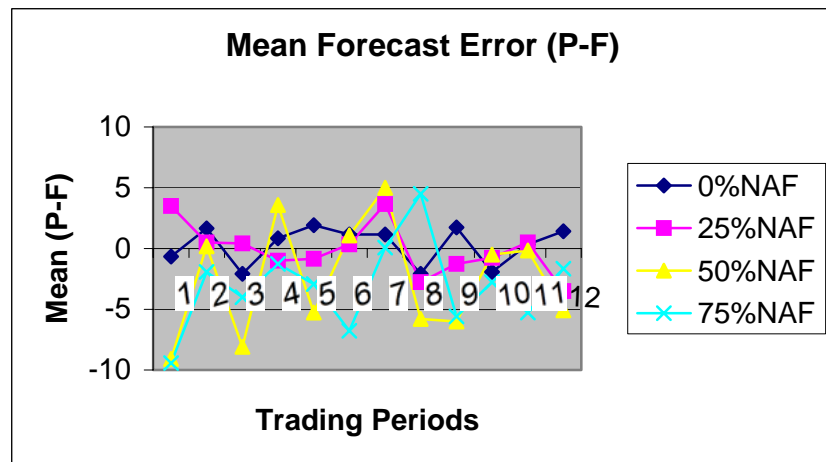
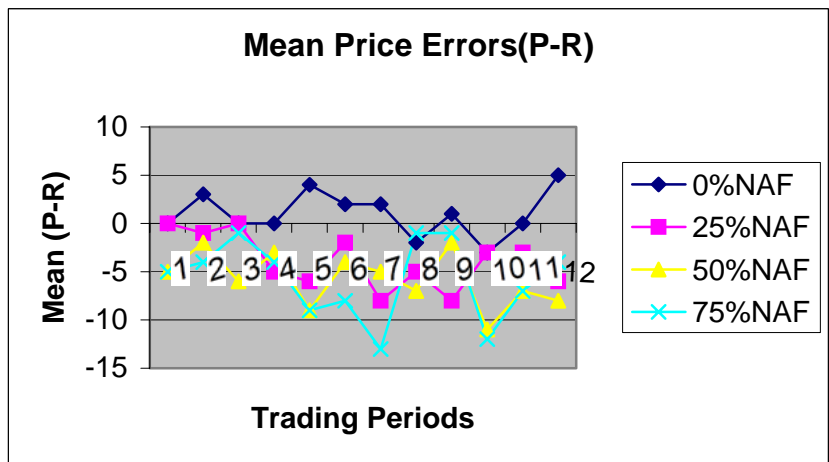
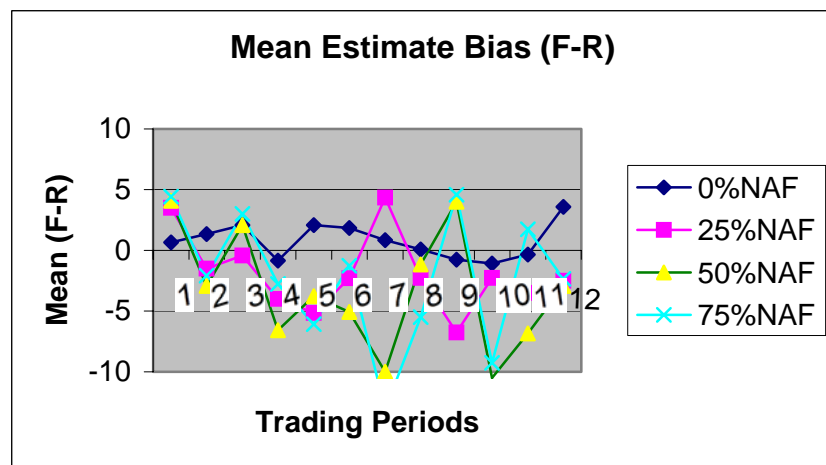
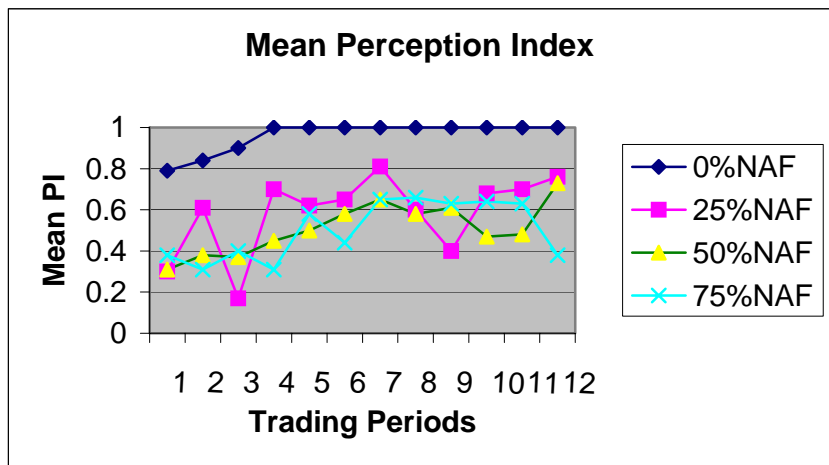


Table 1
Experimental Parameters

Panel A: Experimental Parameters

Number of market sessions	Eight sessions (two for each setting)
Length of session	Approximately two hours
Number of investors in each session	Six investors (MBA and Master of Science students)
Number of trading periods in each session	Twelve trading periods
Length of trading periods	Approximately 2 minutes
Shares and cash endowment.	8 shares and 2000 (yen experimental dollars)
Trading rules	All investors can buy and sell shares, with short sales allowed
Dividend values (D) and distribution of the values in yen	D~U (1.00, 2.00)
Error in auditor's report across settings	$e_{\text{auditor report}} (-10, 0, 10)$; $E(e_{\text{auditor report}}) = 0$
Process that determines the dividends	$D R \pm e$

Panel B: Experimental Values Assigned to Random Variables for Twelve Periods

Trading Period	Actual Values	Auditor's Report	Total Fees ²	Non-audit Fees 0%	Non-audit Fees 25% ¹	Non-audit Fees 50% ¹	Non-audit Fees 75% ¹
1	183	183	20	0	5	10	15
2	164	164	25	0	6	13	19
3	174	164	10	0	3	5	8
4	133	133	5	0	1	3	4
5	151	161	25	0	6	13	19
6	194	184	15	0	4	8	11
7	140	140	20	0	5	10	15
8	176	176	15	0	4	8	11
9	129	139	5	0	1	3	4
10	131	131	25	0	6	13	19
11	189	189	10	0	3	5	8
12	150	150	20	0	5	10	15

[¹] The percentage values are rounded to zero decimal places. [²] The total fees are based on Church et al. 2003.

Table 2
Average Perception Index (PI) and Average Deviation of Forecast from the Auditor's Report (F-R)

Panel A:					
	Trading Periods	NMAR Settings			
		0%NAS	25%NAS	50%NAS	75%NAS
Average Perception Index (PI) ^a	1-3	0.84	0.34	0.35	0.36
	4-6	1.00	0.65	0.51	0.44
	7-9	1.00	0.60	0.61	0.66
	10-12	1.00	0.71	0.56	0.55
	4-12	1.00	0.68	0.56	0.53
Panel B:					
Average deviation of forecast from the report (F-R) ^b	1-3	1.36	-1.80	1.08	1.77
	4-6	0.69	-3.83	-5.13	-3.36
	7-9	0.05	-1.56	-2.38	-4.64
	10-12	0.72	-2.75	-6.75	-4.44
	4-12	0.49	-2.54	-4.75	-4.14

^aThe perception index (PI) is 1.0 for an investor who is “Very Confident” and correct in perception of the auditor (biased or unbiased). If the investor was only somewhat confident, the index would be 8.0, if not confident, the index would be 6.0. The PI is 0.0 for an investor who is “Very Confident” but incorrect in perception of the auditor; 2.0, if somewhat confident; and 4.0, if not confident.

^b(F-R) is the investor's forecast of the asset value (i.e., reservation price) minus the auditor's report value; the difference should be zero across all settings.

Table 3
Average Deviation of Price from the Auditor's Report (P-R), and from Forecast (P-F)

Panel A:					
	Trading Periods	NMAR Settings			
		0%NAS	25%NAS	50%NAS	75%NAS
Average deviation of price from report (P-R)^a	1-3	1.00	-0.33	-4.33	-3.33
	4-6	2.00	-4.33	-5.33	-7.00
	7-9	0.33	-1.67	-4.67	-5.00
	10-12	0.67	-4.00	-8.67	-7.67
	4-12	0.99	-3.33	-6.22	-6.56
Panel B:					
Average deviation of price from the forecast (P-F)^b	1-3	-0.36	1.47	-5.41	-5.11
	4-6	1.30	-0.50	-0.19	-3.63
	7-9	0.27	-0.11	-2.27	-0.33
	10-12	-0.05	-1.25	-1.91	-3.22
	4-12	0.50	-0.62	-1.33	-2.38

^a (P-R) is the price minus the auditor's report value; the difference should be zero across all settings.

^b (P-F) is the price minus the investor's forecast; the difference should be zero across all settings

Table 4
Standard Deviation of Individual Investors Cumulative Trading Profits*

Standard deviation of investors cumulative trading profits	Trading Periods	NMAR Settings			
		0%NAS	25%NAS	50%NAS	75%NAS
	1-3	67.42	42.39	88.16	95.28
	4-6	33.62	56.27	72.66	82.84
	7-9	58.75	68.48	89.09	89.13
	10-12	20.61	42.83	81.52	97.36
	4-12	37.66	55.86	81.36	89.77

* Lower standard deviations indicate more evenly distributed profits across investors.