

## AUDIT TECHNOLOGY AND PREFERENCES FOR AUDITING STANDARDS

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This paper investigates factors associated with audit firm positions on Auditing Standards Board issues during the three-year period ending during 1984. The major finding is that firms with relatively structured audit technologies tend to favor proposed statements while firms with relatively unstructured technologies do not. Audit firm size is not associated with firm position. Also, Big 8 firms favoring proposed statements have lower staff-to-partner ratios and concentrate less in auditing. The staff-to-partner ratio is negatively associated with technology. The results' implications for auditing profession organization studies and auditing and financial reporting research are investigated.

### 1. Introduction

The cost and benefit of a system of audited accounting information is potentially affected by officially established accounting and audit reporting rules and rules governing sufficiency of audit evidence. Various theories have been proposed to explain accounting standards voting and lobbying behavior. For example, it has been suggested that Accounting Principles Board members chose accounting rules based on the preferences of the member's firm's major clients [Wheat (1972), Rockness and Nikolai (1977)]. Also, it has been argued that corporate managements lobby in support of accounting rules that benefit management [Watts and Zimmerman (1978) and Horngren (1973)]. Similarly, there have been charges that Big 8 auditing firms dominate auditing standards setting [U.S. Congress (Metcalf Report) (1976)].

In this paper, we explore auditing firm preferences and voting patterns for recent auditing and reporting issues considered by the Auditing Standards Board (ASB). Groups of firms commonly vote together (or express the same preference) on seemingly diverse issues. We propose a positive theory to explain the observed vote pattern. In particular, we hypothesize that firms' votes are a function of their use of a structured auditing technology.

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For the three-year period studied, a relative technology measure is associated with preferences for proposed statements and the size of the firm is not. This result is consistent with the proposed technology-based economic theory and inconsistent with the charge that large firms dominate the standard setting process.

The paper is organized as follows. Structured and unstructured approaches to auditing are contrasted in section 2. Sections 3 and 4 discuss the nature and role of the ASB and the audit firms' economic self-interest in codifying auditing standards respectively. Section 5 presents the issues discussed by the ASB during the three-year sample period, while section 6 describes the empirical measures used in the study. Results of the analyses are presented in section 7, followed by conclusions in section 8.

## 2. Structured vs. unstructured audit approaches

Audit firms have adopted audit technologies along a structured–unstructured continuum [Cushing and Loebbecke (1983)]. Structured firms tend to (1) require use of statistical sampling, (2) use structured internal control evaluations that culminate in a prescribed audit plan, and (3) use formal scoring sheets or rules for integrating audit test results. Examples of structured firms' techniques include Stringer (1963) (Deloitte Haskins & Sells) on dollar-unit sampling, Stringer (1975) on regression analysis in analytical review, Elliott and Rogers (1972) (Peat, Marwick, Mitchell & Co.) on statistical sampling and its relation to internal control scoring rules, and Zuber, Leisenring, Kinney and Elliott (1983) on allocating materiality among accounts to control the risk of undetected material error in financial statements. Examples of firms' operationalization of the structured approach in Statements on Auditing Standards (SASs) are provided by Holstrum and Kirtland (1982) (Deloitte Haskins and Sells), Elliott (1983), and Touche Ross & Co. (1981).<sup>1</sup>

Unstructured firms, on the other hand, tend to use less structured guidance and leave more considerations to the judgment of the field auditor. Statistical sampling may be used in some situations but its use is not required. For example, in the ninth edition of *Montgomery's Auditing* Defliese, Johnson and MacLeod (three partners of Coopers & Lybrand) (1975, pp. 146–149) discuss statistical audit sampling but emphasize a limited role for its use. Internal control evaluation aids may be used, but the auditor is not directed toward a particular conditional audit plan. Finally, the integration of test results and consideration of audit risk is not formalized. An example of an unstructured approach is provided by Sullivan (1984) (Coopers & Lybrand).

<sup>1</sup>The latter states 'The Touche Ross Audit Process is distinguished from traditional approaches through the use of a conceptual framework for *designing and structuring a detailed program* for each specific audit engagement' (emphasis added) (p. 1).

With respect to audit reporting, a structured firm is expected to specify conditions under which the auditor is to modify the audit opinion. For example, Touche Ross (1982) uses a table based on liquidity and net worth to develop the appropriate audit opinion/footnote disclosure combination for savings and loan associations. A structured firm is also expected to favor reporting options that specify criteria for opinion modification.

Finally, structured firms are more likely to believe that auditor consensus is desirable. That is, in a given situation different auditors should conduct similar audits and give the same opinion. The Mock and Turner (1981) study of auditor judgement consensus was instrumental in influencing top management of Peat, Marwick, Mitchell & Co. to adopt a more structured approach. Similar internal studies in the 1960s at Deloitte Haskins & Sells preceded development of that firm's structured approach. Unstructured firms, on the other hand, are more likely to emphasize the need for individual judgments and accept reasonable variation in audit plans and audit reports under seemingly similar circumstances.

In this paper we assume that a firm chooses a technology and then expresses a preference for profession-wide auditing standards that are consistent with that technology. We do not have a well developed theory to predict the firm's choice of technology, so to help develop such a theory data are collected on several firm-specific organizational factors that we expect are related to technology choice. Specifically, data are collected on (1) the number of auditors in each firm, (2) audit staffing (ratio of audit staff to audit partners), (3) audit concentration (ratio of audit fees to total fees), and (4) an estimate of the average stock price beta for each firm's client portfolio.

### **3. The Auditing Standards Board**

The ASB is the American Institute of Certified Public Accountant's (AICPA) senior technical body charged with interpreting generally accepted auditing standards. It is comprised of fifteen AICPA members with no more than five members from Big 8 firms. The Board has always included five members from Big 8 firms, nine members from non-Big 8 firms and one member from academia.

The Board was formed in 1978 as a result of the recommendations of the Commission on Auditors' Responsibilities which were, in part, a reaction to the Metcalf Report of 1976 [U.S. Congress (1976)]. The Metcalf Report charged that the Big 8 had dominated the AICPA which in turn had dominant influence over both the Financial Accounting Standards Board (FASB) and the ASB's predecessor, the Auditing Standards Executive Committee. The Report notes (p. 11) that all Big 8 firms and 14 of the largest 15 CPA firms then had members on the Auditing Standards Executive Committee. Hence, large firms controlled 14 votes on the 21-member Committee. The Big 8 or the largest 15

firms might dominate Committee votes by voting large firm interests as a block. Whether large firms did, in fact, vote as a block was not established. However, partly in reaction to the Metcalf Report, the 1977–78 Auditing Standards Executive Committee was restructured to include only five members from Big 8 firms. In 1978, the Committee became the 15-member ASB with a maximum of five Big 8 firm members.

The ASB's charge includes responsibility for 'promulgation of auditing standards and procedures to be observed by members of the AICPA in accordance with the Institute's rules of conduct' [AICPA (1984, app. A)]. The ASB issues SASs which are interpretations of the ten Generally Accepted Auditing Standards (GAAS). GAAS and SASs are used by the legal system as the basis for determining whether an auditor has conducted an adequate or 'standard quality' audit under the common law or the securities acts. Thus, the ASB's activities lead to pronouncements with quasi-legal stature.

Most proposed SASs add structure or require auditor actions with respect to audits under GAAS in that they specify application of certain procedures, consideration of certain factors or denote conditions under which particular reports are to be given. These SASs provide the primary focus of this paper.

Some proposed SASs do not relate to required audit actions or practices and hence do not affect audit structure. For example, some proposed SASs that arise in response to an interest by governmental regulatory bodies do not affect audit structure. These include SAS No. 41 entitled 'Working Papers' and SAS No. 46 entitled 'Consideration of Omitted Procedures After the Report Date'. Neither statement affects how standard quality audits are to be conducted. Other standards limit the nature and extent of auditor responsibilities, thus leading to a better public understanding of the auditor's role (e.g., SAS No. 16 entitled 'The Independent Auditor's Responsibility for the Detection of Errors and Irregularities').

#### **4. Economic self-interest in audit standard setting**

An audit firm can benefit from SASs in several ways. The codification and structuring of audit practice can increase the value of the signal sent by the firm's audit, enable the firm to reduce its staff training costs, reduce its legal costs and reduce the likelihood that more costly government regulation of auditing will be imposed.

AICPA membership implies adherence to that bodies' standards and hence can provide a positive signal on the member firm's audit quality. In that case some firms may choose to free-ride on the signal by joining the AICPA and then not complying with the AICPA's standards. To the extent that SASs make detection and punishment of such free-riding more cost-efficient, they reduce its frequency and increase the value of the signal. Also, since SASs are taught

in colleges and universities, staff training costs can be reduced [Hicks (1974) and Mautz (1958)].

Since SASs are used by the legal system to determine whether an auditor has conducted an adequate audit, SAS codification of audit practice enables the audit firm to adopt audit practices that reduce its legal liability and expected legal costs. To the extent that SASs improve average audit quality, they reduce the number of audit failures. This, in turn reduces the likelihood of costly government intervention in auditing.

The above benefits of best audit practice codification via SASs apply to auditors in general. However, the costs of codification are likely to vary across firms. SASs that increase audit structure will be less costly for audit firms that have adopted a structured audit technology similar to that required by the SASs. They will be more costly for audit firms that use an unstructured technology. Those unstructured firms will have to incur costs to implement the technology. Further, the structured technology is likely to be less efficient for the clients of unstructured firms. Those clients probably chose to be audited by an unstructured audit firm because that alternative was cost efficient. Thus, other things equal, structured firms are expected to support and unstructured firms are expected not to support SASs adding required audit actions.

Thus, audit firms have different economic interests in codification of some auditing standards due to differing incidence of cost. Representing those interests may economically justify a major commitment of personnel time to ASB activities, AICPA task forces and sub-committees. Hence, the auditing standards environment provides a direct link between standard setting behavior and economic self-interest.

## **5. ASB voting and the issues**

On all ASB ballots to issue an exposure draft or final pronouncement, a 60-percent majority, or nine votes, is required. Most votes are not close, however. For example, during the 1981–82, 1982–83 and 1983–84 board years twenty ballots on final statements (or separable parts of statements) were taken. All passed and fourteen were passed unanimously. Of the remaining six, two passed 14–1, two passed 13–2 and one each was passed 12–3 and 10–5 (see table 1).

There are several reasons for the strong support of a final SAS. Most issues are not controversial or have little firm-specific interest that can be identified. Also the lengthy ‘due process’ procedures and board discussions often lead to substantial agreement or a negotiated compromise on the substance or at least the wording of a proposed SAS. As board members become familiar with an issue, some positions are changed and a consensus develops. As a result of board discussions, basic changes in member’s positions have been noted. Some board members also report that they have changed their personal position on

Table 1  
Summary votes on SASs issued during 1981–82, 1982–83 and 1983–84.

SAS number	Title	Issue date	Vote
40	Supplementary mineral reserve information	February 1982	13–2
41	Working papers	April 1982	15–0
42	Reporting on condensed financial statements and selected financial data	August 1982	15–0
43	Omnibus SAS:	August 1982	
	1. Generally accepted auditing standards		15–0
	2. The auditor's study and evaluation of internal control		15–0
	3. Receivables and inventories		15–0
	4. Consistency of application of generally accepted accounting principles		15–0
	5. Public warehouses – Controls and auditing procedures for goods held		15–0
	6. Reports on audited financial statements		15–0
	7. The meaning of 'present fairly in conformity with GAAP' in the independent auditor's report		14–1
	8. Letters for underwriters		15–0
	9. Audit sampling		10–5
44	Special purpose reports on internal accounting control at service organizations	December 1982	13–2
45	Omnibus SAS – 1983	August 1983	
	1. Substantive tests prior to the balance sheet date		12–3
	2. Related parties		15–0
	3. Supplementary oil and gas reserve information		15–0
46	Consideration of omitted procedures after the report date	September 1983	14–1
47	Audit risk and materiality in conducting an audit	December 1983	15–0
48	The effects of computer processing on the examination of financial statements	July 1984	15–0
49	Letters for underwriters	September 1984	15–0

an issue but their firm (and the position expressed) has not [see Zeff (1984, p. 462) for a similar phenomenon in setting accounting standards].

Finally, once it is clear that a proposed SAS will pass, there is an incentive for a firm not to publicly oppose the statement and risk appearing to be out of step with the profession as a whole. Often, proposed SASs arise from a well publicized audit failure or practice problem [Jaenicke (1977, p. 79)]. To oppose such a regulation or one that has been suggested by a regulatory body such as

Table 2

Topics on the ASB agenda during the period 1981–84, the hours of agenda time for each topic and the ASB's action on the topic.

Topic	Hours of agenda time	Resolution
Audit risk and materiality	65 <sup>a</sup>	SAS No. 47
Contingencies and uncertainties	56 <sup>a</sup>	Tabled, April 1984
Forecasts and projections	54 <sup>a</sup>	Exposure draft
Consideration of omitted procedures after the balance sheet date	26 <sup>a</sup>	SAS No. 46
Levels of assurance	25	Under discussion, not voted
Letters to underwriters	24	SAS No. 49
Substantive tests prior to the balance sheet date	22 <sup>a</sup>	SAS No. 45, part 1
Audit sampling	7 <sup>a</sup>	SAS No. 43, part 9
Twenty-seven other topics <sup>b</sup>	151	Various resolutions
Total	430	

<sup>a</sup> Topic is included in analysis (53% of total).

<sup>b</sup> Each topic comprised less than 5% of total hours.

the SEC or the AICPA's Public Oversight Board may appear to be self-serving. Thus the great majority of final votes are unanimous or nearly unanimous.

In contrast to final ballots, votes for exposure and intermediate votes for continuing development of a statement are sometimes close. During its 1981–82, 1982–83 and 1983–84 years, the board had an agenda of 35 basic topics with six yielding three or more members opposed. In the empirical work to follow we focus on these three board years and six issues since principal votes by each board member are recorded.<sup>2</sup>

Seven issues, each accounting for more than five percent of the total agenda time, collectively consumed 272 hours or 63% of the total hours for the three-year period (see Table 2). Two of these are not analyzed. 'Levels of Assurance' had not progressed beyond the preliminary discussion stage as of September 30, 1984, and no preference votes had been taken. 'Letters to Underwriters' (SAS No. 49) passed unanimously in both its exposure draft and final form. Thus, while these topics consumed considerable Board time there was no measure of preference in one case and no apparent controversy in the other.

Five of the seven time consuming issues had exposure draft ballots with three or more votes against exposure. A sixth issue, deferral of the effective

<sup>2</sup> Summary vote tallies are available for issues of prior years, but individual votes are identifiable only for SASs that were ultimately issued. This lack of record for intermediate preference votes by members has impeded the work of prior researchers in audit standard setting voting behavior [Pearson, Lindgren and Myers (1979)] and in accounting standards [e.g., Selto and Grove (1982)].

date of SAS No. 39, regulating audit sampling, accounted for only seven hours of board time but passed 10–5 in 1982 (culminating in SAS No. 43, part 9), and a second deferral proposal failed 8–7 in 1983. This issue is included because of the strong disagreement and SAS No. 39 consumed about 10% of the 1980–81 board's meeting time.

Thus, six 'controversial' issues from the ASB's agenda for 1981–84 are analyzed. The six issues are:

1. deferral of the effective date of 'Audit Sampling' (SAS No. 39),
2. exposure of 'Audit Risk and Materiality' (SAS No. 47),
3. exposure of 'Substantive Tests Prior to the Balance Sheet Date' (SAS No. 45, part 1),
4. exposure of 'Prospective Financial Statements',
5. exposure of 'Consideration of Omitted Procedures after the Report Date' (SAS No. 46), and
6. preference votes to continue development and exposure of a proposal to eliminate 'subject to' qualifications as an auditor's reporting option for client uncertainties.

Each of SAS No. 39 and issues 2, 3 and 4 potentially add structure to the audit process. Both SAS No. 39 and SAS No. 47 concern the sufficiency of audit evidence and both consider control of the risk of incorrectly accepting financial statements that are materially in error. SAS No. 39 is focused at the account balance level, while SAS No. 47 focuses on the aggregate or financial statement level.<sup>3</sup> SAS No. 45, part 1, provides a framework of required considerations if principal detailed audit tests are applied prior to the balance sheet date. Finally, the exposure draft of 'Prospective Financial Statements' gives requirements as to evidence and the report form for such forward-looking information.

According to the arguments of section 4, structured firms are expected to support proposals 2, 3, and 4, which increase audit structure, and to oppose deferral of the effective date of SAS No. 39, which also would increase audit structure. Unstructured firms are expected to oppose proposals 2, 3 and 4, and to favor deferral of SAS No. 39.

Deferral of SAS No. 39 perhaps best illustrates a technology based controversy. SAS No. 39 was approved in June 1981, by a 15–0 vote (with a qualified assent by A. Mentzel of Coopers & Lybrand). For various reasons,

<sup>3</sup>Existing standards provide some structure, of course, and compliance with them shows firm preferences. In a study of a firm procedures manuals and training materials Cushing and Loebbecke (1983) found, for example, that five of the twelve largest firms do not document 'preliminary estimates of materiality' that are discussed in SAS No. 22.



SAS No. 39 was given an effective date for audit periods ending after June 23, 1982. In March 1982, several requests from small firms led to a proposal to delay the effective date until June 23, 1983. A majority of the board agreed (10–5) and the proposal was made a part of the ‘omnibus’ SAS No. 43. In March 1983, a request from the Technical Issues Committee of the AICPA’s Private Companies Practice Section and approximately 200 supporting comment letters led to Board consideration of a second deferral of SAS No. 39’s effective date.<sup>4</sup> The second proposal to defer received an 8–7 vote, and thus was one vote short of the required 60 percent majority.

SAS No. 46 gives guidance on what the auditor should do when he or she decides that a standard quality audit may not have been conducted. It arose from a request from the AICPA’s Public Oversight Board after the peer review process had indicated that some auditors had not been applying ‘auditing procedures considered necessary... in the circumstances...’ The SAS does not add requirements for a standard quality audit and, therefore, yields no technology-based predictions of support. However, due to the Public Oversight Board’s interest the SAS might reduce audit firms’ expected cost of government intervention [see Watts and Zimmerman (1979)]. Thus, support by larger, more politically visible, audit firms might be expected.

The technology-based theory of section 3 can lead to alternative predictions of support for eliminating the ‘subject to’ opinion reporting option. Therefore, some background on ‘subject to’ opinions and their proposed elimination is needed. Auditor reporting on uncertainties as specified in SAS No. 2 allows the auditor to issue an uncertainty qualified ‘subject to’ opinion, but criteria for when such an option is required or desirable is largely unspecified. Paragraph 24 states: ‘When there are material uncertainties, the outcome of which is not susceptible of reasonable estimation, the auditor *should consider* whether to express an unqualified opinion or to qualify his opinion’ (emphasis added). However, there are no criteria for determining whether to qualify for ‘reasonably possible’ material losses [AICPA (1984), section 9509.14].

Criteria based on the auditor’s assessment of the probability distribution of possible losses could, of course, be specified. Such criteria are problematic, however, since auditors report on conformity of client financial statements with GAAP and, under Statement on Financial Accounting Standards No. 5 (section 4311), management is not required to elaborate with respect to their assessment of the probability distribution on loss contingencies. Furthermore, for loss contingencies involving lawsuits, elaboration by the auditor might result in a self-fulfilling prophesy. Thus, even auditors who prefer structure are

<sup>4</sup>The Technical Issues Committee Chairwoman had requested such letters from managing partners of members of the Division of Firms of the AICPA. Five unsolicited letters were received from such firms in favor of retaining the effective date. All five were from members of an association of firms that use dollar-unit sampling.

not expected to support specific reporting criteria beyond that required of management under GAAP.<sup>5</sup>

One can argue that elimination of the reporting option is a feasible solution to the lack of criteria problem and would be supported by structured firms as a means of reducing variation in reporting. Alternatively, since elimination leads to fewer required audit considerations, one might argue that elimination would be supported by unstructured firms or that since no required actions are added, the theory yields no predictions. Thus, technology-based predictions are less clear on this issue than the other five.

## 6. Empirical measures

Twenty-three practicing auditors from twenty-two different firms served on the board for at least one of the 1981–82, 1982–83 or 1983–84 board years. These firms' positions on the six issues are measured by the actual votes expressed by its member (if the firm is represented at the time of the vote) *or* by the position taken in firms' public comment letters on exposure drafts issued and positions taken in ASB task force meetings (if the firm is not represented at the time of a ballot). Thus, 107 votes or stated preferences of 22 firms are available for the six controversial issues discussed in section 5.

Preferences on all issues are scored on a three-point scale. For the four exposure drafts (issues 2, 3, 4 and 5), a '3' is assigned if the board member (or firm) assented, '1' is assigned if the member dissented, and '2' is assigned for a qualified assent or a neutral position.

Deferral of SAS No. 39 was balloted twice. A '3' is assigned if a member expressed a preference *not* to defer (i.e., to make the statement effective as planned), on either (single) ballot or on both ballots if the member expressed a preference both times. A '1' is assigned if either single ballot or both ballots supported deferral, and '2' is assigned if a member supported deferral on the first ballot and did not support deferral on the second.

During the 1981–82 board year, the proposed elimination of 'subject to' opinions was on the agenda for five meetings and a special public meeting. Four preference votes for continuing development of a proposed SAS began with a vote of 9–6 in October 1981 and ended in July 1982 with a 5–9 vote on a proposal to prepare an exposure draft.<sup>6</sup> Six members had position changes. A

<sup>5</sup>Such criteria also seem to go beyond the scope of auditing as defined under GAAS. For example, the first sentence of the *Codification* [AICPA (1984, section 110.01)] states: 'The objective of the ordinary examination of financial statements by the independent auditor is the expression of an opinion on the fairness with which they present financial position, results of operations, and changes in financial position in conformity with generally accepted accounting principles.' Also SAS No. 2 (paragraph 24) states: 'The auditor's function in forming an opinion on financial statements does not include estimating the outcome of future events if management is unable to do so.'

<sup>6</sup>The board continued to develop alternative guidance until April 1984, when the topic was tabled pending resolution of more pressing matters.

'3' is assigned to members who consistently favored elimination of 'subject to' opinions, a '1' to those consistently opposed, and a '2' to those who changed position.

To assess a firm's audit practice as to structure, a composite of expert opinion is constructed. Four members of the AICPA's statistical sampling subcommittee were asked first to classify the Big 8 firms into three categories. Following Cushing and Loebbecke (1983), the basis for classification is the extent to which a firm uses a structured guidance approach in audit sampling, internal control evaluation and integration of audit test results. The subcommittee members were asked to name the two or three most structured firms, the two or three least structured and the two to four in the middle. A '3' was assigned to most structured, '1' for least structured, and '2' for intermediate firms. After classifying the Big 8, the evaluators were asked to evaluate the three 'next seven' firms with representation on the board. In addition, each board member was asked to classify his or her own firm into one of the three groups relative to the Big 8. As indicated below, the model value of the available scores or the equally-weighted mean is used as the measure of firm technology. The two measures are consistent.<sup>7</sup>

The technology rankings have the following support. First, the interrater Spearman rank correlations are all greater than or equal to 0.80 and significant at the 0.01 level or better. Second, five of the Big 8 knew their firm's technology rankings based on an analysis of audit policy and procedures manuals as determined by Cushing and Loebbecke (1983). The reported rankings are consistent with the rankings of Cushing and Loebbecke. Finally, two firms have recently publicly discussed the relative merits of the structured and unstructured approaches to auditing [see Mullarkey (1984) and Sullivan (1984)]. Touche Ross favored a structured approach and is ranked as a structured firm. Coopers & Lybrand favored an unstructured approach and is ranked as an unstructured firm.

Following the Metcalf Report (1976), size is measured on a three-point ordinal scale grouping Big 8 firms, the 'next seven', and smaller firms not in the largest fifteen. Other measures obtained are (1) the number of auditors who were partners or employees of the firm in 1982,<sup>8</sup> (2) the staffing ratio (staff to partners) for 1982, (3) audit concentration (estimated ratio of audit fees to total fees) for 1982, and (4) the average stock price betas of each firm's client portfolio. The number of audit staff and partners are obtained from each of the 22 firms. The audit and total fee measures for the Big 8 are from the *Public Accounting Report* and average betas for the Big 8 are from Shank and Murdock (1978).

<sup>7</sup>All firms with a mode of '1' had a weighted mean of one, while the means of those with a mode of '2' ranged from 1.8 to 2.2, and the lowest mean for firms with a mode of '3' was 2.6.

<sup>8</sup>Only three of the eleven small firms had more than fifty auditors, and six had fewer than twenty-five.

Table 3  
Cross classification of audit firm size with audit firm technology.

Technology <sup>a</sup>	Size			Total
	Big 8 (n = 8)	Next 7 (n = 3)	Small firms (n = 11)	
Unstructured	2	0	9	11
Intermediate	3	2	1	6
Structured	3	1	1	5
Total	8	3	11	22

<sup>a</sup>Based on modal ranking on technology:

*Unstructured firms:* Coopers & Lybrand; Price Waterhouse; nine small firms.

*Intermediate firms:* Arthur Andersen; Arthur Young; Ernst & Whinney; Laventhol & Horwath; Main Hurdman; one small firm.

*Structured firms:* Deloitte Haskins & Sells; Peat, Marwick, Mitchell; Touche Ross; McGladrey, Hendrickson & Pullen; one small firm.

### 7. Analysis

Table 3 shows the cross-classification of technology and size as measured by the Metcalf Report classification (no  $\chi^2$  is reported due to the small expected sizes for the cells). Note that while there is a concentration of small firms in the unstructured category, there is one intermediate and one structured small firm. The structured intermediate-sized firm as well as the small firms in the structured and intermediate categories have been members of an association of CPA firms that applies a dollar-unit sampling plan as their principal sampling method. All five structured firms make extensive use of dollar-unit sampling and ordinarily specify its use by field auditors.

Table 4 shows the cross-classification of the 107 standards preferences with technology and two size measures. Panel (a) presents results for technology. If the observations in the panel are independent, the  $\chi^2$  value allows rejection of the hypothesis of independence of standards preferences and technology at the 0.001 level. Furthermore, the probability level of the  $\chi^2$  value is not sensitive to the inclusion of the mixed ('2') preference scores with either the '1' or the '3' positions. Panels (b) and (c) of table 4 present results for standards preferences and two size classifications based on the Metcalf Report (small expected sizes for the cells prevent tabulation of a valid  $\chi^2$  for a 3 x 3 table). As shown, the  $\chi^2$  is not significant whether the 'next seven' are classified with the Big 8 or with firms not in the largest 15.

The significance of the  $\chi^2$  values in table 4 is overstated by conventional tables since there are not 107 independent observations. There is only one measure of technology and size for each firm and a board member (firm) could be represented as many as six times in a row of the tables. However, the magnitude of the  $\chi^2$  statistic for panel (a) suggests that the relation between

Table 4  
Cross-classification of standards preference scores with technology and size.

<b>(a)</b>				
Technology	Standards preference scores			Total
	1	2	3	
Unstructured	26	6	10	42
Intermediate	9	9	17	35
Structured	<u>3</u>	<u>2</u>	<u>25</u>	<u>30</u>
Total	38	17	52	107

$\chi^2 = 31.241$ , Probability = 0.001

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<b>(b)</b>				
Size	Standards preference scores			Total
	1	2	3	
Big 8	15	8	25	48
Non-Big 8	<u>23</u>	<u>9</u>	<u>27</u>	<u>59</u>
Total	38	17	52	107

$\chi^2 = 0.696$ , Probability = 0.706

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<b>(c)</b>				
Size	Standards preference scores			Total
	1	2	3	
Largest 15	20	13	33	66
Small firms	<u>18</u>	<u>4</u>	<u>19</u>	<u>41</u>
Total	38	17	52	107

$\chi = 2.960$ , Probability = 0.228

preferences and technology would still be significant if this dependence is taken into account.

Table 5 shows Spearman rank correlation coefficients for preferences on each issue with technology scores and the number of auditors. Five of the correlations of technology with votes are positive, with all but one significant at the 0.02 level or better.<sup>9</sup> The only insignificant correlation is for SAS No. 46

<sup>9</sup>The relation of voting to technology may be of fairly long standing. For example, the final version of *Statement on Auditing Procedures No. 54* (AICPA, November 1972) entitled 'The Auditor's Study and Evaluation of Internal Control' had assenting votes of all 21 members of the Committee on Auditing Procedures. However, five members gave qualified assents or dissents relating to the inclusion of Appendix B on statistical sampling. Three of these were from Big 8 firms with intermediate structure, one unstructured Big 8 and one small firm. It received unqualified assents from the three structured Big 8 firms and two members from firms belonging to the same association (of dollar-unit samplers) as the two structured non-Big 8 firms in the present study. The other eleven members supporting the entire statement included an unstructured Big 8 firm, two 'next 7' firms with intermediate structure and eight small firms with unknown technologies.

Table 5

Spearman rank correlations of standards preference scores by issue with technology and size.<sup>a</sup>

Issue	Technology <sup>b,c</sup>	Number of auditors
1. Audit sampling (SAS No. 39) deferral ( <i>n</i> = 20)	0.836 (0.001)	0.270 (0.249)
2. Audit risk and materiality (SAS No. 47) ( <i>n</i> = 16)	0.816 (0.001)	0.297 (0.264)
3. Substantive tests prior to the balance sheet date exposure draft (SAS No. 45, part 1) ( <i>n</i> = 17)	0.423 (0.091)	-0.332 (0.193)
4. Prospective financial statements ( <i>n</i> = 17)	0.589 (0.013)	0.181 (0.487)
5. Consideration of omitted procedures after the report date (SAS No. 46) ( <i>n</i> = 20)	-0.037 (0.876)	0.301 (0.197)
6. Contingencies and uncertainties (subject to opinion elimination) ( <i>n</i> = 17)	0.723 (0.001)	-0.100 (0.702)

<sup>a</sup> Top entry is correlation, parenthetical entry is probability of a larger absolute value under the null.

<sup>b</sup> The correlation of technology with the number of auditors is 0.533 (probability 0.011, *n* = 22).

<sup>c</sup> Technology is measured using the equally weighted mean of technology scores.

which is the only controversial issue with no obvious expected relation between preference and technology. In contrast, none of the number of auditors with preference correlations are significant at even the 0.10 level.

Table 6 presents Spearman rank correlation coefficients for additional variables for the Big 8 firms. Included are the sum of preference scores on the six issues, technology, number of auditors, staffing ratios, audit concentration and portfolio beta. As shown in the first row of table 6, the positive correlation of the total vote score with technology is the only association significant at the 0.05 level although the staffing ratio and audit concentration are significant at the 0.10 level.

The only significant associations at the 0.10 level among variables other than the vote score are between audit concentration and portfolio beta and between technology and the staffing ratio. The latter correlation reflects the structured firms' apparent tendency to have fewer audit staff per partner than the unstructured firms. This is consistent with structured technology allowing a reduction in staff time relative to partners. It is inconsistent with the hypothesis that use of structured technology allows a wider span of control of subordinates. The audit concentration with portfolio beta correlation is influenced by the fact that Deloitte Haskins & Sells and Price Waterhouse have

Table 6

Spearman rank correlations between sum of standards preference scores, technology and audit firm characteristics<sup>a</sup> (Big 8 firms only).

	Technology <sup>b</sup>	Number of auditors	Staffing ratio	Audit concentration	Portfolio beta
Sum of standards preference scores <sup>c</sup>	0.804 (0.016)	-0.229 (0.585)	-0.663 (0.073)	-0.685 (0.061)	0.349 (0.396)
Technology		-0.085 (0.842)	-0.703 (0.052)	-0.378 (0.356)	0.194 (0.645)
Number of auditors			0.476 (0.233)	-0.072 (0.866)	-0.357 (0.385)
Staffing ratio				0.491 (0.217)	-0.524 (0.183)
Audit concentration					-0.719 (0.045)

<sup>a</sup> Top entry is correlation, parenthetical entry is probability of a larger absolute value under the null.

<sup>b</sup> Technology is measured using the equally weighted mean of technology scores.

<sup>c</sup> Over all six issues.

the two highest revenue concentrations in auditing and the two lowest portfolio betas. It is as if the low-beta firms choose auditors who concentrate in auditing as opposed to tax and consulting. However, these two firms are among the most different among the Big 8 in staffing ratios and, of course, technology.

Deloitte Haskins & Sells seems to be an outlier in that it has an unusually low portfolio beta and high audit concentration for its technology (and voting behavior). The deletion of Deloitte Haskins & Sells raises the votes with audit concentration correlation to  $-0.973$  ( $p = 0.001$ ) and the votes with portfolio beta to  $0.721$  ( $p = 0.068$ ). Also the correlation of technology with audit concentration goes to  $-0.771$  ( $p = 0.043$ ), and technology with portfolio beta to  $0.709$  ( $p = 0.074$ ). It is interesting to note that the two potential merger candidates (Price Waterhouse and Deloitte Haskins & Sells) are alike in their concentration in auditing and clients with low betas but different in technology, staff/ratio and voting behavior. With respect to the latter, the two firms did not express the same preference on any of the six controversial issues.

## 8. Conclusions

A pattern seems to exist for votes or preferences expressed on controversial auditing standards issues considered by the ASB. The pattern is related to technological preference for structured vs. unstructured auditing. Firms that use a structured approach tend to support audit procedure and audit reporting proposals that add structured guidance. Firms that follow an unstructured

approach generally oppose codification of such guidance. Furthermore, while there is some association between size and technology, there is no significant association between size and standards preferences.

These results have several implications for those concerned with audit standard setting and research in auditing. First, they suggest the concern expressed in the Metcalf Report about large firm or Big 8 dominance of the audit standard setting process is misplaced. Several large firms and several smaller firms supported each position on the controversial issues.

Second, the results suggest that the composition of the standards setting board influences the nature of auditing standards. A board comprised of members from structured firms will likely pass more structured SASs than would a board comprised of members from firms using an unstructured technology and vice versa.

Finally, researchers studying auditors' behavior with respect to procedures or reporting, or studying the organization of the profession ought to consider the potential effects of firms' technological preferences. For example, if an audit judgment experiment includes auditors from a structured and an unstructured firm, the estimate of the firm effect would include any basic technology effects. A sample from say, two structured firms would not. Similarly, a sample from a structured Big 8 and a structured small firm will likely underestimate the effects of size differences over the population of audit firms.

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