1988

Auditing Symposium IX: Proceedings of the 1988 Touche Ross/ University of Kansas Symposium on Auditing Problems

University of Kansas, School of Business

Rajendra P. Srivastava

James E. Rebele

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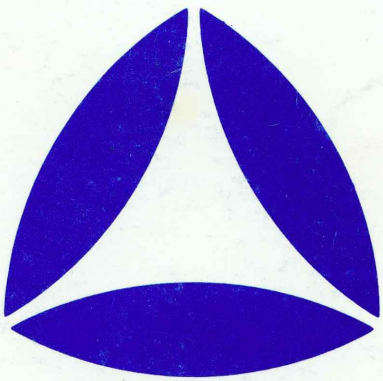

The University of Kansas, School of Business

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Touche Ross/University of Kansas Symposium on
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Edited by
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May 19 and 20, 1988
Division of Accounting
School of Business
University of Kansas
Lawrence, Kansas 66045

Published by
SCHOOL OF BUSINESS, UNIVERSITY OF KANSAS
LAWRENCE, KANSAS 66045

Distributed by
STUDENT UNION BOOKSTORE, UNIVERSITY OF KANSAS
LAWRENCE, KANSAS 66045
Price $10.00 prepaid

Printed by
UNIVERSITY OF KANSAS PRINTING SERVICE

1988 Touche Ross/University of Kansas Auditing Symposium Roster of Participants

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Wyatt, Arthur, Arthur Andersen & Co.
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Preface

The generous financial support provided by the Touche Ross Foundation has once again made this auditing symposium possible. We wish to acknowledge the encouragement and personal support for the symposium provided by David Hunerberg, partner in charge of the Kansas City office of Touche Ross & Co.

The 1988 Auditing Symposium was the ninth in the series of biennial auditing symposia to be held at the University of Kansas. Topics for the symposium, as well as the individuals to serve as presenters and discussants, were selected by us after consultation with other members of the accounting faculty at the University of Kansas. We are indebted to our colleagues in the Division of Accounting at Kansas, especially to Bruce Bublitz and Allen Ford, for their assistance in planning and administering the symposium. Dorothy Jones, Administrative Assistant for the Division of Accounting, provided valuable assistance both with the organization of the symposium and with typing part of the proceedings. Special thanks are due to Viswanathan Subramaniam for his assistance with editing the proceedings. We also wish to thank Howard Stettler, who once again was always there when we needed him.

In selecting papers for presentation at the symposium, the primary considerations were that the paper be relevant and of current interest to both academicians and practitioners. Papers presented by academicians were assigned a practitioner discussant, and vice versa. With the exception of the paper presented following the evening dinner, all papers were distributed to participants in advance. This opportunity for advance preparation by participants allows us to organize the symposium so that presenters have ten minutes to summarize the paper, while discussants have 20 minutes to comment on the paper. One hour is then available for an open discussion of each paper. As anticipated, the ensuing discussion and debate among the many distinguished auditing practitioners and academicians in attendance was both interesting and informative.

The approximately fifty academicians and practitioners who participated in the two-day symposium are listed prior to the contents page. Many others such as faculty members from accounting and other disciplines, doctoral students, and practitioners from the Kansas City area attended parts of the symposium as observers. If you would like to participate in a future symposium, we would be pleased to receive an indication of your interest.

The proceedings of each of the symposia, except the first, are still in print and may be purchased from the Kansas Union Bookstore, University of Kansas, Lawrence, Kansas 66045. Proceedings are shipped only on a prepaid basis. The prepaid price covers mailing costs with the exception of orders from outside the United States and Canada, in which case an additional $2.00 should be included for surface transportation. The papers included in each of the available proceedings and the prepaid price of each volume from the Kansas Union Bookstore are given below.

Contemporary Auditing Problems (1974) $5.00

1. Auditor Independence: Its Historical Development and Some Proposals for Research
   R. Glenn Berryman

2. The New AICPA Audit Commission—Will the Real Questions Please Stand Up?
   Stephen D. Harlan, Jr.
3. Controlling Audit Quality: A Responsibility of the Profession?
   Andrew P. Marincovich
4. Relationship of Auditing Standards to Detection of Fraud
   George R. Catlett
5. A Decision Theory View of Auditing
   William L. Felix, Jr.
6. Setting Standards for Statistical Sampling in Auditing
   John C. Broderick
7. The Sample of One: Indispensable or Indefensible?
   Gregory M. Boni
8. The Case for Continuation of Mandatory Independent Audits for Publicly Held Companies
   John C. Burton

Auditing Symposium III (1976) $5.00

1. An Auditing Perspective of the Historical Development of Internal Control
   Willie Hackett and *Sybil C. Mobley*
2. Management Behavior—An Auditing Horizon
   W. Donald Georgen
3. Symbolism and Communication in the Auditor's Report
   Lee J. Seidler
4. Risk and Uncertainty in Financial Reporting and the Auditor's Role
   D. R. Carmichael
5. Status Report on Auditing in the European Economic Community
   Richard L. Kramer
6. An Examination of the Status of Probability Sampling in the Courts
   Boyd Randall and *Paul Frishkoff*
7. Use of Decision Theory in Auditing—A Practitioner's View
   James K. Loebbecke
8. Capital Investment and U.S. Accounting and Tax Policies
   Richard D. Fitzgerald

Auditing Symposium IV (1978) $6.00

1. Internal Auditing—A Historical Perspective and Future Directions
   Victor Z. Brink
2. Analytical Auditing: A Status Report
   Rodney J. Anderson
3. Sampling Risk vs. Nonsampling Risk in the Auditor's Logic Process
   William L. Felix, Jr.
4. Third Party Confirmation Requests: A New Approach Using an Expanded Field
   Horton L. Sorkin
5. Has the Accounting Profession Lost Control of Its Destiny?
   D. R. Carmichael
6. The Role of Auditing Theory in Education and Practice
   Robert E. Hamilton
7. Resolving the Auditor Liability Problem—An Appraisal of Some Alternatives
   Richard H. Murray
8. Observations on the State of Shareholder Participation in Corporate Governance
   Barbara Leventhal

Auditing Symposium V (1980) $7.00

1. An Historical Perspective of Government Auditing—with Special Reference to the U.S. General Accounting Office
   Leo Herbert
2. Critical Requirements of a System of Internal Accounting Control
   Robert J. Sack

3. A Taxonomization of Internal Controls and Errors for Audit Research
   Miklos A. Vasarhelyi
4. An Investigation of a Measurement-Based Approach to the Evaluation of Audit Evidence
   Theodore J. Mock and *Arnold Wright*
5. A Look at the Record on Auditor Detection of Management Fraud
   Donald R. Ziegler
6. Auditing Implications Derived from a Review of Cases and Articles Related to Fraud
   W. Steve Albrecht and *Marshall B. Romney*
7. Unique Audit Problems of Small Businesses That Operate Under Managerial Dominance
   Dan M. Guy
8. The Accounting Profession in the 1980's—Some SEC Perspectives
   George C. Mead

Auditing Symposium VI (1982) $7.00

1. The Evolution of Audit Reporting
   D. R. Carmichael and *Alan J. Winters*
2. How Not to Communicate Material and Immaterial Weaknesses in Accounting Controls
   Wanda A. Wallace
3. Human Information Processing Research in Auditing: A Review and Synthesis
   Robert H. Ashton
4. Audit Detection of Financial Statement Errors: Implications for the Practitioner
   Robert E. Hylas
5. A Multi-Attribute Model for Audit Evaluation
   Theodore J. Mock and *Michael G. Samet*
6. Some Thoughts on Materiality
   Kenneth W. Stringer
7. SAS 34 Procedures vs. Forecast Reviews: The Gap in GAAS
   Robert S. Kay
8. Developments in Governmental Auditing: Their Impact on the Academic and Business Communities
   Richard E. Brown

Auditing Symposium VII (1984) $8.00

1. The Origins and Development of Materiality as an Auditing Concept
   David C. Selley
2. Auditor Reviews of Changing Prices Disclosures
   K. Fred Skousen and *W. Steve Albrecht*
3. The Case for the Unstructured Audit Approach
   Jerry D. Sullivan
4. The Case for the Structured Audit
   John Mullarkey
5. An Analysis of the Audit Framework Focusing on Inherent Risk and the Role of Statistical Sampling in Compliance Testing
   Donald A. Leslie
6. Current Developments in U.K. Auditing Research
   David R. Gwilliam
7. Let's Change GAAS!!! ??? *&#@
   Robert Mednick and *Alan J. Winters*
8. Self-Regulation: How It Works
   R. K. Mautz

Auditing Symposium VIII (1986) $10.00

1. Historical Perspective-Legal Liability
   Paul J. Ostling
2. Assertion Based Audit Approach
   Donald A. Leslie, Stephen J. Aldersley, Donald J. Cockburn and *Carol J. Reiter*
3. Product Differentiation in Auditing
   Dan A. Simunic and *Michael Stein*

Rajendra P. Srivastava
James E. Rebele.

1

Using and Evaluating Audit Decision Aids[1]

Robert H. Ashton
Duke University
John J. Willingham
Peat Marwick Main & Co.

This paper is intended to stimulate discussion among auditing practitioners and researchers about the use of audit decision aids. While audit decision aids have a long history, they are presently assuming greater importance as the auditing profession is in a period of transition from experience-based to research-based audit approaches. The issues raised in this paper may be of interest to auditing practitioners concerned with managing that transition, and to auditing researchers concerned with the scientific evaluation of audit decision aids.

The types of audit decision aids we discuss are designed to assist auditors in making decisions required in the collection and evaluation of evidence for the purpose of expressing an audit opinion or rendering other audit-related client services. Today's audit decision aids are based increasingly on the implications of research studies, typically rooted in disciplines other than auditing, that examine audit decision making in a controlled, rigorous manner. In saying this, we do not mean to imply that the trend toward research-based audit tools is restricted to the types of decision aids discussed in this paper, nor do we mean to suggest that this is a trend of recent origin. Consider, for example, earlier work in statistical sampling based on the disciplines of mathematics and statistics (e.g., Arkin [1957]), or in systems-based approaches to auditing which relied on the discipline of systems analysis (e.g., Skinner and Anderson [1966]).

The decision aids discussed in this paper are linked to an extensive body of research known as "human information processing" or "behavioral decision theory," which is explicitly concerned with understanding, evaluating, and improving decision making. In auditing, maintaining and improving the quality of decision making has been reinforced recently by governmental activities emphasizing audit effectiveness and by competitive pressures emphasizing audit efficiency. Proponents of decision aids based on the decision research literature maintain that audit efficiency and effectiveness can potentially be improved by employing such aids.

The paper is organized in three major sections. First, we present an

[1] We are grateful to Alison Ashton, Lisa Koonce, Jim Loebbecke, Bill Messier and Ira Solomon for comments on an earlier version of this paper.

overview of audit decision research and the decision-aid development efforts to which it is linked. Second, we argue that the effectiveness of audit decision aids should be evaluated, instead of being accepted on faith alone. Topics discussed include: (1) the issue of choosing whether to use audit decision aids or, alternatively, to train auditors to improve their decision making, (2) various claims made by developers and proponents of decision aids (in auditing and elsewhere), and (3) specific considerations involved in the validation of audit decision aids. The final section of the paper outlines some potential effects (both positive and negative) of using decision aids in audit practice. There we examine possible effects on both individual auditor judgment and the auditing firm that employs decision aids.

Research & Development in Audit Decision Making

This section provides an overview of (1) contemporary research in audit decision making, and (2) development efforts, in the form of audit decision aids, which are closely linked to this research. We do not attempt to provide a comprehensive review of audit decision research (see, e.g., Ashton [1982a,b; 1983], Libby [1981], Mock and Turner [1981], and Ashton et al. [1989] for reviews). Moreover, by restricting our focus to audit decision aids we do not mean to imply that this is the only area in which audit decision research has had an impact on practice or policy making (see, e.g., Elliott and Jacobson [1987], Kinney [1981], and Ward [1987] for additional discussion). Instead, the purpose of this section is to provide some perspective for the later discussion of audit decision aids.

Research in audit decision making is based on the theoretical perspectives and research methods of cognitive psychologists, economists, decision theorists and others concerned with how people do (and should) make decisions. The ultimate goal of the research is to provide a scientific basis for improving audit decisions, thus favorably impacting the efficiency and/or effectiveness of audits. More proximate goals are to evaluate audit decision making in order to know whether (or in what respect) decisions might need improvement, and to understand audit decision making in order to be able to evaluate it. Thus, the research is concerned with *how* audit decisions are made, with *how well* they are made, and with ways of making them *better.*

While some audit decision research might be considered basic, most of it has a strong applied flavor. Applied and basic research can be distinguished in that applied research concerns the scientific discovery of knowledge having applicability to specific, identifiable problems in the short run, while problem specificity and a short-run perspective are not necessary features of basic research. Both applied and basic research can be distinguished from development in that development concerns the practical *use* or implementation of knowledge—often by designing and producing new processes, systems or other devices—but does not involve the *discovery* or production of new knowledge [Ashton, 1981; Kaplan, 1977].

Research

Audit decision making research has addressed several phases of the audit, including evaluation of analytical review results, preliminary estimates of

planning materiality, internal control evaluation, decisions about compliance and substantive testing, evaluations of the work of internal auditors, going-concern evaluations, the choice of audit opinions, and reviews of financial forecasts. Most of the research has focused on issues that relate to the "tactical planning" of evidence collection activities, i.e., planning an appropriate mix of compliance and substantive tests to support an opinion on financial statements at a reasonable cost [Felix and Kinney, 1982].

One way of viewing the dominant focus of audit decision research is via the Cushing and Loebbecke [1986] framework depicted in Table 1. This framework outlines five major stages of audit activities which typically are performed in a roughly sequential fashion, as well as a sixth category, called "continuous" activities, which typically are performed at any of several stages of the audit process. Most audit decision research has addressed audit activities in stages 2 through 4 of this framework. Particular emphasis has been placed on 2.0 (i.e., all of stage 2) and on 4.5, with less emphasis on 3.0, and some on 5.1 through 5.3. Loebbecke [1983] provides examples of audit activities in all six stages of the framework to which decision research could contribute.

The existing research in audit decision making has been concerned with two broad, but related, issues—evaluating the quality of audit decision making and exploring ways of improving audit decision making. Three standards for evaluating audit decisions have been employed. First, decision *accuracy* has been used for situations in which an independent, external criterion of "correctness" has been available. Second, *statistical rationality* has been employed by focusing on whether auditors interpret and use audit evidence in a logically consistent manner. This is done by comparing audit decisions with those prescribed by normative models or statistical principles of decision making. Finally, the *consistency* of decisions—both over time and across auditors—has been assessed.

Some typical examples of results from audit decision research are as follows: (1) while auditors often are relatively accurate in repetitive decision situations, room for improvement exists because they do not always (a) perceive correctly the relevance of information used in decision making or (b) use relevant information in a consistent fashion; (2) auditors are often insufficiently sensitive to certain types of information (e.g., base rates of occurrence of certain events), and often do not fully appreciate the inverse relationship between sample size and sampling variability; (3) although individual auditors have been found to make reasonably consistent decisions over time, different auditors using the same evidence often tend to make decisions that disagree markedly. While this lack of consensus among auditors may be considered problematic per se, it also means that the accuracy and statistical rationality of audit decisions are likely to be poor for some auditors [Ashton, 1985].

This summary of typical results suggests that research in audit decision making tends to focus on the shortcomings of "unaided" decision making. In particular, much of the research has sought to identify systematic errors, biases, and inconsistencies in audit decision making. It is important to realize that this research focus describes the *entire field* of decision research, not just that in auditing. However, as von Winterfeldt and Edwards [1986, p. 530] point out in a broader context, "A research focus on systematic errors and

Table 1

A Comprehensive Outline of the Audit Process
(From Cushing and Loebbecke [1986, pp. 6-7])

1.0 PRE-ENGAGEMENT ACTIVITIES
- 1.1 Accept/Reject New Client
- 1.2 Establish Terms of Engagement
- 1.3 Assignment of Staff

2.0 PLANNING ACTIVITIES
- 2.1 Obtain Knowledge of the Business
  - 2.11 Preliminary Analytical Review
  - 2.12 Appraisal of Risk
- 2.2 Preliminary Estimation of Materiality
- 2.3 Review of Internal Accounting Control
  - 2.31 Preliminary Phase
  - 2.32 Completion Phase
- 2.4 Develop Overall Audit Plan
  - 2.41 Determine Optimal Reliance on Internal Accounting Control
  - 2.42 Design Compliance Testing Procedures
  - 2.43 Design Substantive Procedures
  - 2.44 Write Audit Program

3.0 COMPLIANCE TESTING ACTIVITIES
- 3.1 Conduct Tests
- 3.2 Make Final Evaluation of Internal Accounting Control
  - 3.21 Make Evaluation
  - 3.22 Modify Audit Plan

4.0 SUBSTANTIVE TESTING ACTIVITIES
- 4.1 Conduct Substantive Tests of Transactions
- 4.2 Conduct Analytical Review Procedures
- 4.3 Conduct Tests of Details of Balances
- 4.4 Post Balance Sheet Review Procedures
- 4.5 Evaluate Results of Substantive Procedures
  - 4.51 Aggregate Findings
  - 4.52 Make Evaluation
  - 4.53 Modify Audit Plan
- 4.6 Obtain Representations
  - 4.61 Management
  - 4.62 Attorneys
  - 4.63 Others

5.0 OPINION FORMULATION AND REPORTING ACTIVITIES
- 5.1 Review Financial Statements
- 5.2 Review Audit Results
- 5.3 Formulate Opinion
- 5.4 Draft and Issue Report

6.0 CONTINUOUS ACTIVITIES
- 6.1 Supervise Conduct of Examination
- 6.2 Review Work of Assistants
- 6.3 Consider Appropriateness of Continuing Relationship with Client
- 6.4 Make Required Special Communications
  - 6.41 Material Weaknesses in Internal Accounting Control
  - 6.42 Material Errors or Irregularities
  - 6.43 Illegal Acts by Client
- 6.5 Consult With Appropriate Persons in Connection With Special Problems
- 6.6 Document Work Performed, Findings, and Conclusions in Appropriate Working Papers

inferential biases can lead those who read the research with an uncritical eye to the notion that such errors and biases characterize all human thinking." Common sense and informal observation suggest that this is not the case, in auditing or in the rest of life. On the other hand, it would be naive to think that human decision making is perfect, or that the shortcomings that exist will go away if ignored. Fischhoff [1982, p. 442] concluded a review of the "decision biases" literature as follows:

> An elusive summary from the present review is that people's reservoir of judgmental skills is both half empty and half full. People are skilled enough to get through life, unskilled enough to make predictable and consequential mistakes; they are clever enough to devise broadly and easily applicable heuristics that often serve them in good stead, unsophisticated enough not to realize the limits to those heuristics.

Development

Along with the emphasis on research that documents and evaluates the shortcomings of human decision making is a corresponding emphasis on the development of tools, or decision aids, that may help people to compensate for those shortcomings. The development of decision aids for improving unassisted decision making is perhaps the most direct practical result of audit decision research, as well as of decision research in general. A review of decision research in several fields observed: "The existence of biases and errors in unaided judgments is part of the motivation for aiding the judgment process; the assumption is that aided judgments are less subject to error. The aid is based on a prescriptive formulation that decomposes the problem into its separate elements and presumably helps the decision maker to overcome the limitations of unaided judgments. Thus the development of decision aids requires an understanding of the processes involved in performing the task, together with a suitable prescriptive theory that can serve as a normative formulation for the problem" [Pitz and Sachs, 1984, p. 155].

Following Rohrmann [1986, p. 365], we define a decision aid as

> ". . . any explicit procedure for the generation, evaluation and selection of alternatives (courses of action) that is designed for practical application and multiple use. In other words: a [decision aid] is a technology, not a theory."

Auditing firms have always used decision aids. Examples are audit programs, internal control questionnaires, and various types of checklists [Elliott and Kielich, 1985]. Such aids are simply tools based on the accumulated experience of generations of auditors. In this sense, audit tools are analogous to the tools of everyday life, as experience is the earliest basis for tool development. The archaeological scholar Childe [1954, p. 9] noted that

> Even the simplest tool made of a broken bough or a chipped stone is the fruit of long experience—of trials and errors, impressions noticed, remembered, and compared. The skill to make it has been acquired by observation, by recollection, and by experiment. It may seem an exaggeration, but it is yet true to say that any tool is an embodiment of science. For it is a practical application of remembered, compared, and collected experiences of the same kind as are systematized and summarized in scientific formulas, descriptions, and prescriptions.

Such tools are based on organized knowledge, not on the results of research in decision making. In contrast, many of today's audit decision aids are research-based, and it appears that the trend toward the use of research-based audit tools will accelerate. Examples of research-based audit decision aids are paper-and-pencil worksheets and quasi-statistical formulas for determining non-statistical sample sizes [AICPA, 1983; Elliott, 1983], multiple regression and discriminant models for predicting going-concern problems (e.g., Altman and McGough [1974], Kida [1980]), and time series and regression models for identifying unusual fluctuations in analytical review [Arrington et al. 1983; Kinney, 1983]. Audit decision aids of this type are discussed by Ashton [1983] and Libby [1981].

The most elaborate (and costly) form of audit decision aid is knowledge-based expert systems. We rely on Rauch's [1984, p. 55] definition:

> . . . a class of computer programs intended to serve as consultants for decision making. These programs use a collection of facts, rules of thumb, and other knowledge about a limited field to help make inferences in the field. They differ substantially from conventional computer programs in that their goals may have no algorithmic solution, and they must make inferences based on incomplete or uncertain information. They are called expert systems because they address problems normally thought to require human specialists for solution, and knowledge based because researchers have found that amassing a large amount of knowledge, rather than sophisticated reasoning techniques, is responsible for the success of the approach.

Essentially, a knowledge-based expert system is a computational method of performing a decision task which uses an explicit representation of an expert's knowledge, generally in the form of a series of "if-then" rules instead of in the form of a statistical formula such as multiple regression or discriminant analysis [Chignell and Smith, 1985b]. Expert systems have received substantial attention from researchers in the field of artificial intelligence (e.g., Bobrow et al. [1986], Chignell and Smith [1985a], Davis [1982], Duda and Shortliffe [1983], Michie [1980], Stefik et al. [1982]), and the accounting profession is currently exploring their potential applications in auditing, taxation, and management advisory services [AICPA, 1987]. Abdolmohammadi [1987] and Messier and Hansen [1987] provide reviews and discussions of expert systems in auditing.

Evaluating Audit Decision Aids

Even though decision research may demonstrate errors, biases and inconsistencies in audit decision making, it does not necessarily follow that decision aids should be developed and used. Lewis et al. [1983] point out that the expected benefits of using decision aids must exceed their costs, and that the *reasons* for biases and inconsistencies must be understood before appropriate aids can be identified. Moreover, using decision aids may not be the only way to reduce biases and inconsistencies. An alternative is to train auditors to improve unassisted decision making.

Decision Aids vs. Training

Under what conditions is the development of audit decision aids preferable

to training? In a more general context, Fischhoff [1982, p. 424] provides some insights into the question of aids vs. training by discussing "whether responsibility for biases is laid at the doorstep of the judge, the task, or some mismatch between the two." Fischhoff argues that the appropriate "debiasing" strategies depend on the source of the bias, as summarized in Table 2.

The strategies listed in part 1 of Table 2 address potential methodological problems of the research studies which have demonstrated biases. Although of considerable importance in the design of future studies, they need not concern us here. Assuming that current research results in audit decision making can be validly interpreted as indicating biases and inconsistencies, as we believe they can, parts 2 and 3 of the table are relevant to the present discussion.

If the source of the problem is thought to be faulty judges (auditors), Fischhoff argues that the appropriate debiasing strategies depend on whether the judges are considered "perfectible" or "incorrigible." If they are considered "perfectible," then some type of training, ranging from a simple

Table 2

Debiasing Strategies According to Underlying Assumption About the Source of the Bias (From Fischhoff [1982, p. 424])

Assumption	Strategies
1. Faulty tasks	
a. Unfair tasks	Raise stakes
	Clarify instructions/stimuli
	Discourage second-guessing
	Use better response modes
	Ask fewer questions
b. Misunderstood tasks	Demonstrate alternative goal
	Demonstrate semantic disagreement
	Demonstrate impossibility of task
	Demonstrate overlooked distinction
2. Faulty judges	
a. Perfectible individuals	Warn of problem
	Describe problem
	Provide personalized feedback
	Train extensively
b. Incorrigible individuals	Replace them
	Recalibrate their responses
	Plan on error
3. Mismatch between judges and tasks	
a. Restructuring	Make knowledge explicit
	Search for discrepant information
	Decompose problem
	Consider alternative situations
	Offer alternative formulations
b. Education	Rely on substantive experts
	Educate from childhood

warning that judgment biases may exist to an extended training program aimed at controlling particular biases, is suggested. In this case, having auditors participate in "decision exercises" such as those discussed by Ashton [1984] might be useful. However, if the judges are considered "incorrigible," then Fischhoff suggests replacing people with "some superior answering device" (p. 426), adjusting their responses if the direction and magnitude of their biases are predictable, or somehow allowing for their biases when planning actions based on them. Thus, according to Fischhoff, if individual decision makers are considered "perfectible," training is suggested, while if they are considered "incorrigible," some type of decision aid may be more appropriate.

On the other hand, if the source of bias and inconsistency is thought to be a mismatch between the judge and the task (part 3 of Table 2), then either a restructuring of the "person-task system" is needed to increase their compatibility, or extensive education is needed for developing general capabilities (as opposed to training for developing specific skills). Restructuring, which is closely allied with the use of decision aids, can involve "(a) forcing respondents to express what they know explicitly rather than letting it remain 'in the head'; (b) encouraging respondents to search for discrepant evidence, rather than collecting details corroborating a preferred answer; (c) offering ways to decompose an overwhelming problem to more tractable and familiar components; (d) suggesting that respondents consider the set of possible situations that they might have encountered in order to understand better the specific situation at hand; and (e) proposing alternative formulations of the presented problem. . . ." [Fischhoff, 1982, p. 427].

In summary, Fischhoff is essentially arguing that using decision aids is likely to be preferable to training when it is possible to restructure the decision task to a form more compatible with the decision maker's information-processing capabilities, or when the success of training efforts is considered highly uncertain. While Fischhoff does not explicitly consider either the costs of training or the costs of developing decision aids, the relative costs of these two alternatives are obviously important. What do we know about the relative costs (or effectiveness) of training and decision aids in auditing? Under what conditions, or for which types of decisions, is one likely to be more effective or less costly than the other? Which specific form of training, or of decision aid, is likely to be most effective for particular types of decisions? While the present paper deals with decision aids instead of with training, it is important to realize that audit decision aids are but one of a larger class of "decision improvement options" [Libby, 1981] that could be pursued.

Claims About Decision Aids

Suppose the option of developing decision aids has been chosen over training, at least for certain types of audit decisions. What benefits can decision makers expect from using these aids? Rohrmann [1986, p. 368] observes that "Decision makers above all ask for 'good' decisions that solve their problems, but they also want quick and cheap and comprehensible procedures." Developers and proponents of decision aids claim that such aids offer all of these features. As Rohrmann notes, "The developers claim [that decision aids] make decisions easier and better because they decompose the decision process into comprehensible parts, reveal goals and preferences, guide information search

and integration, and are based on a rational concept . . . for the comparison, evaluation and selection of alternatives" (p. 363). In a similar vein, Hammond et al. [1980] identify six sets of claims that are often made about the value of decision research for aiding decision makers. These claims are summarized in Table 3.

Some of the claims identified by Hammond et al. [1980] are (implicitly or explicitly) made about decision aids in auditing. The principal claims, at least for relatively simple aids involving discriminant and regression models and "structured" paper-and-pencil aids, relate to the accuracy and consistency of audit decisions (e.g., Ashton [1983], Libby [1981]). It is often claimed that (1) when correct answers exist, aided audit decisions will, over a series of decisions, be more *accurate* than unaided audit decisions, and (2) whether or not correct answers exist, aided audit decisions will be more *consistent,* i.e., less variable, both over time and across auditors, than will unaided audit decisions.

The claims for expert systems are similar but, like the systems themselves, are more elaborate. In addition to aiding audit decision making by structuring problems, indicating pertinent information sources, and combining information to reach a preliminary recommendation [Wright, 1984], it is also claimed that expert systems will (1) enable expertise to be distributed throughout the audit firm (e.g., to personnel at multiple locations) and, particularly, to be "pushed down" to lower organizational levels, (2) facilitate

Table 3

Claims About the Value of Decision Research for Aiding Decision Makers
(Adapted from Hammond, McClelland and Mumpower [1980, pp. 108-110])

1. Clarifies thinking
2. Educates the decision maker
    a. Makes hidden assumptions and implicit tradeoffs explicit
    b. Forces consideration of the consequences of actions
    c. Identifies what is important for making decisions and where more information is needed
    d. Identifies what is *not* important for making decisions (a by-product of 2c)
    e. Forces explicit recognition of uncertainty
    f. Facilitates understanding of the complete problem
3. Promotes improved communication
    a. Helps decision maker communicate, defend, and justify decisions and actions
    b. Helps resolve conflicts among decision makers
    c. Facilitates training of new decision makers
    d. Facilitates intellectual, nonemotional discussion of important issues
4. Promotes a policy perspective
    a. Saves time, money, and unhappiness
    b. Facilitates adaptation to new information or changing values
    c. Facilitates the "passing on" of policy to future decision makers (similar to 3c)
    d. Facilitates dissemination of policy to those affected
5. Helps distinguish preferences for consequences from beliefs about whether consequences will occur
6. Creates new solutions, insights, and alternatives

staff training by focusing on simulated audit problems and the knowledge needed to solve them, (3) ease documentation efforts by printing out a record of the process used by the system to make a recommendation, (4) improve the consistency of decisions over time and across auditors, and (5) result in less time devoted to decision making by eliminating time that is wasted on factors irrelevant to the decision (e.g., Elliott and Kielich [1985], Wright [1984]).

Validation of Decision Aids

While the importance of validating decision aids has been recognized (e.g., Gaschnig et al. [1983], O'Leary [1987], Pitz and Sachs [1984]), it has often been noted that few attempts at systematic evaluation have been made, particularly by independent evaluators [Fischhoff, 1980; Hammond et al. 1980; Rohrmann, 1986]. Instead, evidence about the effectiveness or efficiency of aided decision making is largely anecdotal, having been acquired on a trial-and-error basis in the field. However, aided decision making should be evaluated scientifically for the same reasons that *unaided* decision making should be evaluated—to understand the conditions under which it is effective, and to provide a sound basis for improving it when needed. An additional reason for evaluating aided decision making is that decision aids are not costless.

How should one evaluate decision aids? Two broad approaches are to evaluate the *process* embodied in the aid or to focus on the *outcomes* generated by it. Process-oriented evaluations, which may be particularly germane for expert systems, focus on the mechanism by which outputs are generated from inputs, and may include examination of information search, information processing, and the interaction between the aid and the user (e.g., problem clarification, explanation capability, and documentation). The major drawback of process-oriented evaluations is that evidence about improved decisions is only indirect. In contrast, outcome-oriented evaluations focus explicitly on the quality of decisions made with benefit of the aid, but only provide information on *whether* an aid is effective or ineffective, not *why* [Jungermann, 1980; Rohrmann, 1986].

While we recognize that multiple approaches to decision aid evaluation are likely to be necessary, and that different evaluation standards are likely to be most appropriate at different points in the development and use of an aid, more attention to outcome-oriented evaluations seems desirable. The reason is that outcome-oriented evaluations are more direct and meaningful than process-oriented evaluations in terms of discovering how well the aid "really works." With a few exceptions (e.g., bankruptcy or insolvency predictions), it is likely to be impossible to evaluate the performance of a decision aid against observable, empirical outcomes since unassailable "correct answers" are seldom known in auditing. This does not mean, however, that *all types* of outcome-oriented evaluations are impossible. One alternative, which has been used occasionally, is to compare aided decisions with those prescribed by normative models or statistical principles of decision making.

Another possibility, which seems to have gone largely unnoticed in discussions of decision aids, is to compare decisions aided by one type of decision aid with those aided by some other type of decision aid. Such an evaluation might be especially informative in the case of expert systems, particularly if decisions aided by expert systems are compared with those aided

by simpler tools such as multiple regression or discriminant analysis. In many situations, of course, it will not be possible to construct regression or discriminant models based on relationships among environmental data because correct answers are not known. However, "policy-capturing" models, based on relationships among observable input variables and a series of actual decisions, can still be used. Much research has shown that simple policy-capturing models consistently outperform unaided human judgment in repetitive decision situations (see, e.g., Ashton [1982a], Libby [1981]), and it is an open question as to how well policy-capturing models would fare against complex expert systems. A conceptual (nonempirical) analysis by Carroll [1987] concludes that expert systems are *unlikely* to achieve the performance level of policy-capturing models. (See Hammond [1987; 1988] for related discussions.)

Even if an expert system performs better than a policy-capturing model or some other relatively simple decision aid in the same decision task, the difference in the costs of the two alternatives must be considered. The high cost of expert systems in auditing—related to development, knowledge acquisition, maintenance, updating, and preparation of user guides and training manuals (see Elliott and Jacobson [1987])—suggests that the cost difference between these two alternatives could be substantial. Obviously, if the cost difference between any two types of decision aids is sufficiently large, the one that performs better on such criteria as accuracy and agreement with experts is not necessarily the one that should be used. Of course, a similar statement can be made about comparing any type of aided decision making with *unaided* decision making: the increased cost associated with an aid could more than offset the benefits in terms of improved decision quality. Conversely, if the aid results in net cost savings, for example, by reducing the number of staff personnel required, then some *decrease* in decision quality associated with the aid might be acceptable. The point is that both costs *and* benefits of decision aids are important.

The most common standard against which the outputs of decision aids are compared is unaided decision making. The unaided decisions are sometimes those of the experts whose knowledge was used in developing the aid, and are sometimes those of experts, novices, or other individuals who are independent of the development of the aid. While such comparisons are subject to all of the problems inherent in using consensus as a decision-evaluation criterion (e.g., people's decisions may agree perfectly yet all be wrong [Ashton, 1985]), in some situations this approach to "validation" may be the only one available. However, a standard that may be preferable to an individual's decision is a composite, or average, of the decisions made by several individuals. Research has shown repeatedly that composite decisions are more likely to be correct than are individuals' decisions (e.g., Ashton and Ashton [1985], Ashton [1986]).

As noted earlier, little evidence is available about the impact of decision aids on outcome-oriented decision variables. Most of the research in this area involves complex decision support systems in non-auditing settings. Sharda et al. [1988] review 24 such evaluations and report an additional study of their own. The studies reviewed are grouped into four types, according to research method: case studies (4), field studies (6), field tests (3), and laboratory studies

(11). Field studies are distinguished from field tests in that the former typically involve no experimental control, while in the latter, the evaluator tries to manipulate some aspect(s) of the decision aid and control for other factors that could influence the study's results.

Sharda et al. [1988, p. 140] point out that most claims regarding the effectiveness of decision support systems are based on case and field studies instead of on field tests or laboratory studies, which they maintain "is unfortunate as the latter two methods . . . allow for stronger inferences to be drawn." Their review of field tests and laboratory studies finds that the evidence is inconclusive, as evaluations have uncovered positive effects, no effects, and negative effects of decision support systems on various output-oriented measures of decision quality (e.g., average profit per period, variability of profit over periods, cost, and decision time). Aldag and Power [1986] review several additional studies of computer-assisted decision making with similarly inconclusive results.

Two studies have focused on the use of simple decision aids in auditing. Butler [1985] had 18 auditors from five firms of varying sizes make an assessment of sampling risk when evaluating the sample results of accounts receivable confirmations. Prior to making their risk assessments, 11 of the auditors had to answer four questions that were intended to remind them of factors relevant to an assessment of sampling risk, while the remaining seven auditors were not exposed to these questions. This "attention directing" device was considered a decision aid for the purposes of this study. A statistically-determined measure of sampling risk, based on a multinomial dollar-unit sampling program, constituted a normative criterion against which the aided and unaided risk assessments were compared. The results showed that the auditors who were exposed to the decision aid made risk assessments that were closer to the normative criterion, and also made more correct accept/reject decisions about the account balance, than the auditors who were not exposed to the aid.

While Butler [1985] focused on the evaluation of sample results, Kachelmeier and Messier [1988] studied the choice of sample sizes by auditors. In a supplies inventory context, 180 auditors from two Big Eight firms (1) provided sample sizes without the availability of a decision aid (the "intuitive" group), (2) calculated sample sizes using a formal decision aid (the "aid" group), or (3) provided only the input parameters required by the aid (the "parameters" group) which the researchers then used to calculate sample sizes. The decision aid employed was the formula and tables contained in the SAS 39 Guide [AICPA, 1981; 1983]. Since a normative criterion for evaluating the auditors' sample sizes was not available, the analysis focused on differences in sample sizes for the three groups.

The results showed that, on average, the "intuitive" group chose smaller sample sizes than the "aid" group, which chose smaller sample sizes than the "parameters" group. The difference in sample sizes between the latter two groups was interpreted as indicating a "working backward" effect; that is, the "aid" group's desired sample sizes might have affected their choice of input judgments for use in the decision aid. Additional analyses found, contrary to expectation, that the "parameters" group showed greater variability (less consistency) across auditors in sample sizes than the "aid" group, which

showed greater variability than the "intuitive" group. (A study in a non-auditing context by Peterson and Pitz [1986] found that the availability of a decision aid (a multiple regression equation) was associated with greater consistency over time, as well as greater accuracy of individuals' decisions.)

Effects of Audit Decision Aids

In this section, we discuss several possible effects of using decision aids in audit practice. Some of these effects are "positive" in the sense of leading to improvements in audit decision making; others are "negative" in the sense of representing problems that must be controlled. Some of the effects are suggested by research studies; others are more speculative. These potential effects of audit decision aids are divided into two main categories: effects on individual judgment and effects on the auditing firm. We also discuss the potential importance of the initial implementation or introduction of decision aids.

Effects on Judgment

Increased emphasis on judgment: Instead of decreasing the importance of professional judgment in the audit process, as is sometimes feared, the use of decision aids might *increase* the importance of judgment. Note that a major role of audit decision aids is to combine several input judgments to reach a decision or recommendation, while it is the auditor's responsibility to supply those input judgments. For example, Elliott and Jacobson [1987] argue that, although the guidance on audit sampling adopted in 1981 added structure to the audit process, it also increased the number of judgments required of the auditor (pertaining to, e.g., the effect on sample size of control reliance, evidence from related tests, audit risk, and tolerable error). One implication of this shift from holistic to decomposed judgments may be the need for firms (and researchers) to pay more attention to training auditors in the proper formulation of input judgments for decision aids. A corollary issue, noted by both Elliott and Jacobson [1987] and Ashton [1983], is the possibility that auditors who provide such inputs will view their task as "mechanical" and not exercise their judgment carefully. Another issue of potential concern is the question of who is authorized to override the recommendations made by audit decision aids (and under what conditions, and to what extent).

Structuring judgment inputs: The use of decision aids will likely require an increase in the structure of the input information. Prior research in other fields suggests that information processing is facilitated when the decision model employed and the information presentation structure are congruent (e.g., Bettman and Kakkar [1977], Bettman and Zins [1979]). Note that structured information differs from a structured decision aid, in that the former refers to *inputs* to decisions while the latter concerns the *process* by which inputs are combined. Structured input information may lead to greater decision consistency, perhaps because structure makes it easier for people to use decision aids [de Hoog and van der Wittenboer, 1986], or perhaps because it facilitates unassisted information processing even *in the absence* of decision aids.

Justifying decision aid outputs: Decision aids not only require auditors to execute a logical sequence of procedures and decisions, but also to document that they have done so. Documentation is one aspect of the broader area of

justifying, and being held accountable for, one's decisions [Staw, 1980; Tetlock, 1983; 1985]. The potential importance of the justifiability of a decision is often noted by decision researchers (e.g., Tversky [1972], Adelbratt and Montgomery [1980], Gibbins [1984]), but the effects of justification have not been systematically explored. However, some research suggests that one effect of having to justify decisions is an increase in the consistency of those decisions (e.g., Cvetkovich [1978], Hagafors and Brehmer [1983]). An important issue for research and practice is the extent to which increased consistency is due to using the aid as opposed to the accompanying emphasis on justification. A related question is the extent to which consistency could be increased by emphasizing justification *in the absence* of a decision aid. These issues may be particularly important when one considers that the cost of an increased emphasis on justification is likely to be considerably less than the cost of developing and maintaining decision aids.

Increasing vs. decreasing consistency: As noted earlier, increasing the consistency of audit decisions—both over time and across auditors—is a major rationale for using audit decision aids. It is possible, however, that consistency could be *decreased* by the use of audit decision aids. Consider, for example, the sample size equation and tables described in the SAS 39 Guide [AICPA, 1981; 1983]. Use of this decision aid requires that one judgment (sample size) be replaced by *three* judgments (tolerable error, degree of desired assurance, and error expectation). If sufficient variability exists across auditors in specifying these three inputs, then the resulting sample sizes computed by the formula could be more variable across auditors than the sample sizes determined by unaided judgment. Variability in input specification may explain Kachelmeier and Messier's [1988] finding of less agreement in aided than in unaided sample size decisions, as well as Bamber and Snowball's [1988] finding of no relationship between agreement in sample size decisions and the degree of structure of firms' audit methodologies. Thus, while decision aids are capable of "amplifying expertise" [Davis, 1984], they also are capable of amplifying judgment biases and inconsistencies.

This possibility is discussed in a general setting by Slovic et al. [1977], and in an audit setting by Jiambalvo and Waller [1984]. Slovic et al. [1977, p. 27] warn of "the risk of grinding through highly sophisticated analyses on inputs of very little value," and argue that " 'garbage in—garbage out' applies to decision aiding—with the particular danger that undue respect may be given to garbage produced by high-powered and expensive grinding." Thus, while the decomposition, or "divide-and-conquer" strategy on which many decision aids rely can lead to greater decision consistency and accuracy (e.g., Armstrong et al. [1975], Cornelius and Lyness [1980], Lyness and Cornelius [1982]), results such as those of Burns and Pearl [1981] and Chakravarti et al. [1979] suggest that "one should approach the 'divide and conquer' ritual with caution; not every division leads to a conquest . . ." [Burns and Pearl, 1981, p. 379]. As noted earlier, auditors might benefit from training in the proper formulation of input judgments.

Circumventing the aid: Perhaps one of the more troublesome aspects of audit decision aids is the extent to which they might allow the user to circumvent their intent. For example, the intent of the sample size determination worksheet described by Elliott [1983], as well as the sample size equation

and tables described in the SAS 39 Guide, can be circumvented by "working backward." That is, an auditor could first select the sample size he or she desires and then provide input values which would yield this sample size. In that case, the judgmental inputs provided by the auditor could be determined in part by the chosen sample size, not vice versa as intended. As noted earlier, Kachelmeier and Messier [1988] found results consistent with this possibility. Ensuring the proper use of decision aids provides an interesting challenge for auditing firms.

Effects on the Firm

Increased structure of audit methodologies: A major way in which the use of audit decision aids is likely to impact audit firms is by increasing the degree of structure of the audit process [Willingham, 1986]. Cushing and Loebbecke [1986, p. 32] define a structured audit methodology as "a systematic approach to auditing characterized by a prescribed, logical sequence of procedures, decisions, and documentation steps, and by a comprehensive and integrated set of audit policies and tools designed to assist the auditor in conducting the audit." The similarity between this definition and our earlier definition of decision aids should be apparent.

The potential advantages and disadvantages of structured audit methodologies are topics of debate (e.g., Mullarkey [1984], Sullivan [1984]), and the correlates of structure are becoming topics of research. For example, Kinney [1986] found an association between the voting patterns of members of the Auditing Standards Board and the degree of structure of the members' firms. Morris and Nichols [1988] found an association between audit firm structure and the predictability of firm-level materiality judgments. Bamber et al. [1987] found an association between firm structure and audit seniors' perceptions of their firms' organizational characteristics related to role conflict and role ambiguity. Bamber and Snowball [1988] found that auditors from structured firms were more likely to consult with peers and superiors as the uncertainty of their decision tasks increased than those from unstructured firms. Williams and Dirsmith [1987] found that in the U.S., clients of more structured audit firms announced earnings on a more timely basis than did clients of less structured firms. In contrast, Newton and Ashton [1988] found that in Canada, there was a positive relationship between audit firm structure and clients' "audit delay," i.e., the time from fiscal year-end to the audit report date. Whatever the effects of structured audit methodologies, they are likely to be amplified by the increased use of audit decision aids.

Substitution of capital for labor: One implication of increased audit structure and increased use of decision aids is a greater investment in capital such as hardware and software, with possible impacts on pricing and management strategies within auditing firms. A corollary effect is a potential decrease in staff time required because of the automation of certain tasks traditionally performed at the staff level. This could translate into decreased hiring for auditing jobs (with attendant consequences for accounting educators) and decreased turnover [Elliott and Kielich, 1985]. The base of the traditional pyramid in the organization of auditing practice could be narrowed.

Accepting error: There is no doubt that the recommendations of audit decision aids will sometimes be in error (or at least will be judged to have been

in error in the light of subsequent information). While this is not a compelling reason to abandon such aids (people make errors too), auditors and auditing firms might have great difficulty accepting the error inherent in imperfect decision aids. However, the following example (adapted from Einhorn [1986; 1988]) illustrates that accepting error can be wise.

> Imagine that you are placed in front of a panel that displays a red light and a green light. Your job is to predict which of the two lights will be illuminated on each of a series of trials. Each time your prediction is correct, you are given a cash payoff; if your prediction is wrong, there is no payoff. However, unknown to you, the lights are programmed to go on according to a random process with a given proportion of red and green, say 60% red and 40% green.
>
> If you approach this decision task like most people do, you will respond to the lights in the same proportion as they occur. For example, in this case people predict "red" 60% of the time and "green" 40% after they have had some experience with the task. Your expected payoff for such a strategy can be calculated as follows. Since you predict red on 60% of the trials and red occurs on 60%, you will be correct (and receive the payoff) on 36% (.60 × .60) of the trials. Similarly for green; you predict green on 40% of the trials and green occurs on 40%. Hence, 16% (.40 × .40) of the trials will be correctly predicted. Therefore, over both red and green predictions, you will be correct on 36% + 16% = 52% of the trials.
>
> Now consider how well you could do by using a decision aid that said: always predict the most likely color. Note that such a strategy accepts error; however, it also leads to 60% correct predictions (you always predict red, and red occurs 60% of the time). Since 60% is greater than 52%, you would make more money if you accepted error and consistently used the decision aid. However, most people try to predict perfectly . . .

This example suggests that the *relative* amount of error inherent in aided versus unaided decision making is the important factor, not the absolute amount of error associated with the imperfect decision aid. It is not clear, however, that errors made by auditors and by audit decision aids would be equally acceptable (to either the auditor or the firm), or would result in the same amount of "regret" [Bell, 1982; Loomes and Sugden, 1982] for not having made a different decision. The same is true for errors made by different *types* of decision aids; for example, it is conceivable that errors made by expert systems would be more acceptable and result in less regret than errors made by multiple regression models because the former type of aid may seem more "human" than the latter. The choice among complex expert systems, simpler models, and unaided human judgment could amount to a choice among living with the consequences of different types of error (cf. Carroll [1987, p. 289]).

Increased competition from non-accountants: One benefit often mentioned for expert systems in auditing is the dissemination of expertise throughout the firm. The negative side of this benefit is that such dissemination will not necessarily remain within the firm's boundaries. As Elliott and Kielich [1985, p. 134] note, "anyone with the capability to develop or purchase such systems will become a potential competitor." Since the consulting and tax areas are not subject to as much regulation as auditing, they could be especially prone to this

possibility. (Michaelsen and Messier [1987] provide a review of expert systems in taxation.)

Security considerations: Related to such competition is the possibility that decision aids, particularly expert systems, could be copied and passed along to competitors [O'Brien, 1985]. This could be particularly problematic for expert systems that contain confidential information about long-range firm strategies, and for expert systems or other types of decision aids developed for sensitive areas like fee determination.

Legal liability: Ellis [1983, p. 4] suggests that expert systems "will be a minefield for professional bodies, especially over the question of legal accountability." If this is correct, then a possibility of some concern to auditors is that of being held liable for failure to follow the recommendations of expert systems or other aids. Under some circumstances, overriding a decision aid's recommendations might be taken, *prima facie,* as evidence of "a lack of prudent regard for the rights of shareholders, employees, and other publics" [O'Brien, 1985, p. 296].

Implementation of Decision Aids

To this point, we have concentrated on the evaluation of audit decision aids, and on some possible effects of using them in practice. We conclude by drawing attention to the potential importance of the manner in which such aids are initially introduced or implemented. Although this topic has been virtually ignored by decision researchers in auditing, it is likely to be of great practical importance. However, some literature exists on the implementation of management science models, computer-based information systems, and other types of managerial technology, and it may provide useful insights into preferred ways of implementing audit decision aids. A sample of this literature is contained in the Appendix.

The literature on implementation has a strong how-to-do-it (or how-*not*-to-do-it) flavor. As Lichtenstein et al. [1977, p. 317] said in a different context: "The most striking aspect of [this literature] is its 'dust-bowl empiricism.' Psychological theory is largely absent, either as motivation for the research or as explanation of the results." Nevertheless, the references contained in the appendix may provide clues about successful implementation for practitioners, and they may suggest testable hypotheses about implementation for researchers. Implementation research based on some theory or model of the implementation process, or at least on some systematic body of empirical data, could have substantial practical benefit.

Conclusion

A basic tenet of professional auditing is that independent auditors should maintain an attitude of "professional skepticism" about their clients' financial statements. Research in audit decision making suggests that some skepticism about professional audit *judgment* might also be appropriate. The reason is not because audit judgment is poor, but because a skeptical attitude may lead to ways of making it better. Auditing practitioners prize their judgment and tend to emphasize its strong points. Auditing researchers explore the limitations of judgment and tend to emphasize its weak points. More importantly, both

parties recognize that strong *and* weak points exist, and that it may be possible to capitalize on the strengths while compensating for the weaknesses. To the extent that this is effected through decision aids, it becomes important to validate decision aids and to understand the effects of using them in practice.

While we believe that the shift from experience-based to research-based auditing and the related emphasis on decision aids will continue, it must be remembered that the purpose of such aids is to augment rather than replace human judgment. Moreover, since many audit decision aids are *built upon* human judgment and require judgmental inputs for their operation, research that improves our understanding of auditors' knowledge, expertise, and decision making skills will be even more important in the future than it is today. At the very least, cost-effective resource allocation will require an understanding of which decisions need aiding and which do not [Ashton et al. 1989]. As Fischhoff [1982, p. 444] said in a more general context, "Good practice will require better theory about how the mind works. Good theory will require better practice, clarifying and grappling with the conditions in which the mind actually works." In audit decision making, we believe that both better theory and better practice can be achieved by efforts at all points along the research/development continuum and, especially, by sharing the results of those efforts among researcher and practitioner members of the auditing community.

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Appendix

A sample of "implementation studies" is included in this Appendix. Most of these studies involve computer-based information and decision support systems, or operations research/management science models. Similarities may exist between the problems encountered in introducing or implementing information systems or management science models and those likely to be encountered in implementing audit decision aids. Almost all of the articles listed here have an extremely "practical" orientation, focusing on factors claimed to affect the successful or unsuccessful introduction of an information system or a management science model. The articles describe surveys of developers and users of systems or models, as well as personal experiences of the authors with successful and unsuccessful implementation efforts. Eighteen articles are briefly annotated, and the references for another 26 are provided without comment. We regard the annotated articles as potentially more promising for auditing practitioners and researchers; the others tend to be less comprehensive or somewhat redundant with those that are annotated.

1. Adelman [1982]: Presents the author's view that unsuccessful implementation of decision aids is caused largely by lack of user involvement in the development process; offers the argument that user involvement enhances understanding of, and commitment to, the aid and enables the aid to be tailored to the user's needs.

2. Elam and Konsynski [1987]: Argues that decision support systems are not being used as interactive problem solving vehicles as originally envisioned; offers advice on how this situation might be rectified.

3. Fuerst and Cheney [1982]: Reviews a large amount of research literature on the implementation and use of computerized decision support systems. Factors found to affect the use of such systems are discussed under

three headings: characteristics of the decision maker, characteristics of the implementation process, and characteristics of the decision support system.

4. Ginzberg [1978]: Discusses types of implementation research that have been conducted and concludes that the only firmly-established research result is the importance of management support and user involvement; offers advice about successful implementation, including the importance of recognizing that several users may be involved and that they are likely to have different goals and expectations about the model or system being implemented.

5. Ginzberg [1981]: Analyzes the role of users' unrealistic expectations as a factor in the failure of management information systems and decision models; has some suggestions about bringing expectations in line with the capabilities of the system/model, and vice versa.

6. Green, Newsom and Jones [1977]: The principal findings relate to potential barriers to the use of quantitative techniques. While a lack of knowledge of such techniques by management is the most important barrier, lack of useful training, difficulty of quantifying data, and cost are also important barriers.

7. Gupta [1977]: Offers advice based on the author's personal experience; advises not threatening the user's authority, among other things.

8. Huber [1983]: Reviews research on the relationship between the use of decision support systems and the "cognitive styles" of users; concludes that cognitive style is not related to the use of decision support systems; suggests, among other things, that it is better to train users in the appropriate use of such a system than to try to design the system to fit particular cognitive styles.

9. Ives and Olson [1984]: Reviews research on the effects of user involvement in the development of computer-based information systems; concludes that because of poor grounding in theory and methodological problems, a positive relationship between user involvement and system success has not been convincingly demonstrated.

10. Leonard-Barton and Kraus [1985]: Discusses obstacles that must be overcome in the implementation of new technology; suggests strategies for successful implementation, with particular attention to the composition of the implementation team.

11. Little [1970]: Provides an excellent discussion, distilled from the author's own experience, of why managers often do not use models that have been developed for them; also discusses six characteristics that a model should possess in order to be useful (and used). Several worthwhile points are made.

12. McArthur [1980]: Based on personal experience, the author discusses three reasons for the gap between development and use of management science models: (1) technical elegance vs. "people factors"; (2) reluctance of decision makers to admit they sometimes need help with decisions; (3) confidentiality of certain types of important decisions.

13. Mohan and Bean [1979]: Four case studies of implementation efforts are described, and several implications for successful implementation are derived. These implications fall into three broad categories, with a number of useful points made within each: (1) preconditions for successful introduction, (2) introductory period requirements, and (3) on-going period requirements.

14. Robey and Zeller [1978]: Analyzes the successful adoption and use of an information system in one department of a company, and the rejection and

failure of the same system in a similar department of the same company; makes a number of points about the organizational and human factors that were important in the success (and in the failure).

15. Urban [1974]: Based on the research literature and the author's experiences with actual companies, an eight-point plan for building useful models is presented. Several relevant points are made.

16. Watson and Marett [1979]: A survey of management scientists, disclosing ten major reasons for implementation problems; lack of understanding by users is most important, but other reasons are also discussed.

17. Wolek [1975]: Views the adoption of models and other quantitative technology in terms of the theory of adoption/diffusion of innovations, on which there is a substantial literature; a useful perspective on the factors that are important in successful adoptions.

18. Zand and Sorensen [1975]: Applies a general theory of social change, proposed in 1947 by psychologist Kurt Lewin, to the problem of implementing management science methods/models; oriented toward an "academic" research audience; contains a useful overall perspective on change, as well as several specific ideas.

Other references that may be helpful are Alavi and Henderson [1981], Alter [1977], Anderson and Narasimhan [1979], Annino and Russell [1981], Argote et al. [1983], Ashton and Ashton [1988], Bell [1985], Cain [1979], Carter [1984], Emshoff [1978], Evan and Black [1967], Glen and James [1980], Grayson [1973], Hammond [1974], Hayes and Nolan [1974], Lawless [1987], Lucas [1981], McInnes and Carleton [1982], Meredith [1981], Richels [1981], Schultz and Slevin [1975], Schultz et al. [1987], Sheil [1987], Vazsonyi [1978], Wagner [1981], and Zmud [1979].

Discussant's Response to "Using and Evaluating Audit Decision Aids"

Stephen J. Aldersley
Clarkson Gordon

It is a pleasure to have the opportunity to comment on a paper dealing with a subject which has occupied a considerable portion of my time during the past few years—Audit Decision Aids. It should, therefore, not come as too much of a surprise that I agree with much of what is in the Ashton-Willingham paper. Throughout the paper I found myself nodding in agreement with the points being made. However, there are still a number of areas where I think the authors' efforts at organizing and categorizing the issues have led to unwarranted oversimplification. I will direct my commentary to these areas. I intend to follow the basic outline of the Ashton-Willingham paper and will conclude my comments with some observations on what I perceive to be a couple of particularly difficult audit areas that just might lead to important decision aids.

The theme of this paper can probably be stated along the following lines: Decision aids have a role, . . . but they need a cost benefit justification. The theme for my comments is related to the definition of decision aids adopted in this paper, i.e., "any explicit procedure for the generation, evaluation and selection of alternatives (courses of action) that is designed for practical application and multiple use." When you read the rest of the paper you wonder whether the authors have used a *complete* decision aid definition. They appear to have set up several straw men that are subsequently criticized and discredited. Would it not be appropriate to include some evaluative criteria in the definition of the decision aid? My contention is that if you don't, you may have a decision *anti-aid* instead. The courses of action should be "towards some well-defined objective" in a more complete definition of a decision aid.

Development Issues

One oversimplication in the paper is the distinction made between research-based as opposed to experience-based development approaches. The paper implies a dichotomy whereas, in practice, things are not nearly as simple. Although a decision aid may use a research base during development, it will not evolve into a tool solely from that perspective. The reason decision aids are often even considered is usually experience-based. Although one might argue that this is empirical research, the empiricism tends to be anecdotal rather than based on any research design. There are many examples from the past 20 or 30 years. For instance, analytical auditing and the related flow-charting technique grew out of our audit practice needs for concise system descriptions. Statistical sampling was implemented because of actual deficiencies encountered in the use of non-statistical techniques. Regression-based analytical review was introduced because of dissatisfaction with the quality of judgmental

results and we implemented assertion-based auditing to clarify the link between internal control work and the primary audit objectives. In all of these cases the initial need for the technique arose out of common problems encountered in practical application of audit techniques. I imagine other firms have had similar experiences.

However, it would be an oversimplification on my part if I were to completely discount the importance of a research base behind any one of these audit techniques. The development of any decision aid is not a static process. It is highly iterative. Initial stages of the decision aid may be built on prototypes, whether or not the decision aid is computer based. Field testing will play an important role in the initial stages, but practical application is the principal source of many refinements and the future evolution of the decision aid.

None of this should come as a surprise to anyone familiar with the practical application of decision aids, particularly in the context of an audit practice.

Decision Aids and Training

Decision aids are presented almost as an exclusive alternative to training. But the reality in an audit practice situation is that decision aids are often a part of training.

The entire discussion ignores the nature of the auditing business. Our new staff are well educated, intelligent and motivated, but they have no practical experience. Despite university courses, their practical knowledge of the audit process is limited. In many cases, at least in the Canadian environment, they do not even have an accounting or auditing education. All of this is exacerbated by the need for our staff to develop it extremely rapidly. We fully expect our staff to act as senior on most, if not all, of our small audits at the start of their second year. They quickly become seniors on very large audits and then managers in charge of a staff together with a reasonable portfolio of clients. In this environment, decision aids are not as important as training aids particularly in view of the fact that a significant amount of learning occurs on the job. This is an important aspect of the auditing business because training is one of the largest costs in a public accounting practice. The overlap between decision aids and training aids is, therefore, considerable.

Claims about Decision Aids

Ashton-Willingham list a number of claims made about decision aids (e.g., accuracy improvement and consistency, communication, distribution of expertise, staff training, ease of documentation effort, and time savings) in the context of their evaluation. From the practice point of view, many of these claims are assessed on a specific basis. In some cases, e.g., statistical sampling and regression analysis, the accuracy can be established through analytical means whereas empirical methods are necessary in other areas. For example, one of the major benefits of decision aids is the common language they introduce for technical matters so that professional staff who encounter problems are able to communicate the problem and then understand the response. The evidence for this is the high degree of consultation between staff members on technical matters; something which we observe in our internal quality control reviews.

A primary objective of decision aids is often time savings and this can be evaluated very directly using year-to-year comparisons with, and without, use of particular techniques. Although in some cases the learning curve confounds the results, it is still possible to get a reasonable estimate of time savings from this approach. Thus, although many decision aid benefits are not measured with a design-based approach, there are often semi-formal measures taken to determine whether or not a particular decision aid has achieved its objective.

Effects on Judgment

The observation that a decision aid increases rather than decreases the emphasis on judgment is entirely consistent with our experience. So often we find that our staff recognize that they have a problem simply because we have structured the issue for them. This permits a much more rational, consensus-based approach to resolving difficult situations. It also raises the issue of structuring the judgment inputs to a decision aid. As I mentioned at the outset, a complete decision aid should be capable of achieving a well-defined objective, and therefore some structuring of the judgmental inputs to the decision aid will often be necessary before one can consider the decision aid complete in any practical sense.

The illustration dealing with increasing versus decreasing consistency is not entirely pertinent to the critical issue here. The possibility that sample extents (sizes) vary more when a decision aid is employed may result from an incomplete or improperly defined decision aid. Although within the context of the particular task, consistency is desirable, there will be cases when the consistency requirement is with respect to a more general objective. For example, if one restricts consideration to the sample extent issue, using a sample size of 60 all the time is certainly consistent but, from the more important audit objective, it may be like a broken watch—correct only twice a day. If the consistency is not with respect to the correct objective, then the benefits of the decision aid may be foregone.

I can illustrate the consistency issue somewhat further by drawing on one of the decision aids used in our audit practice, our "source of assurance plan," which we use to document our risk analysis for a particular financial statement assertion. Using four categories for the major sources of assurance, our auditors would begin with an assessment of inherent assurance and follow with an assessment of internal control assurance. Figure 1 presents three quite different approaches to the source of assurance analysis which result in quite different audit strategies. In Case 1, there is no reliance placed on internal control and very limited reliance placed on analytical review since the majority of the audit assurance is obtained through substantive tests of details. This can be contrasted with Case 2 in which a regression-based analytical review is performed but is also supplemented by a preliminary review and evaluation of specific assertion-related internal controls. The 3rd case represents an approach that would involve a dual purpose test on specific internal controls together with re-performance of the control procedures.

The important thing in all three cases is that the total assurance is the same. Because each of the factor limitations are set on a firm-wide basis, we have a very high degree of consistency with the applied audit effort in terms of the overall assurance objective.

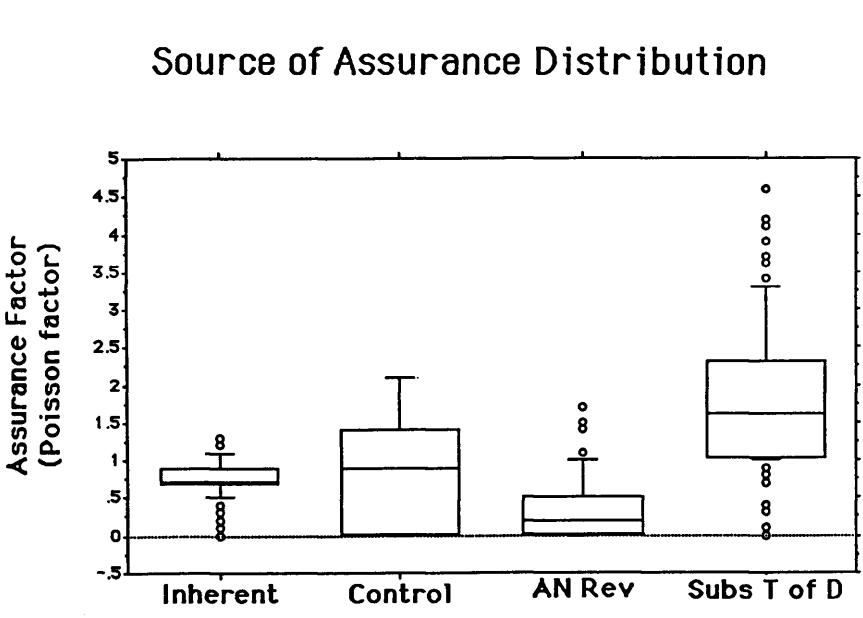
STRATEGY ALTERNATIVES FOR AN ASSERTION

	CASE 1	CASE 2	CASE 3
INHERENT	.7	.7	.7
CONTROL	0	.9	2.1
ANALYTICAL REV	.8	3.0	.8
SUB. TESTS OF DETAILS	3.1	0	1.0
TOTAL	4.6	4.6	4.6

Figure 1

While presumably the staff will choose the approach which is the least costly in their particular circumstance, other factors may enter into their decision. For example, some of our auditors simply aren't comfortable with relying on internal controls and will prefer to take a substantive audit approach. Others are not comfortable with regression analysis techniques and will prefer either the substantive testing or the internal control approach. It is important to recognize that, in any situation, the assessment of the cost involved is not a simple procedure and can vary quite significantly from one situation to the next, even though they may appear similar.

Some idea of the degree of variability in the situation can be seen in the box plot in Figure 2 which shows the distribution of assurance factors for various source of assurance analyses from a number of representative sampling situations. An important objective of the source of assurance decision aid is to control any undesirable variability, i.e.,we attempt to make sure that the audit effort is of a relatively consistent level across our audit practice. However, within that constraint, we permit a considerable amount of variability in order to accommodate specific needs of the situation (you could argue that this is just flexibility) and also the specific capabilities of the individual staff involved in the engagement.



The above box plots show the distribution of assurance factors for the source of assurance analysis on 485 representative samples from 60 randomly selected audit engagements.

Figure 2

Effects on the Firm

One of the realities of modern day auditing is the increased structure of audit methodologies. This is clearly a necessary response to the increased complexity of the business environment that we face. Not only are our clients becoming more complex, but our own auditing standards are becoming more and more prescriptive as they gradually evolve into a form of decision aid. For example, SAS 47 makes explicit requirements for planning audits and evaluating their results and the new "expectation gap" SASs contain some very explicit recommendations with respect to audit approach. This trend is unlikely to abate in the foreseeable future.

Automation is often viewed as a potential substitute for labor, even in the auditing profession. An important prerequisite for effective audit automation is the increased structure of audit methodologies. There is a direct relationship between the degree of structure in an audit approach and its amenability to automation. Without structure, you will probably develop an expensive printing press if you automate an audit task.

Although it is an important factor, one must recognize that automation of an existing manually performed process requires a significant time saving in order to offset the automation cost. True substitution is often possible only by developing a new process. There are significant limits here in the audit profession. The auditor acts as an interface between the client's business environment and his audit objectives. The primary practice skill is adaptability due to the wide range of clients and the constantly changing business environment. One of the key things is the ability to learn quickly. All of these

factors introduce limitations on the extent to which the substitution of capital for labor can be effective in an audit practice situation.

Decision Aids and the Art of Auditing

Decision aids have been used by auditors for decades, ever since the first auditing textbooks were published. While these early decision aids were often limited to a listing of audit steps, they were the forerunners of the computerized decision support/expert systems in use today. I predict that we will see more use of decision aids in the future. Our environment will only become more complex, yet the basic raw material of our business, the people we hire and train, are not going to be inherently more intelligent than in the past. However, because of their environment they are probably going to be better able to make the best use of the decision aids we provide them. Ashton-Willingham have provided a timely overview of the important issue of audit decision aid evaluation and I think they will most surely have achieved their objective of "stimulating discussion among auditing practitioners and researchers."

I would like to leave you now with two of my favorite "chestnut" problems, concerning the "art" of auditing. Perhaps they may someday be amenable to a decision aid approach.

One of the most interesting morsels of audit folklore is that legendary technique demonstrated by the experienced auditor who walks into a client, looks around, and decides that the inventory is wrong based on what he has seen. The "smell test" is a mysterious and unexplainable procedure applied by the auditing profession. When it works, we all admire the auditor who performed the feat, but when it fails, no one seems to notice. How does the smell test work? How does an experienced auditor determine that a particular transaction is sufficiently unusual to warrant further investigation? We have a lot of audit staff who would like to be able to duplicate this feat.

A possibly more difficult problem is the issue of auditing accounting estimates. The real problem here is what constitutes a best estimate? The mean? The median? The mode? Even if we were all well calibrated Bayesians we would often still be in trouble if the range of acceptable values was ten times materiality. Part of the solution may be to increase disclosure when the range of acceptable values is unacceptably large. But one of the interesting paradoxes of auditing is that when the range of acceptable values is several times materiality, the chance of the estimate disagreeing materially with the eventual outcome turns out to be extremely high but the chance of an accounting error is actually considerably less. The paradox lies in the fact that all auditors believe and say the opposite. Can we solve this problem with a decision aid?

2

Audit Theory Paradigms

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> "Quoth the Professor: 'Well, it may be all right in practice, but it will never work in theory.'" (Warren E. Buffett, 1985)

The goal of this paper is to present several candidates for the theory of auditing. Herein, there is no pretension to formulate a "new" audit theory, nor is there any effort to elevate one expression of theory over another. However, toward the end of this paper, a distinction is made between "macrotheory" (a global or all-encompassing perspective) and "microtheory" (models for dealing with specific decisions) along with an assertion that the two, taken together, can be very useful for research and practice.

The first sections of the paper are an excursion through literature that promises some attention to "a theory of auditing." A search for such literature produces only a few pieces that have such pretensions. The broad conclusion from this review is that all the existing expressions of audit theory fall short.

As the title suggests, this paper deals with "paradigms" that give rise to audit theories. A *paradigm* is taken in the same context as it was in the *Statement on Accounting Theory* and *Theory Acceptance* [Committee on Concepts and Standards for External Financial Reports, 1977] as introduced by Kuhn [1970] and defined in the plural as "conceptual and instrumental frameworks that provide modes from which spring particular coherent traditions of scientific research." In this context, a *paradigm* is a "world view" that enables researchers, theorists, and practitioners to discern audit phenomena in terms of *input*—specification of the problems of interest, *setting*—the empirical domain over which the audit work/research is applied, and *process*—the kinds of tests and standards used to adjudicate contradictory propositions. A paradigm, when shared by all concerned, may lead to a single prevailing theory—a broad view and focus for research and practice. This context of "paradigm" is much broader than that used by some researchers when they refer to a particular model or algorithm used in research data analysis.

Nevertheless, the exposition on paradigms herein suffers from the limitation of this author's and others' perceptions of the world of audits. Specifically, perceptions of audit theory paradigms are influenced by existing literature and

* I gratefully acknowledge the contributions and insights provided in the reviews and comments by my colleagues Kermit Larson, Urton Anderson, William Kinney, Michael Granof, and Chitoshi Koga.

thought that begin with a focus on financial statement audits. This biases our "world view" in the direction of quantifiable assertions instead of more subjective subject matter and toward the audit report output instead of the audit process. Anderson [1983] put these biases in focus when he explained the context of internal audit department peer review in terms of being similar to, but more than, an audit. Many theorists infer that a general definition of auditing (e.g., ASOBAC, 1972) can be stretched to encompass all manner of assertions, but Anderson maintains that differences in purpose and subject matter distinguish peer reviews from other activities that are considered "auditing." Indeed, Anderson characterizes most audit theory as being based on "the financial audit paradigm."

Theory and Theory Acceptance

An accumulation of literature, thought, and practice has not yet led to the acceptance of a unique audit paradigm. The search continues for a compelling basis for (a) specifying the activities that collectively constitute "auditing," and (b) resolving controversies about audit activities. Auditors are not alone in this regard. Our brethren in financial accounting have already reached this conclusion about the content of external financial reports [Committee on Concepts and Standards for External Financial Reports, 1977]. In both cases, one is tempted to conclude that even the possibility of an acceptable normative theory is denied. Perhaps the possibility of an acceptable positive theory is likewise denied.

Even if a generally accepted audit theory were proclaimed by a duly constituted committee, the search for a "better theory" no doubt would continue. No matter what issues someone apparently resolves, someone else will raise a case or counter-example to show that the resolution does not work. Such is the fate of modern social science. Consider a "theory of materiality" as an example—one that applies equally to both accounting and auditing. People have struggled with it for a long time, finally pronouncing this truism [FASB, 1980, paragraph 132; Leslie, 1985, paragraphs 2-9]: "The omission or misstatement of an item in a financial report is material if, in the light of surrounding circumstances, the magnitude of the item is such that it is probable that the judgment of a reasonable person relying upon the report would have been changed or influenced by the inclusion or correction of the item." This statement does not appear to be a sufficient product for a theory of materiality. Yet, some would argue: "That's as good as it gets. Practitioners and researchers/theorists just need to grapple with materiality in each and every case, depending on the facts and circumstances."

Turning to auditing, the search for a generally accepted audit theory appears to be equally difficult and unsatisfying. Nevertheless, the benefits to practice and research may be in the journey, not at the final destination.

Role of Theory

An audit theory paradigm—a perceptive "world view"—should first enable people to recognize "audit phenomena." Audit theory should then facilitate description, explanation, and prediction of these phenomena in research and

professional practice. Such a theory might possess elements both of positive theory and of normative theory.

However, an anonymous commentator (not an auditor) raised this issue: The meaning of "audit phenomena" is not clear to me, therefore I do not understand what is meant by "audit theory." In light of this kind of comment, one must try to capture at least the rudiments of a paradigm in a concept or definition that differentiates audit phenomena from other phenomena. The most general definition appears to be this: "Auditing is a human evaluation process to establish the adherence to certain norms, resulting in an opinion or judgment" [Schandl, 1978]. The central features of this definition are (a) human judgment process, and (b) norms. With this beginning, "auditing phenomena" can at least be distinguished from such things as physics, pharmacy, and singing (although not from the truly "auditory" process of judging singing performances). It is no surprise that the Committee on Basic Auditing Concepts [1972] sought to express a definition that would narrow the field of "audit phenomena," producing a definition that relied heavily on "assertions about economic actions and events" and "communication of the results of evidence evaluation to interested users," thus adding to the central features (c) emphasis on economic data, and (d) communication.

Even though these definitions may be widely accepted, in whole or in part, they are clearly not sufficient to lead everyone to a common paradigm or a generally accepted theory of auditing. While many people have little trouble recognizing most "audit phenomena," people still look to different empirical domains for evidence, and they frequently apply differing tests, standards, and research methods. Something is missing. Too many auditors lament the lack of theory to go unacknowledged. (See the Appendix for a sample of theory complaints.) However, most of these complaints can be traced not to differing paradigm starting places—the audit phenomena—but to desires for theory closure *within* an audit paradigm.

Theory Closure

Whenever people agree on a theory, the agreement is always achieved within the social context of the time, accommodating the then-current perceptions of cost and benefit, technology, and socio-political factors. Times change and so does knowledge of the field. The history of science is replete with discarded theories, most of which deserved to be discredited and tossed by the wayside. When they were overthrown, new directions took their place.

So it is with audit theory. Conformity with a single world view that presents a complete identification of all possible audit phenomena, a complete enumeration of empirical domains, and a complete inventory of research tests and standards has not been accomplished. In fact, it may not be desirable. Pretending to achieve such closure would invite intellectual and practical stagnation. While complaints about audit theory (Appendix) may be astute or ignorant, objective or self-serving, on point or off target, or some other characterization depending on one's own paradigm, they are all nonetheless expressions of "demand" for audit theory to provide the comfort of a rational basis for research and practice activity.

Theories die a long, slow, and painful death. Their decline is asymptotic—

seldom reaching complete extinction. For example, part of the audit theory extant eighty or more years ago described audits in terms of their fraud-detection purpose and activity. This fraud detection view of the world was later suppressed in the auditing literature for several decades, and now it seems to be rising to prominence again. As theory elements fall into decline, they are accompanied by the people who accepted a particular paradigm. Even so, the people and their theories can never be completely discarded. As quoted from Kuhn by the Committee on Concepts and Standards for External Financial Reports [1977]:

> Still more men, convinced of the new view's fruitfulness, will adopt the new mode of practicing normal science, until at last only a few elderly holdouts remain. And even they, we cannot say, are wrong [Kuhn, 1970, p. 159].

While a diversity of theories is welcome for the development of the field, proponents should not denigrate prior theoretical efforts. The "elderly holdouts" have no doubt contributed a platform for the new theorists (next elderly holdouts), and their contribution should be honored. After all, they may turn out to have been "right" in the first place. Perhaps the "elderly holdouts" for a fraud detection tint to the audit world view will yet turn out to be "right."

Paradigm Candidates

Very few titles make pretensions to a general theory of auditing, so the search for paradigm candidates included a perusal of research, symposium presentations, and other sources. In numerous cases, authors presented some aspects of audit theory without attempting to knit an analysis into a whole fabric of auditing. An example is Toba's "A General Theory of Evidence as the Conceptual Foundation in Auditing Theory" [1975]. His theory of evidence, as presented, is not comprehensive enough to qualify as a paradigm candidate. Others are more amenable to conceptual expansion, as will be shown later.

Another noticeable aspect of theory presentations is the authors' tendency to comment upon a very narrow band of audit interests without trying to comprehend the breadth of audit issues and problems. In contrast to writings about general theory (herein dubbed "macrotheory" signifying a comprehensive treatment of auditing), these authors dealt with "microtheory"—a concern with a model or theory of some particular decision problem set in an audit context. Examples abound in research reviews such as Felix and Kinney [1982] and Scott [1984].

The paradigm candidates which follow are the ones perceived to be amenable to some degree of generalization to a "theory of auditing." A theory ought to be broad enough to encompass a wide range of audit phenomena from auditor characteristics like competence and independence, to field work tasks of evidence-gathering and decision-making, thence to communication. The challenge is to determine to what extent the paradigm candidates differ, if at all, in the central characteristics of a paradigm—specification of problems of interest, empirical data domains, and research method tests and standards. The beginning point is the classic Mautz and Sharaf *Philosophy of Auditing* [1961].

The Inductive Theory of Audit Professionalism

The theoretical core of the *Philosophy of Auditing* is the organization of concepts and postulates. Mautz and Sharaf presented inductions about auditor qualities, field work, and dependence on accounting principles. In abridged form, their theory structure, which is embedded in their postulate statements, is:

Auditor Qualities

Concepts:	Ethical conduct Independence Due audit care
Postulates:	There is no necessary conflict of interest with management. The auditor acts exclusively in the capacity of auditor. Professional status imposes professional obligations.

Technical Aspects of Audit Work

Concepts:	Due audit care Evidence
Postulates:	Financial statements are verifiable. Financial statements are free from collusive and other unusual irregularities. Internal control eliminates the probability of irregularities. The past will hold true for the future.

Communication

Concept:	Fair presentation
Postulate:	Consistent application of GAAP results in fair presentation.

Their theory was inductive—based on their observations of audit practice. For all practical purposes, part of this observation involved cognizance of the official auditing standards. Indeed, even though the ten audit standards already existed, they can be shown to "flow from" the concepts and postulates. They can even be perceived as the *precepts* Mautz and Sharaf said they did not have time to pursue [1961, p. 246]. The Mautz and Sharaf theory formulation is a product of practice leading theory—which is not a condemnation, because theory must get a start somewhere.

Every theory is forever subject to examination and reformulation, and the Mautz and Sharaf theory is no exception. It was produced during a period of relative calm in the practicing profession before many other political, social, and economic events wrought change in the practice of auditing in the United States. In the light of such events, even a friend of the theory could not reproduce as explanations to students two of the basic assumptions (postulates), namely: "There is no necessary conflict of interest between the auditor and the management of the enterprise under audit," and "The financial statements and other information submitted for verification are free from collusive and other unusual irregularities." A textbook chapter on auditing theory and standards changed the former postulate to: "A potential conflict of interest *always* exists between the auditor and the management of the enterprise . . . ," and the latter postulate was omitted entirely [Robertson, 1979]. These alterations were also inductions.

The important issue is not so much the endurance of the Mautz and Sharaf

formulation but whether it constitutes a paradigm supporting a useful theory of auditing, enabling people to generate research hypotheses and describe, explain, and predict audit phenomena. It has indeed been useful as a theory structure, but it has also failed in some respects.

Numerous identifications of problems of interest have sprung from the Mautz and Sharaf theory. Many, but certainly not all, research projects can be traced to its roots regardless of whether the researchers acknowledged them [Robertson, 1984]. One should not be surprised about the facility of the theory to point to problems of auditing. After all, it was derived by induction from audit practice. Nevertheless, it was induced from observations of *external* audit practice and independent audits of financial statements—producing the bias toward the "financial audit paradigm." The Mautz and Sharaf theory is much more strained to produce identifications of problems in governmental and internal auditing. One can see clearly the differences and similarities in the management audit and performance audit definitions and objectives presented by Herbert [1979].

A great deal can be inferred from the Mautz and Sharaf theory about the empirical domain over which audit work and research can be applied. Various postulates touch the areas of auditor characteristics (e.g., independence, professionalism), field work (e.g., evidence-gathering, prediction), and reporting relative to generally accepted accounting principles. One area not emphasized is the economic and social forces that create demand and supply of audits. Mautz and Sharaf took the demand for, and the existence of, auditors largely for granted.

Very little can be seen in the theory about research models and methods or about tests and standards, although a good deal is said about practitioners' work. Mautz and Sharaf apparently did not write the *Philosophy* with a primary purpose of directing academic and practical research methods. Thus, as a broad paradigm, Mautz and Sharaf's formulation is not complete. As shall be seen later, other theory statements have more to say about models and methods, taking the identification of audit phenomena for granted.

Process Theory of Audits

Schandl attempted to integrate into one system the findings of semantic philosophy, communication theory, and the psychology of thinking and to apply them to the judgment (opinion formulation) process in auditing [1978, p. ix]. Although published in 1978, Schandl's papers were available to members of the AAA Committee on Basic Auditing Concepts before its report (ASOBAC—A Statement on Basic Auditing Concepts) was issued in 1972. The two streams of thought have some points in common. They both presented broad definitions of auditing, purporting to encompass a wide variety of judgment activities. As mentioned earlier, the ASOBAC definition narrowed the field that Schandl opened wide. They both paid considerable attention to the investigative process. They brought into clear focus the importance of *assertions* as the beginning problem-recognition facet of audit decision-making.

Schandl also proposed a system of postulates—propositions which he took as self-evident. Briefly, his postulates were:

Purpose: Each audit has a purpose.

Judgment (opinion): Audit problems lead to decision conclusions.
Evidence: Evidence is required in the decision-making process.
Norms (criteria): Norms are required in the decision-making process.
Communication: Communication exists and is meaningful.

The difficulty with Schandl's theory is its level of generality. The postulates briefly stated above are not unique to auditing in terms of the independent, internal, governmental, operational, and other forms of auditing commonly practiced. Collectively, Schandl's postulates constitute the scientific method of inquiry developed in philosophy long ago. Significantly, Schandl truncated his presentation of postulates, saying: "Their number could be multiplied, as we could go deeper and deeper into the analysis of human mind and intellect. But we have to leave the rest of the postulates to the disciplines of philosophy and psychology." He left the theory of auditing at a macro level, and therein lies the source of complaint for many researchers who have followed. They have lamented the lack of theory, not about auditing, but about the applications of philosophy and (particularly) psychology in auditing. These are found "deeper and deeper in the analysis of human mind and intellect," to use Schandl's words.

Schandl's formulation appears to be too general to serve well as the theory flowing from an audit paradigm. One can use it to specify problems of interest in many investigative fields, not only those widely acknowledged as auditing. Along with mice in the vents and corpses in the lane, he illustrated audit phenomena, but extracting the audit content from the generality is tedious through his 212 pages. In the interest of efficiency, despite Schandl's disputes about differences, one can study ASOBAC and derive the spirit of the investigative process and the science of decision-making and obtain the incremental contribution to audit thought.

However, both Schandl and ASOBAC expanded the details of the empirical domain relevant in audits. They carved the place for assertions, norms (accepted criteria), and communication much more finely than did Mautz and Sharaf. They indeed added elements to the extant audit theory. Both works provided auditors/researchers more focus on the essential elements of audit decision-making that have now become embedded in AICPA and IIA auditing standards statements.

Neither Schandl nor ASOBAC had enough to say about "microtheory"—the level of concern with models and methods, tests and standards for particular audit decisions. (Notwithstanding Schandl's explanation of psychological schema and recognition of the role of clues (similar to "cues") in connection with the psychology of information [1978, pp. 38-55].) As a complete paradigm, Schandl appears to fall short on this dimension, and ASOBAC never pretended to contribute beyond the definitional/investigative process element.

Decision Theory View of Auditing and a Note on Game Theory

It may be an injustice to other authors to attribute a decision theory view of auditing to one, but with apologies to others, Felix [1974] presented such a view. Since it was in a brief paper, perhaps it should be called a "glimpse" instead of a "view"—certainly not a full-blown theory statement. A decision

theory view is more like a perspective on auditing and audit theory than a theory in its own right, but it has a significant contribution to offer.

In terms of a paradigm, decision theory has no global pretensions, at least not as presented by Felix. His presentation focused on applications in field work. Therefore, one will find no broad ability to specify the wide variety of problems of interest in auditing. Not much, if anything, is inferred about professionalism (e.g., independence, social responsibility) nor about communication in the context of information content for users.

The significant contributions of the decision theory "glimpse" are the expansion of the specifics of the empirical domain and the exposure of the family of models, methods, tests, and standards which can be applied in audit work and research. The domain is expanded with explicit recognition of alternative actions, their monetary or utility payoffs, and the probabilities (uncertainties) associated with them. Decision theory brings the economics of auditing into focus, although it usually leaves hard-to-quantify considerations (e.g., professionalism) as an afterthought. Conceptually, however, the entire scope of audit problems could be treated in a decision theory framework.

Game theory applications in auditing make contributions similar to, though potentially richer, than decision theory. The potential is realized in the recognition of the persona of the game players compared to the decision-theoretic game against passive nature [Fellingham and Newman, 1985]. While game-behavioral influences of auditors upon auditees, and vice versa, are not new, the formality of the game theoretic algorithm lends an elegance to thought and research. Like decision theory, however, the game theory/strategic view of auditing makes its major contribution in the areas of the empirical domain with explicit recognition of alternative actions, interactions, payoffs, and probabilities, and in the utilization of a particular algorithm. The game theoretic algorithm, like single-person decision theory, brings the economics of auditing into focus at the apparent sacrifice of professionalism considerations. However, one must rely upon other expressions of audit theory to identify the audit phenomena to which game theory might be applied. Decision theory and game theory do not identify these phenomena. They *accept* them as subjects for attention.

Social Mechanism Theory of Auditing

Scott's [1984] paper on the state-of-the-art of academic research in auditing did not actually present an audit theory. Nevertheless, he alluded to "an explosion in the theory of auditing," "major theoretical approaches to auditing," the "wide range of relevant theories," and the view of the audit as a "social mechanism to enhance the process of contracting, thereby improving the operation of securities and managerial labor markets." Actually, the "social mechanism theory" amounts to acceptance of the basic reason audits are demanded. In Scott's words:

> Society's interests will be served if audits are efficient, in the sense of being available at least cost, and effective, in the sense of supplying relevant, credible information. Concern over efficiency looms large in the auditing literature. Formal concern over effectiveness is more recent, primarily because of the complexity of the topic [Scott, 1984, p. 153].

Scott was not the first to mention audits in the same breath as economics, efficiency, and effectiveness. (He was just more elegant with the "social mechanism" words.) Elsewhere, the demand for audits has been said to flow from the maxim of economic efficacy: "Audited information is more useful than unaudited information" [Robertson, 1984]. Wallace also described auditing as an economic service and offered several explanations for the demand for auditing (agency theory—the stewardship (monitoring) hypothesis, the information hypothesis, and the insurance hypothesis), as well as observations about costs and benefits and the incentives for supplying audits [Wallace, 1980].

Scott's mention of a "social mechanism theory," however, was not an expression of an audit theory. He was setting the stage for a review of research. The studies he proceeded to review dealt with other theories and other models applied in an audit context—statistical sampling theory, Bayesian decision theory, single-person decision theory, Brunswick lens model, and others. The point is that Scott, like others, related *audit theory* to the "microtheory" applications of various models and methods and their attendant empirical domains. He appears to have accepted a version of "macrotheory"—audit theory—that had already identified the important audit phenomena.

Notwithstanding the narrow focus of most of the studies he reviewed, Scott raised a "macrotheory" question at the end: "The basic theoretical question . . . is the extent to which firms' information production decisions should be regulated." As a normative matter, this issue may or may not be within the orbit of an appropriate audit theory paradigm. After all, not everything can be comprehended within "auditing." As a social endeavor, auditing is affected, if not controlled, by other forces represented by political science, sociology, macroeconomics, and others. At some point, the outer boundary of the audit paradigm, and, hence, of audit theory must be drawn. Given this normative boundary issue, theorists ought to determine whether the normative question of information regulation is a matter for comprehension within an audit theory paradigm or a matter of public policy outside the orbit of auditing.

"Macrotheory" vs. "Microtheory"

People can debate the usefulness of audit theory for practice, echoing an earlier refrain: "Auditing is a series of practices and procedures, methods and techniques, a way of doing, with little need for the explanations, descriptions, reconciliations, and arguments so frequently lumped together as 'theory'" [Mautz and Sharaf, 1961, p. 1]. The debate and the productive activity of practice and research has proceeded and no doubt will continue to proceed on two levels.

One is a global or all-encompassing "macrotheory" level that is very useful for identifying the important/interesting issues for audit practice. This level enables practitioners to have more than an *ad hoc* basis for various social-economic and professional interactions (e.g., expansion of attestation standards to representations other than financial statements, provision of consulting and operational auditing services for external audit clients, performance of police/detection work by internal auditors, interaction of public policy considerations with program evaluation by governmental auditors). It has little or nothing to

say about practice/research models, methods, tests, and standards. Macrotheory (e.g, Mautz and Sharaf, 1961; Schandl, 1978; ASOBAC, 1972) provides important insights for an audit theory paradigm.

The other level is the more practical "microtheory" that usually is presented as models, methods, and explanations dealing with audit field work activity. This may be called the "applied" area, and it seems that much audit research and theory development is concentrated in it. Ashton [1981] explained the high interest in applied research (high potential for short-run payoffs, support for the status quo) as a direct function of the fact that the largest sources of research funds and resources are from practicing organizations—accounting firms and professional associations—whose goals are application-oriented. Hence, KPMG Peat Marwick [1987] reports that fifty-nine percent of its Research Opportunities in Auditing (ROA) projects had prospective implementation in five years or less. Perusal of research descriptions in the ROA reports shows an applied/practical bias in projects whose implementation may be considered beyond the five-year horizon. The theory associated with the applied/micro level tends to be expressed as the "theory of X *in* an audit context," where X can be statistics, behavioralism, strategic games, and the like.

This concern with "microtheory" and explanations of field work decision processes permeates audit research—in search of "theories" that explain or improve on-the-job techniques and behaviors. The more recent laments about lack of theory almost always refer to a particular area of concern for applications *in* auditing, not for auditing as a broad discipline.

Further reflection sheds more light on the state of audit theory and the paradigm power of "macrotheory." The global theories (e.g., Mautz and Sharaf taken as a whole) are theories *of* auditing that set broad parameters for the field. They can help in many ways to channel the direction of auditing scholarship. Nevertheless, they are not complete paradigms because they do not attempt to specify empirical domains very precisely, nor do they have much, if anything, to say about research models, methods, tests and standards. Macrotheory sets the stage for auditing, and thus for audit research, but it does not specify how applied research can be guided and executed.

Microtheory, on the other hand, appears to be most concerned with a more operational, practical level. Practitioners and researchers want to discern underlying theory for applications *in* auditing. Hence, applied research and development work starts with theory development such as applications of statistics *in* auditing, behavioral theory *in* auditing, decision theory *in* auditing, game theory applied *in* auditing, and so forth.

All audit theories, both macrotheories and microtheories, suffer from the frailties of construction by induction and observation of practice. Mautz and Sharaf freely admitted their reliance on observations of practice. Other theoretical points of view, such as decision theory applied in auditing, may start with a normative model, but then people observe the anomalies and try to speculate about (a) altering the model to fit observations, or (b) indoctrinating the auditors to change their decision approaches to fit the model. The former action—altering the model—represents a beginning in normative science but a default to induction. No amount of induction can tell people what auditing *should be.* Such conclusions are normative matters that quickly interfere with the

larger worlds of public policy (politics), economics (practitioners' and companies' profit motives), and sociology (user perceptions and demands).

Audit theory, having its anchor in the practice of auditing, will probably always experience wide swings from times when global concerns are highly important to times when field applications recapture theoretical attention. The primary impediment to developing an audit theory paradigm, complete at all levels, is the fact that auditing arises only by human action. It has no independent existence in physical nature like gravity and friction. Hence, prescriptions (normative theory) about audit purposes and field activities will continue to be difficult, if not impossible to "prove," and certainly will be disputed by others' differing prescriptions.

The "macrotheory" and microtheory" spheres of interest can coexist, and both can be very useful for scholarship, empirical research, practice, and audit policy. It may be that the current state of audit theory is that the "macrotheories" provide much of the identification of relevant audit phenomena, while the "microtheories" provide most of the views of empirical domains and research tests and standards. Taken together, they constitute the present state of the audit theory paradigm.

Appendix

Theory Complaints

Currently, there is very little available in the professional literature that can be described as auditing theory [Mautz and Sharaf, 1961].

In their *Philosophy of Auditing,* Mautz and Sharaf attempt the development of a theory of auditing. Regrettably, this work has not produced the scholarly inquiry which the authors hoped would follow from it [Anderson, Giese, and Booker, 1970].

Events since 1969 have shown the need for a comprehensive theory of auditing, including the philosophical and psychological foundations. . . . In no other discipline can we find less literature in the last 150 years than in the field of auditing [Schandl, 1978].

Someone looking to the recorded auditing research should notice that a complete, logical and empirically defensible theory that explains the auditor's existence in an economy is not present. The necessary conditions for a solution to all auditing problems have not been established in a theoretical structure which is shown to be consistent with the data from the world around us [Hamilton, 1978].

Accountants and auditors . . . have for their work, as yet, no generally accepted conceptual framework or foundation by reference to which agreed objectives can be established and ordered, and progress towards them monitored [Kitchen, 1982].

Although interest in auditing research has increased substantially over the last ten years, no audit theory has been developed to support a coherent research effort. Mautz and Sharaf (1961) and Schandl (1978) developed theories of auditing, but their works provided little assistance in directing auditing research. Peat, Marwick, Mitchell & Co. (1976) in *Research Opportunities in Auditing* identified critical auditing areas for future research but gave no overall organizing theme [Bamber and Bylinski, 1982].

Auditing is not yet at the point where it can be conceptualized in terms of a unified theory [Scott, 1984].

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Discussant's Response to "Audit Theory Paradigms"

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Ernst & Whinney

The stated goal of the paper is to present several candidates for the theory of auditing. No attempt is made to order the candidates, although the point is made that all fall short of a useful audit theory. The paper distinguishes between "macrotheory" and "microtheory," and asserts that the two, taken together, can be useful for research and practice.

As a practitioner, I found the paper difficult to read and understand. The following concepts are used which are foreign to most practitioners:

Positive versus normative theory
Empirical domain
Paradigm
Global pretensions
Theory closure
Utility payoffs

Even the title is somewhat daunting. A more understandable and, perhaps, more descriptive title would be "Audit Theory: What Is It? How Is It Developed?"

The paper states that "a *paradigm* is a 'world view' that enables researchers, theorists, and practitioners to discern audit phenomena in terms of *input*—specification of the problems of interest, *setting*—the empirical domain over which the audit work/research is applied, and *process*—the kinds of tests and standards used to adjudicate contradictory propositions." To help the practitioner understand the point being made, the paper should give two examples familiar to practitioners—one for an audit engagement and the other for an attestation engagement—to illustrate the meanings of the terms "input," "setting," and "process."

The section of the paper entitled "Macrotheory" vs. "Microtheory" did not address whether macrotheory drove microtheory or vice versa. A discussion of this point would be helpful.

The more restrictive auditing theory perspective is dominant rather than the more expansive attestation theory perspective. This focus is disappointing. There is only one reference to the attestation standards. And that is in a parenthetical comment! The attestation standards, of which generally accepted auditing standards can be considered a subset, are of growing importance to practitioners. The attestation standards are an expansion of, but faithful to, the theoretical core of the Mautz and Sharaf theory formulation as summarized in the paper. Within the last year, two interpretations of the attestation standards have been published, as follows:

Defense Industry Questionnaire on Business Ethics and Conduct[1]
Responding to Requests for Reports on Matters Relating to Solvency.[2]

[1] American Institute of Certified Public Accountants, "Interpretation of Statement on Standards for Attestation Engagements, Attestation Standards: 'Defense Industry Questionnaire on Business Ethics and Conduct,'" *Journal of Accountancy* (August 1987), pp. 152-161.
[2] American Institute of Certified Public Accountants, "Responding to Requests for Reports on Matters Relating to Solvency," *Journal of Accountancy* (May 1988), pp. 178-181.

3

Why the Auditing Standards on Evaluating Internal Control Needed to be Replaced

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In February 1988, the Auditing Standards Board (ASB) of the AICPA approved the issuance of nine Statements on Auditing Standards (SASs). The profession developed these statements to narrow what has been referred to as the "expectations gap," the gap between what the public and financial statement users believe auditors are responsible for and what auditors believe they are responsible for. Among the new standards, there is one that dramatically changes the auditor's responsibility for considering internal control in a financial statement audit. Effective for audits of financial statements beginning on or after January 1, 1990, SAS No. 55, *Consideration of the Internal Control Structure in a Financial Statement Audit,* replaces Section 320, *The Auditor's Study and Evaluation of Internal Control,* of SAS No. 1.

This new standard is by far the most complex and controversial, at least among academic circles, of the new auditing standards adopted by the profession. This paper discusses the author's perspective on why the new standard was issued.

Should Section 320 Have Been Revised Rather Than Replaced?

The ASB concluded that the minimum study and evaluation of internal control required by Section 320 was insufficient for audit planning. Effective audit planning requires the auditor to identify the types of material misstatements that could occur in the financial statements and to assess the risk that such misstatements will occur. Because an entity's internal control significantly affects the possibility of misstatements in the financial statements, the ASB concluded that the auditor needed a better understanding of internal control when planning an audit.

This is a different notion from that encompassed by the minimum study and evaluation required by Section 320, which stated that the purpose of the review of the system was to obtain sufficient knowledge and understanding about the accounting system and the internal accounting control system "(a) to make a determination of whether there are internal accounting control procedures that may provide a basis for reliance thereon in determining the nature, extent, and timing of substantive tests; or (b) to aid the auditor in designing substantive tests in the absence of such reliance." While Section 320 required the auditor to have a general knowledge about the control environment and flow of

transactions through the accounting system, it did not require any knowledge of control procedures unless the auditor planned to rely on them.

Some may argue that Section 320 (particularly the limited knowledge about internal controls required for audit planning purposes) should have been amended rather than completely replaced. However, the basic fabric of Section 320 was showing stress cracks, and there were compelling reasons for the Board's conclusion that so much of it had to go, and so many new concepts and principles had to be added, that it was far more appropriate to completely rewrite the standard than to attempt to patch it. Section 320 had evolved on a piecemeal basis over the past 36 years. It was a combination of three Statements on Auditing Procedure issued between 1949 and 1972 and was later amended by eight Statements on Auditing Standards. Several other SASs introduced or altered auditing concepts that should have been incorporated into Section 320, but were not.

This combination of factors created a hodge-podge of professional requirements pertaining to the study and evaluation of internal control, with the result that many practitioners, from both small and large firms, were detouring around the standard in conducting audits. This was evidenced by the growing number of practitioners who preprinted memorandums for insertion into working paper binders on all of their audits that blatantly stated, in one fashion or another, that they "were not relying on internal controls," thereby disavowing any responsibility to understand the client's internal control procedures.

Such statements were too often inconsistent with the auditor's substantive audit programs and other working papers that acknowledged the presence of effectively operating internal controls that affected either the nature or extent of specific substantive tests. For example, audit programs and working papers often reflected the presence of a well planned and controlled physical inventory, which the auditor tested for physical inventory quantities; the presence of cash reconciliations performed by "independent" employees, which were utilized by the auditor to restrict substantive tests of cash; and the existence of prenumbered shipping documents and customer invoices, which were matched and accounted for by the client to ensure the completeness of revenue and which the auditor often considered when deciding to restrict substantive tests to analytical procedures and tests of revenue transactions in the post-balance sheet period.

There are probably many reasons why practitioners interpreted and applied Section 320 in the manner described above. This inconsistency in audit planning and performance avoided "relying on controls" and incurring the cost of applying compliance tests to specific control procedures. Compliance testing, to most practitioners, means re-performing a specific control procedure using the principles of sampling explained in SAS No. 39, *Audit Sampling* [AICPA, 1981]. This notion was exacerbated by the risk model in SAS No. 47, *Audit Risk and Materiality in Conducting an Audit* [AICPA, 1983], which directs the auditor's assessment of control risk to the effectiveness of *internal accounting control procedures* related to an account balance or class of transactions—not to the effectiveness of the accounting system or the control environment, which most practitioners believe do reduce control risk in most entities. And finally, if the practitioner compliance tests one or more specific control procedures,

exactly how did he or she rely on them? How were substantive tests restricted in either nature or extent? These problems and questions were far easier for the practitioner to avoid by inserting a memorandum in the working papers that avoided the whole morass.

The ASB recognized these problems associated with Section 320 and addressed them squarely when drafting SAS No. 55. By requiring auditors to take a different and broader view of internal controls—from the perspective of control risks—SAS No. 55 will change dramatically the way audits are planned and performed. The new standard will require the auditor to (a) assess control risk associated with the control environment, which research has demonstrated to be a principal source of audit risk; (b) broaden his or her perspective to include not only the control environment but also the accounting system and specific control procedures; and (c) consider control risk more discriminately, at the assertion level rather than at the class of transactions and account balance level, and along a continuum ranging from the maximum to the minimum.

Importance of the Control Environment

The key elements in the ASB's response to the "expectations gap" are (i) to increase the auditor's responsibilities in performing an audit of financial statements, (ii) to require audits to be planned and performed to provide reasonable assurance that material financial statement fraud and error will be detected and, most important, (iii) to provide guidance for meeting those increased responsibilities. To do this, the ASB needed to understand the types of irresponsible, unreliable financial reporting that led to the concerns expressed by Congress, the press, and the organizations that sponsored the Treadway Commission.

Research conducted at Coopers & Lybrand led to the same conclusions as the Treadway research on fraud: the basic, underlying source of fraudulent financial reporting is found at the very top of the organization—what the Treadway report calls the tone at the top—not in erroneous or fictitious transaction data used to prepare the financial statements. In other words, the problem is not with specific internal control procedures; rather, it is related to the attitude, awareness, and actions of management pertaining to financial reporting—what auditors call the control environment—and this emphasizes the need to consider the risks associated with that environment when performing an audit.

That same research also told us that almost all the financial frauds that occurred involved improper revenue recognition methods, the overvaluation of assets, or incomplete information in financial statements. In each instance, the fraudulent behavior was motivated not by a plan to embezzle corporate assets, but rather by the desire to mislead financial statement users for one or more of a variety of reasons. Moreover, the research showed that the major frauds were not perpetrated by manipulating data as the transactions passed through the accounting system. In fact, the perpetrators almost always used complete, accurate financial data in creating the misstatements.

For example, accounting estimates, such as loan loss reserves, are based on subjective factors, and controls over them are often more difficult to establish than controls over factual information. As a result, there is greater

potential for bias by top management. Corporate watch-dogs, top management and directors, are less concerned these days with the number-crunching aspects of an audit or with the accuracy of the accounting for transactions, and are more concerned with management's judgments, estimates, and valuation decisions.

Thus, audit risk is not reduced by chasing financial transactions endlessly through the client's accounting systems in the mostly irrelevant, and certainly boring, quest to establish their accuracy and the absence of "transaction error." Modern computer systems have a low risk of random error (systematic error is a greater risk, but it is generally assessed and tested by means other than re-performing controls at the transaction level). Furthermore, in the current computer environment, today's transactions are summarized tomorrow to assist in managing the business, which in many environments further mitigates the risk of systematic error. In most environments, if the financial data are corrupted, employees, management, and third parties are generally the first to know. The auditor arrives long after the need to know arises and corrective action is to be taken.

While the auditor still needs to assess the risk of "transaction error" and to take appropriate steps where it is other than low, he or she also needs to focus on control risk from a broader perspective—the control environment. Specifically, the new standard requires the auditor to obtain the following information about the client:

(a) Its management philosophy and operating style,
(b) Its organizational structure,
(c) Whether it has an effective audit committee,
(d) The methods it uses to communicate authority and responsibility,
(e) The management control methods it uses,
(f) Whether it has an internal audit function,
(g) Its personnel policies and procedures,
(h) External influences on its operations, and
(i) Regulatory rules under which it operates.

Many critics have suggested that the control environment is illusive and that any assessment of it would be subjective and should not be used as a basis to restrict substantive tests. They argue that Section 320, in its abbreviated discussion of the control environment, stated that the auditor's understanding of it should provide general knowledge to be considered in deciding whether to test specific control procedures and not in restricting substantive tests. Further, they note that specific policies and procedures in the control environment cannot be compliance tested by re-performing them to obtain an understanding of management's and the board's overall attitude, awareness, and actions.

Undeniably, the auditor's assessment of the control environment involves judgments based on his or her observation of actions and documents. However, this does not mean that the auditor obtains the required understanding of the control environment by casual conversations with enterprise management. Rather, that understanding involves making judgments based on observing and inspecting evidence of the implementation of policies and procedures that demonstrate the actions taken by management related to the financial reporting process.

The practice aid developed by Coopers & Lybrand for understanding and assessing the control environment requires the auditor to gather, consider, and reach conclusions on about 60 separate factors for even the smallest clients. I believe that the assessment of this type of information in conducting an audit will aid in focusing the auditor's attention on risks that are unusually high, as well as in identifying opportunities for more efficient audit procedures.

The Internal Control Structure—A Broader Concept

SAS No. 55 replaces the concept of internal control with a broader concept, the internal control structure, which includes the control environment. The internal control structure also includes the accounting system and specific control procedures. This broader concept acknowledges that policies and procedures established within each of the three elements can be relevant to audit planning, since they are an important source of information about the types and risk of potential misstatements in the financial statements. Each of the three elements of the control structure also provides information about the recording, processing, summarizing, and reporting of financial data useful for designing substantive tests.

Section 320 also discussed each of the three elements, but provided limited guidance about the control environment and the accounting system, and excluded them from the concept of internal control. SAS No. 55, in addition to expanding the concept of internal control, provides more guidance about the interrelationship of these three elements of the control structure, particularly in the context of audit planning. The new standard requires the auditor to obtain knowledge about all three elements of the internal control structure to determine whether policies and procedures relating to each of the elements have been placed in operation.

The accounting system was distinguished in Section 320 from the system of internal accounting control. This is a distinction without a difference in modern computer systems, where thousands of programmed procedures operate interactively to produce reliable financial data. Identifying which individual programmed procedures operate as controls is not so important as identifying whether the architecture of the accounting system, including the controls over it, enables the entity to record, process, and summarize reliable financial data. SAS No. 55 requires the auditor to obtain sufficient knowledge of the accounting system to understand:

- The classes of transactions in the entity's operations that are significant to the financial statements;
- How those transactions are initiated;
- The accounting records, supporting documents, machine-readable information, and specific accounts in the financial statements involved in the processing and reporting of transactions;
- The process of accounting from the initiation of a transaction to its inclusion in the financial statements, including how the computer is used to process data; and
- The financial reporting process used to prepare the entity's financial statements, including significant accounting estimates and disclosures.

When the auditor obtains an understanding of the accounting system and

the control environment, he or she is also likely to obtain knowledge about related individual control procedures. For example, when obtaining an understanding of the accounting system pertaining to inventory, the auditor usually will become aware that physical inventory quantities are reconciled to the accounting records. The auditor considers the knowledge about control procedures obtained from the understanding of the control environment and accounting system in determining the additional understanding of individual control procedures that is necessary to plan the audit.

SAS No. 55, however, does not require the auditor to obtain an understanding of individual control procedures related to all account balances, classes of transactions, or assertions embodied in the financial statements. The knowledge that the auditor needs about each of the internal control elements for audit planning purposes is affected by his or her assessment of inherent risk, preliminary judgments about materiality, the complexity of the entity's operations and systems, and information about the entity obtained from prior audits that may be relevant to the assessment of control risk. The latter item is an important concept that SAS No. 55 recognizes and Section 320 did not. While this concept is new to the authoritative literature, it is already embedded in some firms' auditing manuals and, in practice, all auditors, consciously or not, take prior years' results into account in assessing control risk.

Assessing Control Risk Along a Broad Continuum

SAS No. 55 provides a framework for practitioners to improve their assessment of control risk in two respects. First, it establishes a requirement to assess control risk in relation to the financial statement assertions identified in SAS No. 31, *Evidential Matter* [AICPA, 1980]. This helps with the age-old linkage problem that has confronted auditors in the past because it fuses a bond among the internal control structure, assessing control risk, and obtaining evidential matter about financial statement assertions.

Focusing the auditor's attention on control risk at the assertion level is particularly important in today's audit environment. Modern computer systems have dramatically increased the reliability of financial data on which management makes valuation judgments, and presentation and disclosure decisions. The valuation and the presentation and disclosure assertions, which involve management judgment applied to financial data after they have been processed by the accounting system, often represent relatively high risks to the auditor. For example, after assessing control risk, the auditor may conclude that the completeness, mechanical accuracy, and existence of accounts receivable are low risks and may adjust the nature and extent of substantive tests accordingly for these audit objectives. However, the auditor may conclude that the control environment is not conducive to reducing control risk to a low level for the audit objectives relating to the valuation, and the presentation and disclosure assertions.

Section 320 and SAS No. 55 remind us that the fundamental reasons for not permitting complete reliance on controls are the inherent limitations on the effectiveness of accounting control, namely, human error caused by misunderstanding of instructions, mistakes of judgment, carelessness, distraction, or fatigue; collusion; management override of controls; and the ineffectiveness of controls in preventing wrong estimates and judgments that enter into the

financial statements. These are all valid points about the limitations on the effectiveness of controls. But these limitations may not be relevant to the conclusion that there is a low level of audit risk with respect to certain assertions regarding specific accounts, e.g., those assertions about rights and obligations, presentation and disclosure, and the measurement of accounting estimates.

SAS No. 55 acknowledges that when audit risk is appropriately low as a result of the auditor's judgment about control risk together with inherent risk for a specific assertion or related audit objective, the auditor need not apply *specific* tests to an account balance or class of transactions to reduce detection risk for that specific assertion. One of the problems with Section 320 was that it was unclear on the issue of complete reliance on controls at the assertion level. The auditor was told not to place complete reliance on internal control to the exclusion of other auditing procedures with respect to particular account balances and classes of transactions, but no guidance was given about complete reliance at the individual assertion and audit objective levels. It is difficult to fathom the original intent of the framers of Section 320, simply because the notion of assertions and their relation to audit objectives was not explicitly addressed in the literature at that time. Many auditors, and obviously the ASB, now believe it is appropriate to permit complete reliance on controls at the individual assertion level.

Moreover, substantive tests do not provide evidence about a single assertion only. For example, most analytical procedures provide evidence about all assertions relevant to an account balance. Confirmations of accounts receivable balances, while directed primarily at obtaining evidence about the existence assertion, also provide evidence about mechanical accuracy.

The second way in which SAS No. 55 improves the auditor's assessment of control risk is that it replaces an "all or nothing," "rely or don't rely," approach with one that recognizes that the auditor's assessed level of control risk may vary from the maximum level to the minimum level for an assertion. The level assessed may be expressed in quantitative terms, such as percentages, or qualitative terms such as maximum, moderate, or low.

SAS No. 55 does not require the auditor to undertake procedures to assess control risk at below the maximum level for any assertion. However, when the auditor identifies potentially effective policies and procedures relevant to assertions, he or she may decide that it would be efficient to test the effectiveness of their design and operation. The tests used, which are referred to as tests of controls in SAS No. 55, include procedures such as inquiry, observation, inspection of documents, or reperformance of a policy or a procedure. The auditor then assesses the evidence obtained from these tests to make judgments about the level of control risk.

SAS No. 55 acknowledges that in many audits the minimum required understanding of control structure policies and procedures will provide the auditor with knowledge about their effectiveness. This will often be so whether or not the auditor's procedures were designed to obtain evidence about the effectiveness of control structure policies and procedures as well as to obtain the required understanding. Thus, after obtaining the minimum understanding required by SAS No. 55, the auditor may conclude that control risk is below the

maximum level for some assertions because of evidence obtained about the effectiveness of specific policies or procedures.

For example, in obtaining an understanding of the control environment, the auditor may examine evidence of management's cash forecasting and treasury operations. This may include inspecting management reports, as well as tracking actual cash receipts and collection of accounts receivable and comparing them with forecasted amounts. This understanding may provide the auditor with knowledge about management's investigation of variances and other controls established over cash collections. In this scenario, even though the auditor's intention was to obtain an understanding about the treasury and cash forecasting systems used by management, the procedures may also provide evidence about the valuation of accounts receivable.

Thus, the auditor is encouraged by SAS No. 55 to consider all evidence, whether obtained as part of understanding the control structure or from planned tests of controls, in reaching a judgment about the effectiveness of control policies and procedures.

Conclusion

At a recent meeting held to consider the implications of pervasive deficiencies noted in peer reviews conducted during the past year, eight matters were identified that indicated the possible need for guidance in auditing standards. Four of the eight matters related to performance deficiencies involving Section 320, and it can be argued that a fifth one is also associated with that section. This suggests that a disproportionately high percentage of audit performance problems relate to the evaluation of the client's internal control structure. While the implementation of SAS No. 55 has yet to stand the test of peer review, the standard establishes a framework that will significantly improve audit quality and the public perception of auditor performance. Chairman Dingell of the Congressional Oversight and Investigations Subcommittee has often asked how auditors can examine financial statements and not know about their clients' internal controls. The answer "I didn't rely on internal controls" doesn't play very well.

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Discussant's Response to "Why the Auditing Standards on Evaluating Internal Control Needed to be Replaced"

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In a way, I feel that I should apologize for not joining Jerry and the AICPA Auditing Division leadership in supporting their response to the alleged expectations gap. One would like to support the profession that one studies and about which one teaches. However, it is traditional for a scholarly discussant to take a position contrary to that of the author. That will be easy for me to do since, as most of you know, I hold a contrary view on the need to replace AU 320.

It is also traditional to critically discuss a paper on the basis of its own criteria and to discuss the topic of the paper from an alternative perspective. I will follow the traditional approach, but in reverse order. I will begin by giving a little background on the role of Statements on Auditing Standards (SASs) in general, and the role and importance of AU 320 or Statement of Auditing Procedure (SAP) No. 54.

GAAS and SASs

As we all know, SASs are codified interpretations of Generally Accepted Auditing Standards (GAAS). They are quasi-legal in nature and help define acceptable practice under the securities acts as well as within the ethical rules of the profession. Codified professional standards play two important and related roles. They serve a before-the-fact *educational* role of guiding the auditor as to what should be done to conduct a "standard quality" audit under GAAS. They also serve an after-the-fact *enforcement* role in determining whether an auditor has been guilty of "malpractice." The first helps the profession by facilitating uniform, high quality audits and the second helps the profession by making it easier to disassociate itself from low quality audits. Thus, the SASs are important and they should be clearly worded and be readily interpretable.

Traditionally, SASs have related almost exclusively to the *effectiveness* of audits—that is, regulation to make sure that audits are effective in achieving appropriately low audit risk that error might exceed material limits. Some practitioners read the SASs as providing minimum requirements for a legal defense, and the minimum is their target. Without auditor quality differentiation, the SASs may also provide the maximum service in a competitive market. Therefore, it is important to have the effectiveness minimum clearly stated.

Efficiency, or the achievement of a given level of audit risk at minimum cost, has, with rare exception, been left unregulated or left without comment by the

Auditing Standards Board (ASB) for two reasons. First, in a competitive market, practitioners can be expected to be efficient on their own. Second, there is no long-run danger to the public of inefficient auditing—the market will discipline inefficient auditors.

SAP No. 54 (now AU 320) has had a revolutionary, and I believe salutary, effect on auditing practice, education, and research. Several generations of professors, textbook writers, students, and regulators have learned about the inherent limitations of internal control and the related necessity of substantive testing, the reasons behind segregation of duties, the *necessity* of compliance testing if controls are to be relied upon, the logical basis for evidence integration, and the basic concepts of control of audit risk. It has stood the test of time in practice and in research—many professors have tried to shoot holes in it and could not. Perhaps most important to us here, it gave a conceptual evidence model of auditing that has provided the basis for respect for auditing professors on campus. Many of us in this room are here due, in part, to SAP No. 54.

Certainly AU 320 is not perfect and it could use some updating and editing. In that regard, many of you are aware of my controversial letter of March 26, 1987 to Alan Winters. It was a response to his invitation to comment on the exposure draft (ED) of SAS No. 55. I read the ED with the view that, I believed, a skeptical, "minimum requirements-seeking" practitioner or accountant's defense attorney might take. Since AU 320 would be eliminated by the ED, I tried to read the ED without reliance on what I *knew* was in AU 320 because the next generation of students, auditors, and "enforcers" will have to read, understand, and apply SAS No. 55 cold!

In his response to the planning subcommittee (May 15, 1987), and the entire ASB (June 2, 1987), Al stated that there was little problem with the exposure draft but that I simply didn't read the words as he had meant them. The latter is true, of course. Both letters are in the public record if you wish to study the issues for yourself. I encourage you to try to read SAS No. 55 from the perspective of one who doesn't already know about AU 320.

I am pleased to say that I believe the current draft of SAS No. 55 is a considerable improvement over the exposure draft of last year. This is because, in effect, it *adds back* a number of the AU 320 concepts. Whether the present draft of SAS No. 55 is a net improvement over AU 320, or indeed, if the benefits of its passage outweigh its costs, is not at all clear to me.

The net benefits of SAS No. 55 are also not clear to others as evidenced by the fact that six ASB members had dissents or qualified assents to its issuance. Their number includes partners from five national accounting firms and the accounting professor, Jim Loebbecke. The audit firms are Ernst and Whinney, Grant Thornton, Laventhol & Horwath, Peat Marwick Main, and Price Waterhouse. Their stated concerns include illogical reasoning, confusing exposition that is likely to lead to over-reliance on controls, unnecessary changes of wording with no change in concept, and the need for stronger procedures to support the auditor's "understanding" of the control structure. That is, the dissenters are asking for *more* rigor as to effectiveness and *more* clarity!

This reception by a substantial minority of Board members can be contrasted with that of SAS No. 47 on Audit Risk and Materiality. SAS No. 47

was peculiar in that it added "structure" to the official literature, but its task force chairman (a Big-Eight partner and ASB member) wanted a 15-0 vote and held up a ballot draft until all objections by all parties were accommodated. A required 60% majority supported a more structured SAS but structure was diluted in order to get unanimity. For example, a requirement for "preliminary estimates" of materiality was replaced by the more vague "judgments about" materiality. Also, in an attempt to make the SAS "less quantitative in tone," the title was changed from "Materiality and Audit Risk" to "Audit Risk and Materiality."

SAS No. 55 is peculiar in that it is arguable whether it adds more structure than it removes. It is also peculiar in that its task force is the first to be chaired by a member of the AICPA staff. In contrast to SAS No. 47, the SAS No. 55 chairman apparently *did not* try to accommodate all suggestions for improvement. Ironically, if the chairman had achieved unanimity, then SAS No. 55 would have been a *stronger* document since the dissenters were asking for more guidance or clarity rather than less. In fairness to the task force chairman, political expediency may have necessitated foregoing further rigor and clarity.

SAS No. 55 and the "Expectations Gap"

Now, I'll discuss specifics of the Sullivan paper. I'll be very specific as to references so that you can verify my statements. On page 47, Jerry states that the nine new SASs were developed to "narrow what has been referred to as the 'expectations gap.'" Among the new standards is SAS No. 55 that "dramatically changes" the auditor's responsibility for considering internal control.

If we accept Jerry's premise, then we would reasonably expect to see the following in a discussion of "why" AU 320 needed to be replaced:

a. First, we would expect to see a description, listing, or citation of a number of highly visible audit failures due to the application of guidance in AU 320—that is, audits for which the auditor had properly applied the guidance and yet failed to detect material error.
b. Second, we would expect to see a focus in SAS No. 55 on audit effectiveness. The SAS would provide means of increasing audit *effectiveness* through guidance to prevent the abuses noted.
c. Third, we would *not* expect to see extensive discussion of *efficiency* or how to do an audit more cheaply or with less work since Dingell hasn't criticized the profession for being inefficient.

How well does Jerry's paper and SAS No. 55 meet these three expectations? First, let us consider the evidence on audit failures due to following AU 320.

On page 48, Jerry cites a "growing number" of practitioners who use preprinted memorandums proclaiming "no reliance on controls" yet rely on "effectively operating internal controls." We don't know if "growing" means from one to two or from 10,000 to 11,000 auditors, and Jerry doesn't claim that these audits were improper or ineffective.

On pages 48 and 49 he states that AU 320 and SAS No. 47 direct the auditor's attention toward internal control procedures related to account balances and transactions and not to the accounting system or control environment "which most practitioners believe reduce control risk." Now, if

auditors don't rely on controls that they don't study or evaluate, then by not looking at the accounting system and control environment the audit may be inefficient. However, the audit would not necessarily be ineffective!

On pages 49 and 50, Jerry cites research conducted at Coopers and Lybrand. No reference is given so apparently this is secret research about which one can't determine the methods used, the data examined, or whether there were flaws in their application or alternative interpretations of the results. According to the secret C&L research [Sullivan, 1988, page 49] "the problem is not with specific internal control procedures; rather it is related to the *attitude, awareness* and *actions* of management related to financial reporting." [emphasis added]

Therefore, Jerry concludes that, we ought to audit management's attitude and awareness more and audit transactions and balances less. This is consistent with the views expressed in his 1984 Kansas paper [Sullivan, 1984] in which he championed reliance on supervisory controls verified by observation and inquiry over reliance on transaction and balance controls verified by reperformance.

The idea that, because few errors are discovered in tests of transactions and balances, we can deemphasize or even eliminate them is bothersome for two reasons. First, the auditor contracts to do an *audit*. The public *expects* that an auditor has audited transactions and balances, not just verified that management has a good attitude and awareness. Second, auditing behavior is dynamic or *strategic*—an analogy will suffice as explanation. There are very few guns detected at Kansas City International Airport. Yet, if gun control were reduced or eliminated, I believe that there would be many more guns leaving the jetway. Anticipation of detection yields prevention.

If the official audit literature is to emphasize management's good attitude and awareness as a basis for assessing low control risk, then I believe that the ASB should tell us *how much* the auditor can rely on management's general good "attitude and awareness" to reduce substantive testing across particular accounts and balances. Is it a lot? Can it be 100%? Or is it a very small amount?

There are repeated *efficiency* reminders in SAS No. 55. For example, paragraphs 31, 40-42, and 43-45 remind the auditor that results from testing one assertion for one account may be useful in reducing testing in another. Paragraph 48 and 50-52 give compliance tests as options for reliance. The auditor is also encouraged to rely on favorable audit results from last year [para. 23, 53]. It is not that the auditor should not consider such evidence, it is just peculiar that a document designed to increase audit *effectiveness* is directed at being *efficient* or, perhaps, the *ex post* legal protection of the auditor. There is only one warning and no examples that evidence from varied sources may conflict with or "disconfirm" each other. Such examples and warnings would likely increase effectiveness.

Finally, I'm very troubled by the suggestion, in paragraph 63, that the auditor try to figure out means of placing complete reliance on an assessment of low control risk. That is, the auditor would conduct no substantive tests for an assertion. The auditor is warned that "ordinarily" one cannot do this for all assertions on a significant account, but there is no guidance as to whether substantive testing should be the exception or whether complete reliance on

controls is the exception. (It should be noted that the new SAS on Analytical Review reduces this risk.)

According to Sullivan [1988], SAS No. 55 provides a framework to improve control risk assessment in two respects:

1. It establishes a requirement to assess controls in relation to financial statement *assertions* (presumably all five assertions for each financial statement caption).
2. It replaces an "all or nothing," "rely or don't rely" approach with a more continuous approach such as percentages, or "maximum, moderate or minimum."

Now, does anyone really believe that we needed a new SAS to explain that AU 320 applies to assertions? I doubt it. Second, I cannot find any statement in AU 320 that dictates an "all or nothing" approach. In fact, paragraphs 72 and 73 of the original SAP No. 54 (now AU 320, 81-82) are explicit in discussing a *variable* extent of reliance and Appendix B [paragraph 35] illustrates reliance as being 30%, 50%, 70%, or 90%! That hardly sounds like all or nothing/rely or don't rely. Something is wrong here.

Overall, I'm not sure what is going on. There is a political problem for the profession. Is there an expectations gap (an effectiveness problem)? Is AU 320 part of it? Is SAS No. 55 more than the product of political-economic actions by the ASB?

As we have seen, if the Sullivan explanation is correct, there are some surprises in the data. There are no specific abuses listed nor locatable references to abuses. There is little, if any, increase in effectiveness of SAS No. 55 over AU 320 and there is a concentration on efficiency. None of those supports the claim that SAS No. 55 is needed to close the alleged expectations gap.

If you follow the ASB's activities, you know that the Sullivan paper is the fourth in a series of papers that "explain," "sell," or "excuse" SAS No. 55. One is by Dan Guy and Jerry Sullivan in the April, 1988 issue of *Journal of Accountancy* [Guy and Sullivan, 1988], a second is by ASB member Bob Temkin and Al Winters in the May, 1988 issue of *Journal of Accountancy* [Temkin and Winters, 1988], and a third will appear in the June, 1988 issue of *Journal of Accountancy* and will explain how one should apply SAS No. 55 to small firms. With an apparent lack of "effectiveness" differences from AU 320, these papers seem to be much like advertising for "new and improved" laundry soap.

Closing Statement

In his closing statement, Jerry states that Congressman Dingell has often asked how auditors can examine financial statements and not know about their clients' internal controls. Further, he states that the answer, "I didn't rely on internal controls" doesn't play very well.

I am very concerned that the answers given in SAS No. 55 won't play very well. That is, in defense of an audit failure, I would not like to hear:

"I didn't do much substantive testing because management had such a good attitude toward controls." or,

"I didn't do much substantive testing because management had such a good system last year."

Now these responses seem silly to the uninitiated. But you, Jerry, and Al Winters, and Dan Guy, and anyone else who has reviewed the files know that such responses will be observed in future peer reviews and perhaps in court cases. I, for one, would be hard-pressed to say that the particular words in SAS No. 55 don't lend some support to that position.

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4

AUDITOR'S ASSISTANT: A Knowledge Engineering Tool For Audit Decisions*

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1. Introduction

In recent years, there has been significant interest in developing expert systems for assistance in audit decisions [see e.g, Boritz and Wensley, 1988; Chandler, 1985; Hansen and Messier, 1986a, and 1986b; Leslie *et al.*, 1986]. It is believed that use of such systems will facilitate audit decisions and make audits more efficient and effective. This appears to be the reason that major accounting firms are committing increasingly greater resources to developing such systems [see e.g., Boritz and Brown, 1986; Kelly, 1987; Shpilberg and Graham, 1986].

Most of the expert systems being developed are rule-based. While such systems have many attractive features such as modularity of knowledge-base, ease of updating knowledge-base, etc., they are not well-suited for coherent reasoning under uncertainty. This is because in rule-based systems, the user has no control over the chain of inference whereas, coherent reasoning under uncertainty requires controlled firing of rules [Shafer, 1987]. Because of this difficulty, some developers of expert systems have avoided dealing with uncertainties altogether [Kelly *et al.*, 1986]. In domains where uncertain reasoning is unavoidable, heuristic approaches have been attempted with little success [Shortliffe and Buchanan, 1975; Duda *et al.*, 1976]. In recent years, considerable theoretical work has been done on the subject of coherent uncertain inference using Bayesian probabilities and belief-functions [see e.g., Pearl, 1986; Kong, 1986; Shenoy and Shafer, 1986; Mellouli, 1987; Shafer, Shenoy and Mellouli, 1987; Lauritzen and Spiegelhalter, 1988; Shafer and Shenoy, 1988]. The expert system described in this article represents one of the first practical applications of these new techniques.

The purpose of this paper is to describe an interactive tool called AUDITOR'S ASSISTANT (AA). The system, when fully developed, should

* This research has been supported in part by grants from the Peat Marwick Foundation, the National Science Foundation grant No. IST-8610293 and General Research Fund of the University of Kansas. The authors are grateful for discussions and assistance with programming from Yen-Teh Hsia, Debra Zarley and Ragu Srinivasan.

enable its users (auditors) to construct a network of variables and evidence. The system will automatically aggregate all evidence that is entered and display the resulting beliefs in all variables in the network. The system will have the capability of using both the Bayesian and the belief-function formalisms for managing uncertainties. It will provide a graphic interface for constructing a network of variables and evidence and it will automatically revise beliefs in all variables as new pieces of evidence are entered.

This paper is divided into four sections. Section 2 provides a detailed discussion of AUDITOR'S ASSISTANT. Section 3 discusses an example demonstrating the process of constructing a network of variables and evidence and aggregation of evidence using the belief-function calculus. The final section summarizes the results. A brief introduction to the theory of belief-functions is given in Appendix A.

2. Auditor's Assistant

AUDITOR'S ASSISTANT is an interactive system for assisting auditors in making audit decisions. AA's theoretical foundation is based on coherent management of uncertain inference. With this system, an auditor can graphically create a network of variables and evidence, input judgments about the degree of support provided by a piece of evidence to the variable it is linked to, and evaluate the resulting total belief in all variables in the network. An auditor can also use the system to decide which procedure or test to perform next and also to decide when sufficient evidence has been obtained to issue an opinion.

In auditing the financial statements of a firm, there are two major conceptual tasks. First, an *argument* needs to be constructed. This is the process of organizing different pieces of evidence and the variables which they support. One formal result of this process is a network of variables and evidence. We shall refer to this network as a *design* [see Shafer and Cohen, 1987]. The process of constructing a design cannot be easily automated. It has to be done by a human expert, i.e., an experienced auditor. However, we can assist the auditor in this process by providing examples in the form of templates and by checking certain technical conditions, e.g., the Markov property [Shafer, Shenoy and Mellouli, 1987; Shafer and Shenoy, 1988], that have to be satisfied.

Second, once an argument is in place, evidence has to be collected, judgments about the degree of support provided by such evidence to variables have to be made, and these judgments have to be aggregated and evaluated for all variables in the tree. The collection of evidence and judgments of degree of support are tasks that have to be done by the auditor. However, the aggregation and evaluation of evidence can be automated.

The process of collecting evidence, making judgments, and aggregating judgments is iterative. Items of evidence are evaluated as they are collected, and this evaluation influences what evidence is collected next. The decisions about what evidence to seek next is one aspect of *control* [Cohen, 1987; Shafer and Cohen, 1987]. Again, this is not easy to automate. The experienced auditor makes these decisions. However, an interactive system should assist the auditor in these decisions in two ways. First, the system should automatically aggregate evidence as it is obtained and entered into the system, and the

system should display the net effect of all evidence on all variables in the network. Second, the system should allow a what-if analysis by allowing its user to enter a hypothetical piece of evidence and displaying its effect on all the variables. The user should then be able to retract this hypothetical evidence.

In general, as discussed in the professional standards [AICPA, 1987] and also in the academic literature [see, e.g., Graham 1985a-1985e], auditors gather three types of evidence. One type comes from reviews of the external and internal environments in which the business is operating. External environments include economic, social and political environments. Internal environments include management integrity, quality of management, structure of management, and the general business awareness of the management. A second type deals with the strength of internal accounting controls. A strong set of internal accounting controls may mean more reliable accounting data and, therefore, less need for substantive tests. The third type comes from performing substantive tests to determine directly whether account balances are fairly stated in accordance with generally accepted accounting principles. Such tests include analytical review procedures and direct tests of balances such as confirmations of receivables from customers.

There are several formalisms to aggregate uncertain evidence, including the Bayesian probability calculus [Pearl, 1986; Shenoy and Shafer, 1986; Lauritzen and Spiegelhalter, 1988; Shafer and Shenoy, 1988] and Shafer's theory of belief-functions [Shafer, 1976; Shenoy and Shafer, 1986; Kong, 1986; Shafer, Shenoy and Mellouli, 1987; Mellouli, 1987]. These calculi differ in their need for structure, inputs, flexibility and computational complexity. The Bayesian probability calculus demands structure in the form of conditional independence, and it demands numerous inputs in the form of priors and conditional probabilities, but it is relatively efficient computationally. The belief-function calculus offers more flexibility and demands less inputs, but it can be computationally more intensive than the Bayesian calculus.

AUDITOR'S ASSISTANT uses the belief-function calculus to represent and aggregate evidence. Shafer and Srivastava [1989] have demonstrated the importance and relevance of belief-functions for audit decisions based on the structure of audit evidence. Since the belief-function calculus reduces to the Bayesian calculus when all inputs demanded by the Bayesian calculus are available, AA can also work with probabilities.

Once a network is in place, the auditor conducts procedures and, on the basis of the results, he or she provides numerical degrees of support for the variable the evidence is linked to. Then, AA aggregates the evidence and maintains a display of the degrees of support provided by all evidence collected so far to all variables in the network.

As it exists today, AA allows an auditor to construct only a tree of variables and evidence. No loops are allowed. However, AA is currently being updated to include arbitrary networks. The user creates the tree visually and interactively using a mouse as an input device. The nodes of the tree represent variables and the links between nodes represent relations between variables. The user has many options for manipulating the tree on the screen: moving a node by dragging it, collapsing a sub-tree into a node, etc.

3. An Example

In this section we will describe the use of AA in a simple audit engagement.[1]

Suppose ABC Hardware Co. is a small wholesale distributor of hardware located in the Midwest. Most of ABC's customers are retail hardware stores. Srifer & Co. has been asked to perform an annual audit of ABC's financial statements.

3.1. Constructing a Network of Variables and Evidence

Srifer & Co. has audited ABC Hardware's financial statements for the last four years. After reviewing the previous years' working papers and understanding the client's business environment, the audit team (consisting of a senior, manager and partner) constructs a network of variables and evidence related to accounts receivables (AR) and allowance for bad debts (ABD). For simplicity of exposition, we assume that the audit team has decided not to depend on the internal accounting controls in the sales and collection cycle. Thus, the audit team will depend only on the environmental factors, analytical review results, and some direct tests of balances. This network is shown in Figure 1.

The rounded rectangular nodes represent *variables* that are of interest to the auditor. For example, the main variable in Figure 1 is whether net accounts receivable is fairly stated. Associated with each variable is a collection of mutually exclusive and collectively exhaustive *values*. For example, the values associated with the net accounts receivable variable are nar (denoting that net accounts receivable is fairly stated) and $\sim$nar (denoting that net accounts receivable is not fairly stated). All variables in Figure 1 are binary-valued. A brief description of each variable is indicated inside the node.

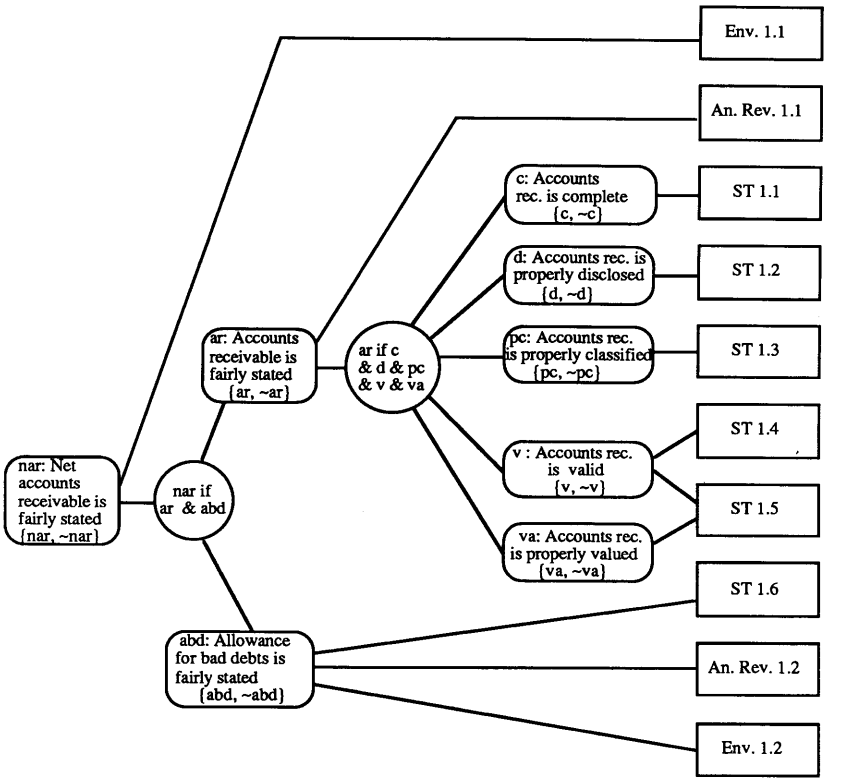
The circular nodes represent *relations* between the variables they are linked to. For example, net accounts receivable is fairly stated if and only if both accounts receivable and allowance for bad debts are fairly stated. Also, accounts receivable is fairly stated if and only the following objectives have been met: *completeness, ownership, adequate disclosure, proper classification, validity* and *valuation* (see, e.g., Arens and Loebbecke [1988], for further discussion of these objectives). Formally, a relation is modeled as a belief-function. For example, the relation between net accounts receivable, accounts receivable and allowance for bad debts can be represented in terms of a basic probability assignment function m as follows (see Appendix A for a definition of m):

$$m(\{(nar,ar,abd), (\sim nar,ar,\sim abd),(\sim nar,\sim ar,abd),(\sim nar,\sim ar,\sim abd)\}) = 1.$$

The rectangular nodes represent *evidence.* A description of the procedures and tests leading to the evidence shown in Figure 1 is given in Table 1. The links between evidence nodes and variable nodes indicate that the evidence provides some support for the variables it is linked to. For example, in Figure 1

[1] The main purpose of this example is to illustrate the use of AA in planning and evaluation decisions. The numerical inputs used in the example are purely for illustration purposes.

Figure 1. A network of variables and evidence for ABC Hardware.



evidence Env. 1.1 provides support directly to the net accounts receivable variable.

Formally, each piece of evidence is modeled as a belief-function on the set of possible values of the variables it is linked to. For example, if the outcome of the Env. 1.1 procedure results in a 60% degree of support for nar, then this piece of evidence is represented in the system as follows:

$$m(\{nar\}) = 0.60,\ m(\{nar,\ \sim nar\}) = 0.40.$$

Functions of this type (where a certain degree is committed to one value of a variable and the rest is uncommitted) are called *simple support functions*. We expect most of the evidence to be of this type. Thus, in order to make a judgment about a piece of evidence, an auditor needs to decide whether the evidence supports the affirmative or negative value of a variable, and the degree (a number between 0 and 1) to which it does so.

At the outset of the engagement (before any tests or procedures have been performed), a network of variables and evidence, such as the one shown in Figure 1, serves as a plan for performing the audit. Before a procedure is

TABLE 1. Description of procedures and tests leading to evidence shown in Figure 1.

An. Rev. 1.1	Review AR journal for unusual items and compare individual customer balances over a stated amount with previous years.
An. Rev. 1.2	a. Compare allowance for bad debt as a percentage of accounts receivable with previous years. b. Compare number of days accounts receivable outstanding with previous years. c. Compare bad debt expense as a percentage of gross sales with previous years.
Env. 1.1	Review the competence and trustworthiness of the accounting personnel working in sales transactions.
Env. 1.2	Review management's credit policy.
ST 1.1	Trace a sample of accounts from the subsidiary ledger to the aged trial balance.
ST 1.2	Review the minutes of the board of directors' meetings for any pledged or factored accounts receivable. Also inquire of management whether any receivables are pledged or factored.
ST 1.3	Review the receivables listed on the aged trial balance for notes and related party receivables.
ST 1.4	Trace a sample of accounts from the trial balance to the related subsidiary ledger.
ST 1.5	Confirm accounts receivables from customers.
ST 1.6	Discuss with credit manager the likelihood of collecting older accounts over 120 days and evaluate whether the receivables are collectible.

performed, it is represented in the system as a *vacuous* belief-function (see Appendix A for the definition of a *vacuous* belief-function). Propagating all these belief-functions results in zero belief for each value for all variables in the network. In other words, before collecting any evidence, the auditor is completely ignorant about whether the financial statements are fairly presented or contain a material error. However, once a test is performed, the auditor makes a numerical judgment about the degree of support provided by the test to the variable the evidence is linked to in the network. After this is entered into the system, the system propagates the evidence to all variables in the network and the revised beliefs for all variables are then displayed.

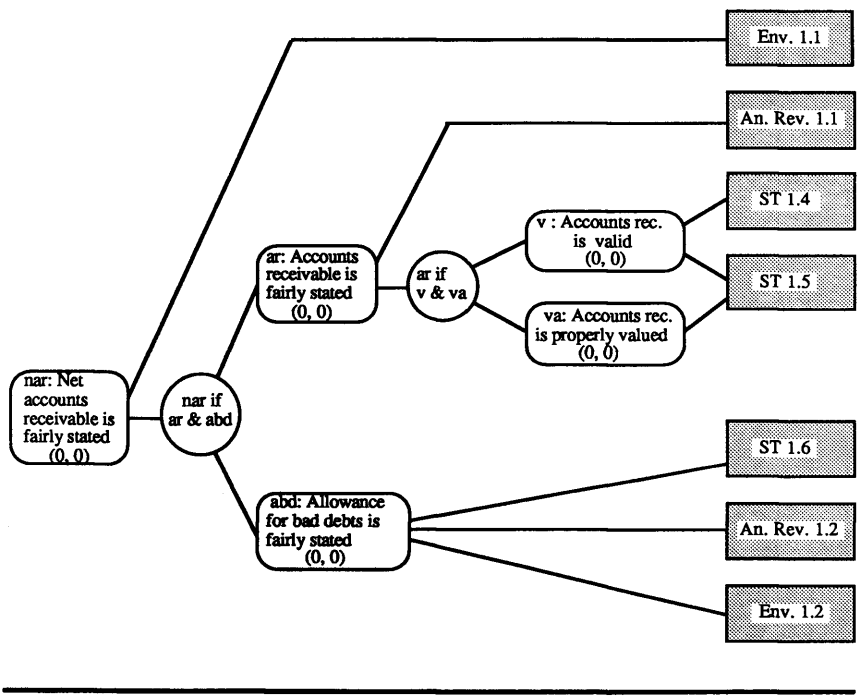
At any stage of the audit, the auditor has to decide which procedures he or she is going to perform next. Of course, at any stage of the audit, depending on the results of the tests already conducted, an auditor may decide that certain procedures are unnecessary. On the other hand, an auditor may need to change his or her plan to include more tests because the tests planned for do not provide the necessary evidence to issue an opinion.

3.2. Planning and Aggregation of Evidence

To illustrate the planning of the audit and the aggregation of evidence, we will further simplify the example. Assume that the audit team has concluded that the objectives of *completeness, ownership, adequate disclosure,* and *proper classification* have been met without any reservations. The objectives yet to be verified are *validity* and *valuation* for AR. The network relevant to this situation is shown in Figure 2. The rectangular nodes are shown with a dotted fill in Figure 2 to indicate that none of these procedures has been performed yet. Since no procedures have been performed yet, no support is available to any of the values of the variables as shown in Figure 2. For each variable in the network, there are two numbers shown inside the rectangular box at the bottom. The first of these two numbers indicates the total belief for the affirmative value of the variable. For example, for the NAR variable, $Bel(\{nar\}) = 0$ in Figure 2. The second number indicates the total belief for the negative value of the variable. For example, for the NAR variable, $Bel(\{\sim nar\}) = 0$ in Figure 2.

We will consider two different scenarios and the resulting evaluations about the fairness of NAR.

Figure 2. The simplified network of Figure 1.

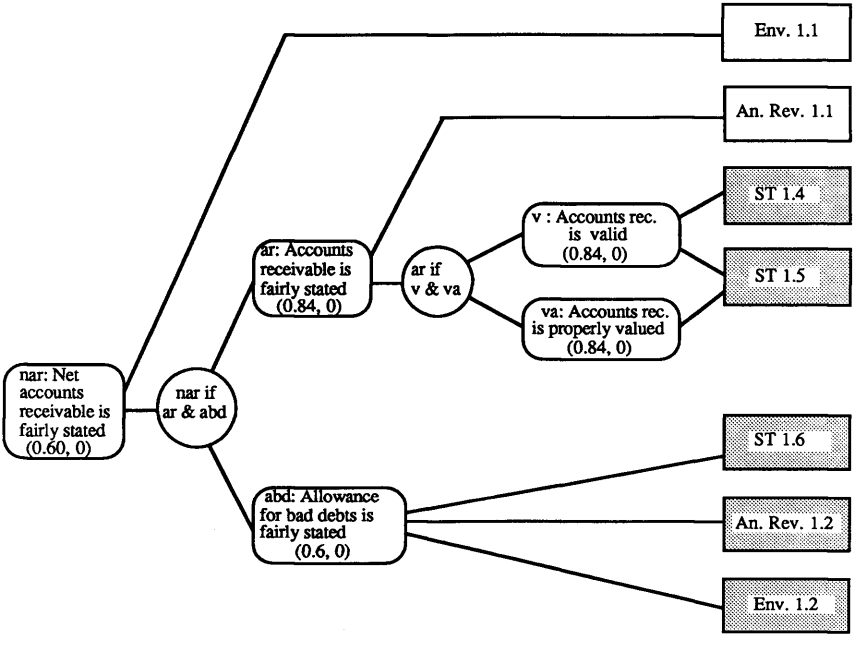


3.2.1. Scenario One

Suppose that the audit team finds the management and accounting personnel to be competent and trustworthy (Env. 1.1). The audit team decides that this evidence supports nar to degree 0.60. Also, the results of the analytical review procedures (An. Rev. 1.1) show no unusual items and no apparent problems in AR balance. The team makes a judgment that this supports 'ar' to degree 0.60. These judgments are propagated through the network resulting in the beliefs shown in Figure 3. Notice that there is now an overall support of 0.60 for the assertion that NAR is fairly presented and no support for the assertion that NAR is materially misstated (i.e., $\text{Bel}(\{\text{nar}\}) = 0.60$, $\text{Bel}(\{\sim\text{nar}\}) = 0$). Although there is no support for the assertion that NAR is materially misstated, there is a maximum 40% risk based on the two pieces of evidence that NAR could be materially misstated (i.e., $\text{Pl}(\{\sim\text{nar}\}) = 0.40$ where Pl is a plausibility function related to the belief-function Bel by the relation $\text{Pl}(\{\sim\text{nar}\}) = 1 - \text{Bel}(\{\text{nar}\})$.

Let us assume that the audit team plans to conduct the audit so that they obtain at least 90% overall support for nar, i.e., targeted $\text{Bel}(\{\text{nar}\})$ is 0.90. Note that the evidence from An. Rev. 1.1 provides no support yet to nar since no support for abd has yet been obtained from procedures, ST 1.6, An. Rev. 1.2, and Env. 1.2 (remember that NAR is fairly stated only when AR *and* ABD

Figure 3. The network of variables after performing Env. 1.1 and An. Rev. 1.1 in Scenario One.

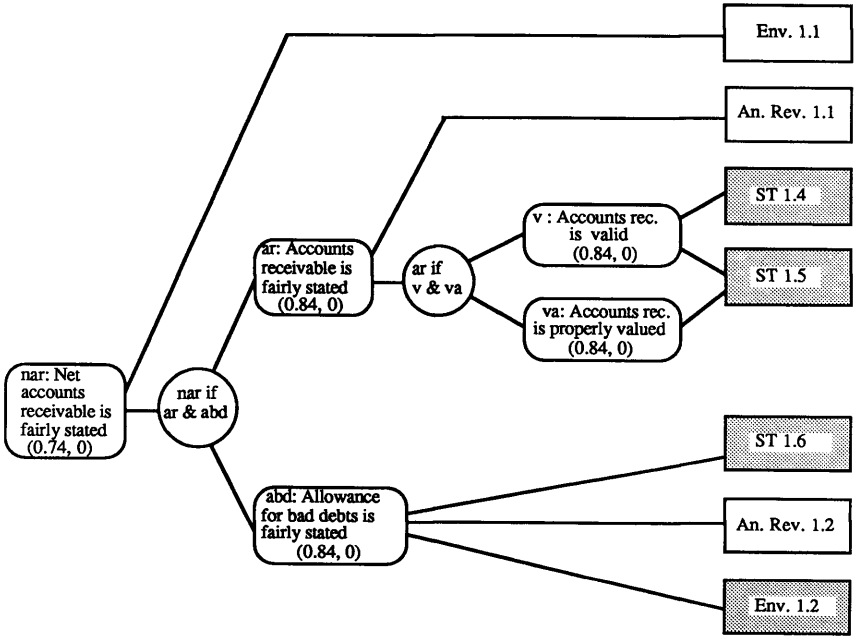


are fairly stated). It should be noted that ar and the two objectives of ar (validity and valuation) in Figure 4 have 84% support from Env. 1.1 and An. Rev. 1.1. The 0.60 support for nar is entirely due to Env. 1.1. Therefore, the team decides to perform analytical review procedures for allowance for bad debts (An. Rev. 1.2) next.

Suppose they find that the allowance is reasonable given the accounts receivable balance. Also, certain ratio analyses suggest that ABD is fairly presented. The team makes a conservative judgment that a 60% degree of support is obtained from this evidence for abd. The resulting network is shown in Figure 4. Thus, propagating the three judgments through the network results in an overall support for nar of 0.74 and no support for $\sim$nar (i.e., $Bel(\{nar\}) = 0.74$, $Bel(\{\sim nar\}) = 0$).

Next, since not enough support is available yet for nar, the team decides to perform substantive test procedures for validity and valuation of AR. (Of course, the team recognizes that certain substantive test procedures are required by the AICPA. For example, confirmations of AR from the customers is a requirement [AICPA, 1987, AU331]). The extent of testing would depend on the level of support desired by the team. Let us assume that they plan on achieving 80% support for validity of AR by tracing a sample of accounts from the aged trial balance to the related subsidiary ledger. The senior performs the

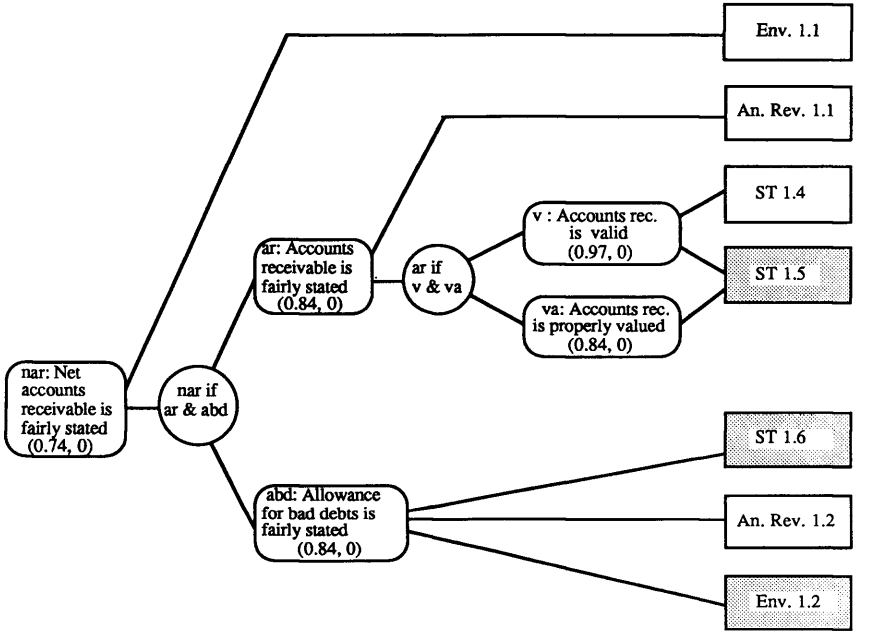
Figure 4. The network after performing Env. 1.1, An. Rev. 1.1 and An. Rev. 1.2 in Scenario One.



test and finds no exceptions. The team makes a judgment that an 80% degree of support is obtained by the evidence for the validity objective. This evidence is entered into the system and the resulting network is shown in Figure 5. The overall support for nar is still 0.74. The reason for no change in the overall support for nar is that the evidence from ST 1.4 supports only the validity objective. There is no direct support yet for the valuation objective. Since both objectives have to be met for AR to be fairly presented, ST 1.4 provides no support by itself to the fair presentation of AR. However, the level of support shown in Figure 5 represents the overall support when all the items of evidence have been aggregated.

As discussed earlier, AUDITOR'S ASSISTANT would have the capability of performing a what-if analysis for deciding the nature, timing, and extent of tests. In principle, the auditor can assume a certain level of support that he or she plans to obtain from a test procedure and see its impact on the overall support for the main assertion of interest. Of course, the decision about what test to perform next, and the extent of the test, depends on the auditor. The cost of performing a test has to be balanced with the level of support desired. Usually, analytical review procedures do not provide a high level of support unless the test involves statistical analyses. Similarly, making inquiries of the

Figure 5. The network after performing Env. 1.1, An. Rev. 1.1, An. Rev. 1.2 and ST 1.4 in Scenario One.

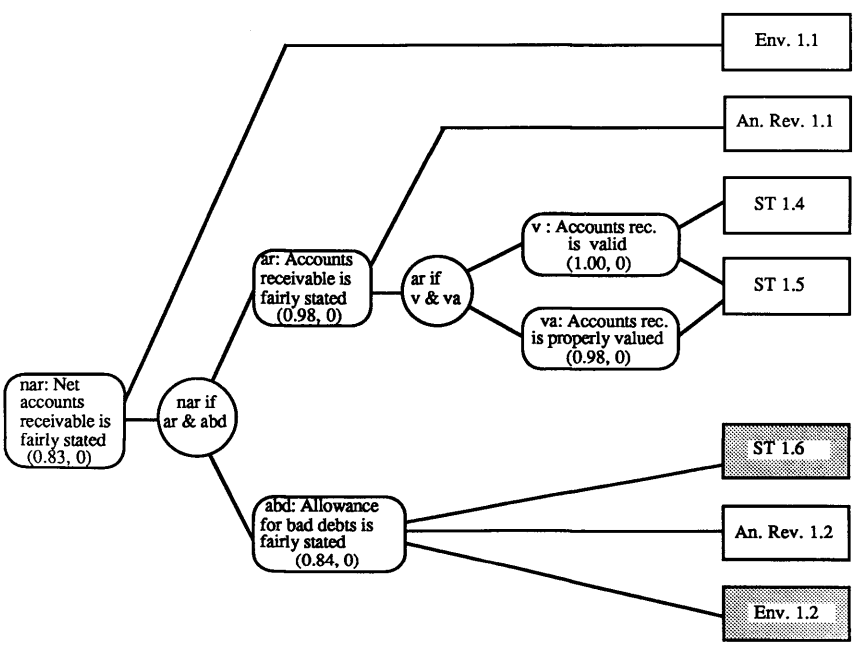


client provides a lower level of support. However, confirmation from third parties is considered to be reliable and it provides a higher level of support.

Now suppose that the team decides to send a sample of positive confirmations to the client's customers in order to achieve a 90% degree of support for the validity of AR. The confirmation test also provides support for the valuation objective to a great extent because the customer usually checks the account balance for accuracy. The audit staff analyzes the returned confirmations and finds no exceptions. The team, having reviewed the staff's work, makes a judgment that the confirmation test provides a 90% degree of support for the validity objective and an 85% degree of support for the valuation objective. For simplicity of exposition, we will assume that the above two judgments are independent. The resulting beliefs of all variables are shown in Figure 6. The overall support for nar is now 0.83 and there is still no support for $\sim$nar (i.e., $Bel(\{nar\}) = 0.83$, $Bel(\{\sim nar\}) = 0$).

Since the overall support for nar is still below the target level of 0.90, the team plans to perform some further tests. Since the support for ar is already quite high ($Bel(\{ar\}) = 0.98$), they conclude that there is no need for further evidence that supports ar. However, support for abd is still low ($Bel(\{abd\}) = 0.84$). Thus, they decide to meet with the credit manager to discuss whether the firm has any collectibility problems with their accounts (ST

Figure 6. The network after performing Env. 1.1, An. Rev. 1.1, An. Rev. 1.2, ST 1.4, and ST 1.5 in Scenario One.



1.6). They find that there is no account that is more than 120 days overdue. Furthermore, all accounts seem to be quite good. The team makes a judgment that this evidence supports abd to degree 0.60. The resulting beliefs for the variables are shown in Figure 7. The overall support for nar is now 0.92 and there is no evidence to support $\sim$nar (i.e., $Bel(\{nar\}) = 0.92$, $Bel(\{\sim nar\}) = 0$).

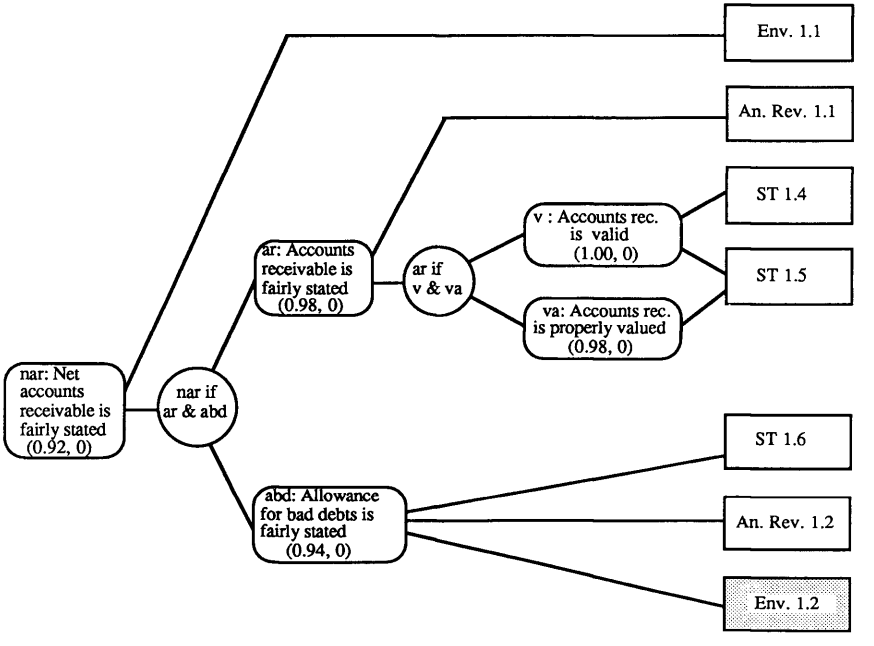
At this stage, the audit team decides to conclude the audit since they have sufficient evidence to issue an opinion about the fairness of NAR. The audit team also knows that given the evidence, the maximum risk that NAR is materially misstated is only 8%.

Although the audit team had initially planned to review ABC's credit policy (Env. 1.2), they do not perform this test since, on the basis of tests already conducted, they have a sufficiently high belief that NAR is fairly stated. Without a formal analysis of the type shown above, perhaps an audit team may end up doing more tests than necessary. AUDITOR'S ASSISTANT, when fully developed, should provide assistance to auditors in deciding when sufficient evidence has been collected to issue an opinion.

3.2.2. Scenario Two

In this case, assume that the results of Env. 1.1, An. Rev. 1.1, ST 1.4, and

Figure 7. The network after performing Env. 1.1, An. Rev. 1.1, An. Rev. 1.2, ST 1.4, ST 1.5, and ST 1.6 in Scenario One.



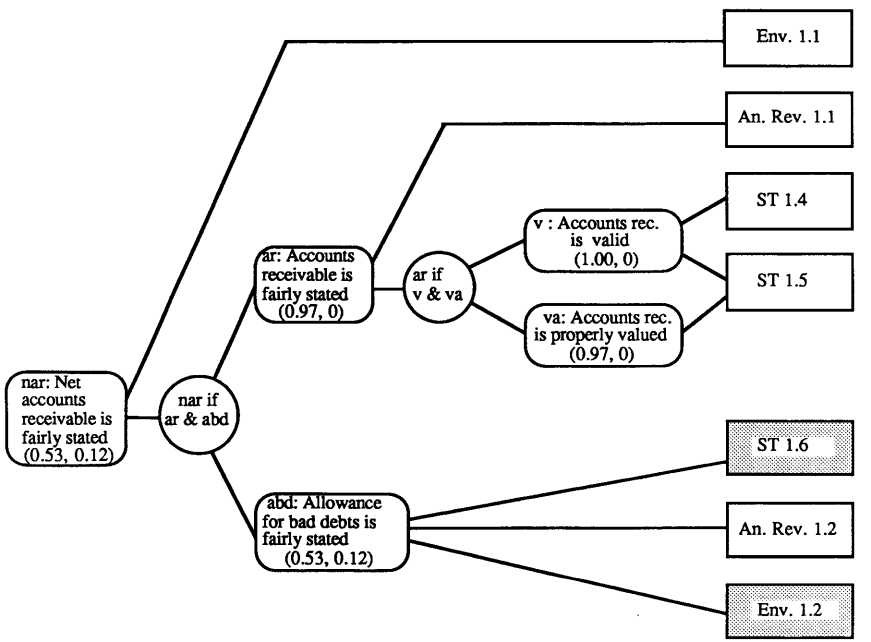
ST 1.5 are the same as in Scenario One. The results of An. Rev. 1.2 and ST 1.6 are different from the ones described above.

Suppose that the analytical review procedure An. Rev. 1.2 performed by the senior has revealed that the allowance for bad debts may be understated in relation to this year's accounts receivable balance. Also the AR balance has increased significantly compared to the credit sales, implying that a more liberal credit policy has been adopted this year, compared to the past. Furthermore, the collection of receivables is slow. Based on this evidence, the audit team makes a judgment that ABD is understated to degree 0.25. The aggregate beliefs in all variables are now shown in Figure 8. The overall beliefs in nar and $\sim$nar are 0.53 and 0.12, respectively. The maximum risk of NAR being materially misstated is 0.47 (i.e., $Pl(\{\sim nar\}) = 1 - Bel(\{nar\}) = 0.47$).

The audit team now decides to review the client's credit policy (Env. 1.2). The senior performs the review and finds that this year, the client has been quite liberal in granting credit. He attributes the increase in AR balance this year to the firm's liberal credit policy. The team makes a judgment that the evidence supports $\sim$abd to degree 0.40.

The senior also meets with the credit manger to discuss the firm's credit policy (ST 1.6). The credit manager agrees with the senior's assessment that allowance for bad debts may be understated. Based on this evidence, the audit

Figure 8. The network after performing Env. 1.1, An. Rev. 1.1, ST 1.4, ST 1.5, and An. Rev. 1.2 in Scenario Two.

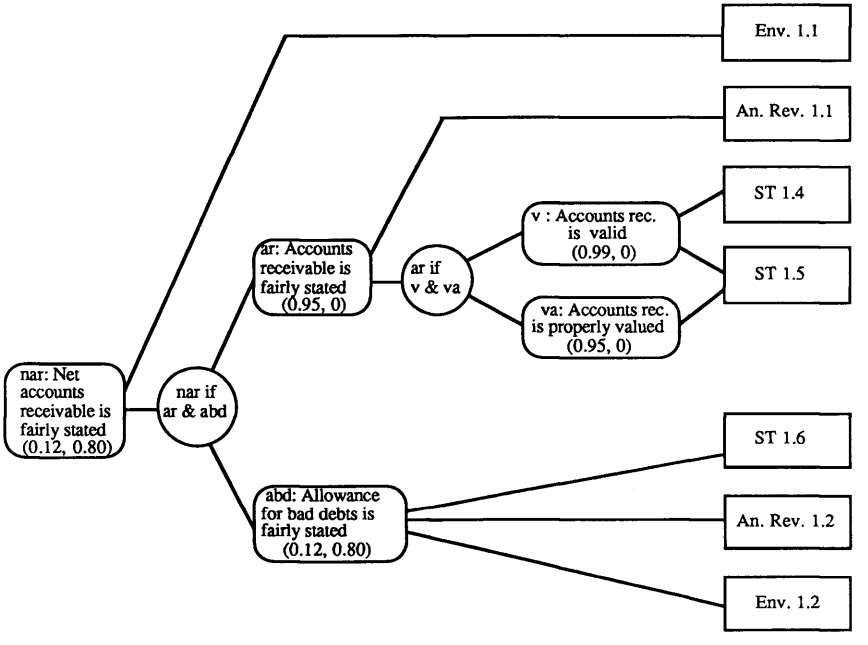


team makes a judgment that supports ~abd to degree 0.80. This judgment, when combined with the previous findings, yields an overall support of 0.80 for ~abd (see Figure 9). Therefore, the audit team decides at this point to propose an adjustment for ABD. No adjustment need be proposed for AR since the overall support for ar is 0.95, which is above their target level.

4. Summary

AUDITOR'S ASSISTANT is not a rule-based system. The knowledge-base of AA is a network of variables and evidence. Since each auditing engagement is unique, a network of variables and evidence has to be constructed by the user. There are several ways in which the system assists the user with this task. First, the graphics user interface of AA is designed to make the task of constructing a network as easy and intuitive as possible. Second, the user does not have to start from scratch. Instead, (s)he can start with a template and modify it to fit the engagement at hand. The system automatically handles technical aspects of network construction such as ensuring that the network satisfies the Markov property. Also, the system (when fully developed) should automatically reduce a non-tree network to a tree by clustering variables and using the resulting clustered tree to propagate the evidence. At this time, the

Figure 9. The network after performing Env. 1.1, An. Rev. 1.1, ST 1.4, ST 1.5, An. Rev. 1.2, Env. 1.2 and ST 1.6 in Scenario Two.



system is only capable of propagating belief-functions in networks that are already trees.

The user can use the network of variables and evidence as a planning device. At each stage, AA will display the beliefs for each variable in the network as a function of the evidence that has been collected and entered into the system. At each stage, the user needs to decide what test or procedure to perform next. AA can assist in this decision by performing a what-if analysis and indicating the degree of belief provided to the main variable of interest as a function of the test results. The auditor can then choose between different tests and sample sizes based on cost of test and increase in degree of belief for the main variable of interest.

When there is sufficient belief for the main variable of interest, the auditor can issue an appropriate opinion.

In summary, it is useful to think of AUDITOR'S ASSISTANT as a *knowledge engineering* tool instead of as an expert system. Coherent reasoning under uncertainty requires construction of an argument. Once an argument is in place, aggregation of evidence is easily automated.

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Appendix A

A Primer on The Theory of Belief Functions

Here we shall present the basics of the theory of belief-functions. See Shafer [1976] for details.

Let X denote a variable with possible values $x_1, \ldots, x_n$. We shall refer to the set of all possible values of a variable (exactly one of which is true) as a *frame of discernment.* A *basic probability assignment* (bpa) function on a frame Θ is a function $m: 2^\Theta \rightarrow [0,1]$ such that

$$m(A) \geq 0 \text{ for all } A \epsilon 2^\Theta,\ m(\phi) = 0, \text{ and } \Sigma\{m(A) | A \epsilon 2^\Theta\} = 1$$

Intuitively, m(A) represents the degree of belief assigned exactly to A (the proposition that the true value of X is in the set A). A basic probability assignment function corresponds to a probability mass function in Bayesian probability theory. Whereas a probability mass function is restricted to assigning probability masses only to singleton values of variables, a bpa function is allowed to assign masses to sets of values without assigning any mass to the individual values contained in the sets. For example, if we have absolutely no knowledge about the true value of a variable, we can represent this situation by a bpa function as follows:

$$m(\Theta) = 1,\ m(A) = 0 \text{ for all other } A \epsilon 2^\Theta.$$

Such a function is called a *vacuous* bpa function. Note that in Bayesian probability theory, the only way to express total ignorance is to assign a mass of 1/n to each value where n is the total number of possible values. Thus, in Bayesian probability theory we are unable to distinguish between equally likely

values and total ignorance. The theory of belief-functions offers a richer semantics.

Associated with a bpa function are two related functions called belief and plausibility. A *belief-function* is a function $\text{Bel}:2^{\Theta} \rightarrow [0,1]$ such that

$$\text{Bel}(A) = \Sigma\{m(B) | B \subseteq A\}.$$

Whereas m(A) represented the belief assigned exactly to A, Bel(A) represents the total belief assigned to A. Note that $\text{Bel}(\phi) = 0$ and $\text{Bel}(\Theta) = 1$ for any bpa function. For the vacuous bpa function m, the corresponding belief-function Bel is given by

$$\text{Bel}(\Theta) = 1, \text{ and } \text{Bel}(A) = 0 \text{ for all other } A \epsilon 2^{\Theta}.$$

A *plausibility function* is a function $\text{Pl}:2^{\Theta} \rightarrow [0,1]$ such that

$$\text{Pl}(A) = \Sigma\{m(B) | B \cap A \neq \phi\}$$

Pl(A) represents the total degree of belief that could be assigned to A. Note that $\text{Pl}(A) = 1 - \text{Bel}(\sim A)$ where $\sim A$ represents the complement of A in Θ, i.e., $\sim A = \Theta - A$. Also note that $\text{Pl}(A) \geqslant \text{Bel}(A)$. For the vacuous bpa function, the corresponding plausibility function is

$$\text{Pl}(\phi) = 0, \text{ and } \text{Pl}(A) = 1 \text{ for all } A \epsilon \Theta.$$

If a bpa function m is also a probability mass function (i.e., all the probability masses are assigned only to singleton subsets), then $\text{Bel}(A) = \text{Pl}(A) = \Sigma\{m(\{x_i\}) | x_i \epsilon A\}$ = probability of proposition A.

If m_1 and m_2 are bpa functions representing two independent pieces of evidence, then we can combine them using *Dempster's rule of combination* and obtain a new bpa function, denoted by $m_1 \oplus m_2$, representing the aggregated evidence as follows:

$m_1 \oplus m_2(A) = K^{-1}\Sigma\{m_1(B_1)m_2(B_2) | B_1 \cap B_2 = A\}$ if $A \neq \phi$, and $m_1 \oplus m_2(\phi) = 0$ where $K = 1 - \Sigma\{m_1(B_1)m_2(B_2) | B_1 \cap B_2 = \phi\}$. The above definition assumes that $K \neq 0$. If $K = 0$, then the two pieces of evidence contradict each other completely, and it is not possible to combine such evidence.

Let us illustrate Dempster's rule of combination by means of two examples.

Example 1

Suppose that the variable under consideration is the validity of accounts receivable with frame $\{v, \sim v\}$. The results of substantive test 1.4 lead to the bpa function m_1 as follows:

$$m_1(\{v\}) = .8, \; m_1(\{v, \sim v\}) = .2$$

Furthermore, results of substantive test 1.5 lead to the bpa function m_2 as follows:

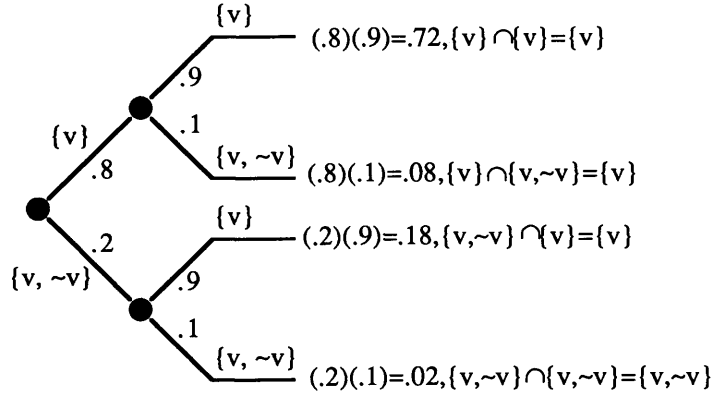
$$m_2(\{v\}) = 0.9, \; m_2(\{v, \sim v\}) = .1$$

Combining m_1 and m_2 by Dempster's rule leads to the bpa function $m_1 \oplus m_2$ as follows:

$$m_1 \oplus m_2(\{v\}) = .72 + .08 + .18 = .98,$$
$$m_1 \oplus m_2(\{v, \sim v\}) = .02.$$

The details of Dempster's rule are shown in Figure 10. In this example, there is no conflict between the two pieces of evidence, i.e., $K = 1$.

Figure 10. Dempster's rule for Example 1



Example 2

Suppose that the variable under consideration is the fairness of allowance for bad debts with frame {abd, ~abd}. The results of an analytical review test lead to a bpa function m_1 as follows.

$$m_1(\{abd\}) = 0.8,\ m_1(\{abd,\ \sim abd\}) = 0.2$$

However, an environmental review uncovers the fact that one of the client's major customers has filed for Chapter 11 and may not be in a position to pay its bills. Let us represent this evidence as follows:

$$m_2(\{\sim abd\}) = 0.1,\ m_2(\{abd,\ \sim abd\}) = 0.9$$

Combining these two pieces of evidence leads to the aggregated bpa function:

$$m_1 \oplus m_2(\{abd\}) = .72/0.92 = .78$$
$$m_1 \oplus m_2(\{\sim abd\}) = .02/0.92 = .02$$
$$m_1 \oplus m_2(\{abd,\ \sim abd\}) = .18/0.92 = .20$$

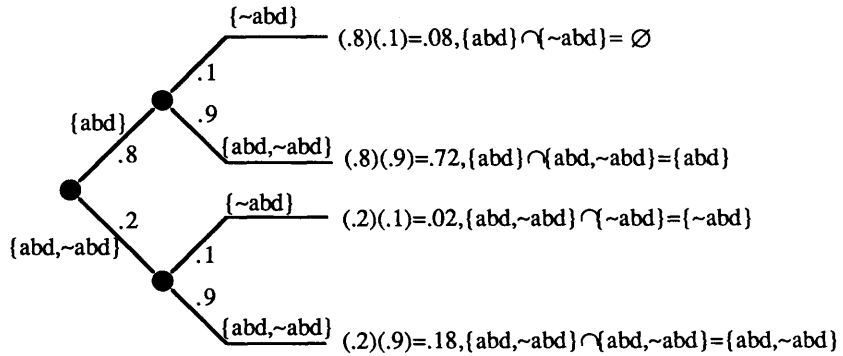
The details of Dempster's rule are shown in Figure 11. Note that in this case the evidence is conflicting ($K = 1 - .08 = 0.92$) and so we end up renormalizing the bpa function so that the values add to 1.

In general, Dempster's rule of combination has the following properties:

(i) Commutativity: $m_1 \oplus m_2 = m_2 \oplus m_1$
(ii) Associativity: $(m_1 \oplus m_2) \oplus m_3 = m_1 \oplus (m_2 \oplus m_3)$
(iii) In general, $m_1 \oplus m_1 \neq m_1$. The bpa $m_1 \oplus m_1$ will favor the same subsets as m_1, but it will do so with twice the weight of evidence, as it were.
(iv) If m_1 is vacuous, then $m_1 \oplus m_2 = m_2$.

In Bayesian probability theory, evidence is aggregated using Bayes's rule. It is easy to show that Bayes's rule is a special case of Dempster's rule of combination.

Figure 11. Dempster's rule for Example 2



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(iii) In general, $m_1 \oplus m_1 \neq m_1$. The bpa $m_1 \oplus m_1$ will favor the same subsets as m_1, but it will do so with twice the weight of evidence, as it were.

(iv) If m_1 is vacuous, then $m_1 \oplus m_2 = m_2$.

In Bayesian probability theory, evidence is aggregated using Bayes's rule. It is easy to show that Bayes's rule is a special case of Dempster's rule of combination.

Discussant's Response to "AUDITOR'S ASSISTANT: A Knowledge Engineering Tool for Audit Decisions"

John B. Sullivan
Deloitte Haskins & Sells

There is much about this article that I like. The focus of this article is on the development of an expert system designed to help the field auditor make more efficient decisions about the level of audit testing required. Both these topics are high on the list of priorities of all of the national accounting firms. A significant portion of the budgets of most major firms is being directed toward the development of personal computer-based expert systems to increase audit efficiency.

The authors recognize the need for the active interaction of the field auditor in the use of an expert system. Too many articles fail to give proper credit to the level of knowledge which resides in the audit engagement team. Firms attempt to keep turnover at the partner, manager and senior levels to a minimum. As a result, audit engagements are frequently staffed by an engagement team with ten or eleven years of total client experience. I believe this paper attempts to give proper recognition to the benefits to be gained by tapping into that experience. The authors stress the importance of understanding the client's business environment. In our firm's approach, we list "Understanding the Business" as the first step of the business review. Although this differs slightly from the authors' "understanding the client's business environment," I believe they both recognize this area as the first and most important step in an audit.

The article is also one of the few which focus on the audit team and the decisions which must be made by that audit team. We need more articles on and research in this important area of audit practice.

Unfortunately, I believe that my negative comments outweigh my positive comments. In summary, I do not believe that the authors are on the right track yet. My general impression of the knowledge engineering tool described in the paper is that it will not be widely endorsed in practice and it may be flawed in theory.

In my view, some of the fatal theoretical flaws of the tool involve a failure to appreciate the complexity of the audit process. Individual pieces of audit evidence frequently impact more than one assertion, and indeed may impact other areas or the entire audit. For example, one piece of audit evidence which indicts the integrity of management may lead either to a qualification or a disclaimer of opinion.

In addition, I do not believe that the authors' system, as described in this paper, gives enough weight to the importance and interaction of individual audit procedures. In Scenario One, the authors indicate revision of the nar from 0.83

to 0.92 based upon discussions with the credit manager on collectibility problems. As a result of this increase, an additional audit procedure which had been planned is not performed. This is even more distressing as the paper does not discuss whether or not any objective evidence other than discussions was used to put the team over the target level of 0.90.

The additional audit procedure not performed is a review of ABC's credit policy. There have been so many instances of audit problems created by changes in a company's credit policy that not to perform such a basic procedure would lead me to question whether the engagement team had obtained an understanding of the business.

From a practical point of view, this type of question would generally not represent any significant time savings. The engagement team did have access to the credit manager. How much longer would the conversation have lasted if the team had asked the credit manager if there were any changes in credit policy? The only way this could represent a significant time savings would be if there had been significant changes in policy. In that case, time savings should not be the driving force because a radical change in credit policy could mean a significant increase in potential uncollectible accounts. This could be true without regard to whether or not the accounts are over 120 days past due.

Also in Scenario One, "the audit team finds the management and accounting personnel to be competent and trustworthy and decides that this evidence supports nar to degree 0.60." Where are the SAS 47 [AICPA, 1983] concepts of inherent and control risk in the authors' equation? I am sure we have all dealt with competent and trustworthy accounting personnel who, because of the existence of significant inherent risk, delivered to the auditors an accounts receivable section which contained a material error. This has frequently been the case where the industry has experienced rapid change such as the oil and gas industry or the savings and loan industry. By neglecting to assess the risk that the balance contains errors that could be material to the financial statements, the authors' belief functions could also be misstated. The article states "the audit team also knows that the maximum risk that nar is materially misstated is only 8%." This would appear to be a very bold statement, given the fact that the allowance for doubtful accounts has not been reviewed. However, even if this statement were true, SAS 39 [AICPA, 1981] would appear to set the limit of audit risk at about 0.05.

The authors appear to either ignore, or fail to understand, the practical role of an audit program. One of the authors' statements is that "at any stage of the audit the auditor has to decide which procedures he or she is going to perform next." This question is generally answered, in practice, by the audit program. The authors' statement that the decision on what to do is taking place during the performance of the audit is simply not true for most audit engagements.

AU Section 311.05 states that "the author should prepare a written audit program (or a set of written audit programs)." The audit programs are generally prepared during the planning stage of an engagement. The auditing literature also states that "as the examination progresses, changed conditions may make it necessary to modify the planned audit procedures." I assume that the elimination of planned audit procedures, as a result of changes in the actual versus planned strength of audit evidence represents the core of the authors' "engineering tool."

However, in an actual audit, I believe there would be significant practical problems with the system described by the authors. The system generally requires an assignment of degrees of support to each piece of audit evidence by the audit team. The audit team is described as comprising the audit senior, manager and partner. I know of no present audit engagements which require this much team decision making. On most medium-sized audit engagements, the audit team is not together on a daily basis, or even a weekly basis. Most decisions on the extent of audit procedures are made during the planning and review stages of the engagement. While I agree with the authors that this may lead to a slight degree of overauditing for new clients, for old established clients or for clients in specialized industries, there is probably very little overauditing. There is certainly not enough overauditing to justify the system described in this paper.

Additional comments concerning the "automation of evaluation of evidence" also trouble me. I believe that the degree to which we remove the auditor from the active association with the evaluation of evidence we create audit risk. It is great to see that each piece of evidence, gathered mathematically, increases our degree of confidence. However, such techniques may create the "halo" effect that has been noted in previous academic studies. How questioning will an auditor be if he is examining a piece of audit evidence when his nar equals 0.80? Will he still have the same degree of professional skepticism required?

Many firms presently require an auditor to sign off each program step as it is completed. Each step is separate and distinct, and represents a concrete individual audit unit. Although I recognize that some of the steps give us more audit comfort, each step is important and generally must be performed diligently.

In the paper, statements are made concerning analytical review, client inquiries and confirmation procedures that are very judgmental and unsupported. SAS No. 56, dated April 1988, will require the application of analytical procedures in the planning and overall review stages of all audits [AICPA, 1988]. The required use of analytical procedures was also recommended in the report by the National Commission on Fraudulent Financial Reporting in October 1987. Client inquiries and confirmations vary in effectiveness depending upon the circumstances of the individual client.

Another practical problem created by this article is illustrated by the comment: "The team having reviewed the staff's work makes a judgment that the confirmation provides a 90 percent degree of support for validity and an 85 percent degree of support for the valuation objective." The paper does not address how a team would be able to distinguish such a fine degree of percentage support for each objective. I believe such a fine distinction would not be possible in practice.

Scenario Two provides even more examples of impractical mathematical calculations. In Scenario Two, the engagement team believes that the allowance for bad debts may be understated. They discuss the situation with the credit manager, who also agrees with the assessment that the allowance may be understated. Based upon this information, the support is calculated at 0.80. In my experience, if the client were to agree with the auditor's assessment,

the support would be much higher than 0.80. Clients generally do *not* agree unless there is a problem.

In summary, I believe that the system described in this article will not be practicable. The team concept envisioned by this article is not a workable concept in practice. The system basically ignores the role of the audit program in an audit process and the requirement for preparation of such a program during the planning phase of an engagement. Finally, the system provides far too many chances for an aggressive litigation counsel to question the firm's judgment in the event of an audit failure, and does very little to prevent such a failure.

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5

Reports on the Application of Accounting Principles—A Review of SAS 50

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Touche Ross & Co.

Introduction

Like most other professionals, a Certified Public Accountant is often asked to air views on matters within his or her ken. When the American Institute of Certified Public Accountants issued the Statement on Auditing Standards No. 50, *"Reports on the Application of Accounting Principles,"* professional standards applied to the accountant's response to many of these requests.

Background

SAS 50, issued in July, 1986, was the work product of the Generic Letter Task Force of the Auditing Standards Board. The original charge to the Task Force, in 1984, was relatively benign: "to monitor the issuance of, and prepare issues papers on the technical aspects of, generic letters."

In reality, the atmosphere was highly charged. In June, 1984, Don Kirk, the Chairman of the Financial Accounting Standards Board at the time, asked a number of pointed questions when commenting on professionalism in accounting:

- Does heightened competition among CPA firms encourage a search for ways around the spirit of accounting standards?
- Are not investment bankers fulfilling their essential role in developing innovative financing arrangements which may, in fact, tend to frustrate the spirit of accounting standards?

He also recommended, among other things, that each CPA firm focus on the problem of "advising non-clients on accounting matters."

In short, the profession, the standard setters, the regulators and others were, and continue to be, concerned with the application of "cute" accounting principles and "shopping" for accounting opinions.

Does SAS 50 help halt either of these practices? Sadly not, in the opinion of the author. On the other hand, the author believes that the reports themselves are a positive development in the accounting principles process. This paper explains these conclusions, examines the guidance contained in SAS 50, and discusses the reasons financial intermediaries and other "non-auditing" clients ask CPAs for reports on the application of accounting principles.

SAS 50: Reports on the Application of Accounting Principles

Terms Used

A variety of parties interested in the "outcome" of an SAS 50 report are identified in the standard:

- Reporting Accountant—An accountant in public practice who issues a written report or other form of communication covered by SAS 50;
- Continuing Accountant—An accountant engaged to report on financial statements. Simply put, the continuing accountant is usually the auditor for a company contemplating, or having completed, a transaction of the type dealt with by the reporting accountant; and
- Intermediary—Most often an investment banker, but anyone advising a principal to a transaction, including attorneys and commercial bankers.

The standards for the conduct and reporting of an SAS 50 engagement are straightforward. However, determining when these standards apply to a particular request are more complex. The sections below examine each of these aspects of SAS 50.

Performance and Reporting Standards

Consultation with the Continuing Accountant

A significant provision of SAS 50 requires the "reporting accountant" to sometimes consult with the "continuing accountant." Consultation is required if a written report and, in some cases, other forms of response, including oral answers, will cover a *specific transaction* or relate to a specific entity's financial statements.

SAS 50 contrasts *specific* and *hypothetical transactions*. The former includes "specified transactions, either completed or proposed," and the latter includes transactions "not involving facts or circumstances of a particular principal." This is, at best, a vague distinction and one that causes some difficulty in implementing SAS 50, as discussed later.

SAS 50 justifies the consultation requirement because the continuing accountant may have knowledge which is not available to the reporting accountant, and which is crucial to reaching a professional conclusion, e.g., understanding of the form and substance of the transaction, the entity's past accounting principles for similar transactions, differing views on the matter between the reporting and continuing accountants or management, and so on.

Before the release of SAS 50, Ethics Interpretation 201-3 covered "Shopping for Accounting or Auditing Standards." The Interpretation required similar consultation, but only when (translated to the parlance of SAS 50) a principal to a transaction *retained* a "reporting accountant" to provide professional advice in connection with the principal's financial statements.

The consultation requirements of SAS 50 differ subtly from the Ethics Interpretation as given below:

- The accountant may need to consult, even in the absence of being "engaged" or "retained,"

- The accountant may need to consult, even if the advice is given to third parties, such as intermediaries, and
- Consultation, when required, is a step to take while performing the work. The ethics interpretation requires consultation "before giving such advice."

The reference to "shopping" in the title of the Ethics Interpretation also caused accountants to limit its application. "Shopping" suggests that a principal is seeking a beneficial ruling on an accounting or auditing issue not available from its continuing accountant. When a principal had not previously sought the opinion of its auditors on a matter, accountants argued that "opinion shopping" was not involved. Hence, the Ethics Interpretation did not apply and consultation was unnecessary.

Other Performance Standards of SAS 50

Due Professional Care

In addition to performance standards derived from ET 201 [AICPA, 1987] (requiring competence, professional care, planning and supervision, and accumulation of supporting information), SAS 50 requires the reporting accountant to consider the identity of the requester of the report and the circumstances in which the request arises. The last requirement is especially important. The reporting accountant must be alert to the possibility that a company is actually using its financial advisor to "shop" for a favorable accounting decision. If the seemingly hypothetical situation is actually a specific transaction, the provisions of SAS 50 apply and consultation may well be required.

Procedures in Addition to Consultation

The reporting accountant should (i) obtain an understanding of the form and substance of the transactions, (ii) review applicable generally accepted accounting principles, (iii) consult with experts, if necessary, and (iv) perform research or otherwise find appropriate precedents or analogies, if necessary.

Reporting Standards

SAS 50 contains an illustrative report (Exhibit 1) which includes the contents required for a written report by the standard. SAS 50 does not prescribe the "contents" of oral advice, although the statement suggests that accountants might find the guidance for written reports useful.

Applicability (see Exhibit 2)

Exempt Situations

SAS 50 does not apply if the advice is proferred to an audit client or to another accountant in public practice, or when the advice is proferred in connection with litigation support or expert testimony work.

Exhibit 1

A Written Report on the Application of Accounting Principles

Introduction

We have been engaged to report on the appropriate application of generally accepted accounting principles to the specific (hypothetical) transaction described below. This report is being issued to the ABC Company (XYZ Intermediaries) for assistance in evaluating accounting principles for the described specific (hypothetical) transaction. Our engagement has been conducted in accordance with standards established by the American Institute of Certified Public Accountants.

Description of Transaction

The facts, circumstances, and assumptions relevant to the specific (hypothetical) transaction as provided to us by the management of the ABC Company (XYZ Intermediaries) are as follows:

Appropriate Accounting Principles

[Text discussing principles]

Concluding Comments

The ultimate responsibility for the decision on the appropriate application of generally accepted accounting principles for an actual transaction rests with the preparers of financial statements, who should consult with their continuing accountants. Our judgment on the appropriate application of generally accepted accounting principles for the described specific (hypothetical) transaction is based solely on the facts provided to us as described above; should these facts and circumstances differ, our conclusion may change.

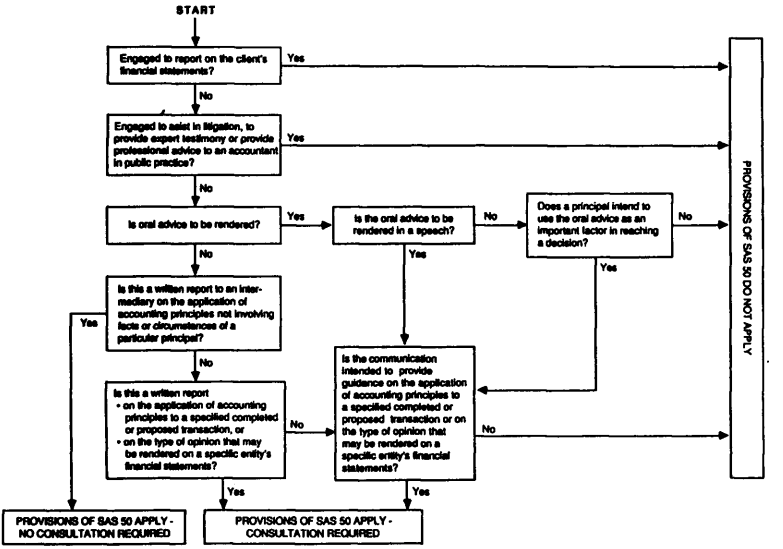
Very truly yours,

CPA firm

Exhibit 2

DECISION TREE

Applicability of SAS 50 to Requests for Opinions on Accounting Principles



Written Reports

Except in the above circumstances, SAS 50 applies to preparation of the following written reports:

- Regarding the application of accounting principles to *specified transactions,*
- Addressed to *intermediaries,* regarding the accounting principles of *hypothetical transactions,* and
- Regarding the type of opinion that may be rendered on a specific entity's financial statements.

Other Means of Proferring Advice

Potentially, SAS 50 applies to the broad spectrum of ways accountants communicate—from formal written reports to casual conversation. Speeches, newsletters, letters to regulators, external training seminars, all fall somewhere in the spectrum. However, SAS 50 excludes these "intermediate" forms of communication unless the accountant intends to provide specific guidance on the application of accounting principles to a "specific transaction" or on the type of opinion that may be rendered on a specific entity's financial statements ("covered guidance").

The following examples will clarify the applicability of SAS 50. Suppose a commercial bank engages in interest rate swaps as a "product line" for customers. The bank has used cash securities, long or short positions in US Treasury notes, to hedge the swap inventory's exposure to changes in interest rates. The accounting is controversial; should gains and losses on the cash

securities be recorded when realized or can "hedge accounting" be applied with gains or losses deferred? Consider the scenario where the CFO tells his old college roommate, a partner at a major accounting firm (not the bank's auditors), that the bank has to formalize its accounting policies in this area because the transactions are getting more significant. The partner tells the CFO that he can help, and sends a brochure prepared by his firm containing the firm's conclusion that hedge accounting is appropriate for similar cash positions if certain correlation requirements are satisfied. Does SAS 50 apply to the partner's response?

The author believes that SAS 50 does not apply because the partner has no idea whether the bank's securities meet or fail the brochure's correlation requirements and he has not been asked to evaluate the bank's portfolio.

Suppose now that the bank CFO tells the partner that a recent business combination failed the pooling of interest criteria of APB 16 because of the magnitude of the bank's treasury stock transactions in the past few years. The partner uses the facts about the merger to illustrate a speech on business combinations. A key point of the speech is that his organization views the calculation of "tainted treasury shares" differently than most other accounting firms. After the speech, he sends the transcript to the CFO with a "buck slip" attached saying, "Thought you'd be interested in our views on permissible treasury shares!" Does SAS 50 apply to the speech transcript?

The answer is yes. It may even apply to the speech (as opposed to the transcript of the speech) if the partner knew the CFO was in the audience. The partner intended the transcript "to provide guidance on the application of accounting principles to a specific transaction" and he should apply the performance standards of SAS 50.

In the above case, would SAS 50 require the partner to consult with the bank's continuing accountants before he sends the transcript? Possibly. The standard requires consultation "when evaluating accounting principles *at the request* of a principal, or an intermediary acting for a principal, that relate to a specific transaction . . . [emphasis added]." So if the CFO had attended the speech and *asked* for a transcript, the partner should first consult with the continuing accountants.

Oral Advice

SAS 50 can also apply to oral advice. Although some accountants are troubled by the notion that they might violate professional standards in idle conversation on a golf course, the Auditing Standards Board had a much more common situation in mind.

Many investment bankers and other intermediaries routinely check with accountants as they work on transactions. Very often the check is informal; for whatever reasons, the intermediary does not believe the request warrants the time and expense of a formal written reply. SAS 50 covers oral advice when (i) it is in response to a covered guidance (defined earlier) *and* (ii) the reporting accountant "concludes that the advice is intended to be used by a principal to the transaction as an *important* factor considered in reaching a decision [emphasis added]."

Suppose an investment banker asks a reporting accountant about the earnings per share consequences of a newly devised common stock purchase

warrant. The banker mentions that a large defense contractor has just issued the security. Financial statements for periods following the date the security was issued have not been published. The accountants could be justified in concluding that the question falls outside of the scope of SAS 50 by using the following line of reasoning. Principals would only rarely consider an intermediary's representation of an accountant's views to be an important factor in reaching a decision. Further, the question at hand involved an understandable request by the investment banker to be educated in the complexities of an earnings per share calculation for a new financial instrument.

However, to be prudent, the reporting accountant probes a bit further. Is the defense contractor a client of your firm? Will you report my views on this question to someone at the contractor's firm with financial reporting responsibilities? Has the contractor asked you to solicit my views?

The investment banker answers "no" to all of these questions. However, he tells the reporting accountant that he is preparing an unsolicited proposal suggesting that the contractor issue a convertible debt security. As part of his proposal, he will generally describe the incremental dilution of convertible securities and illustrate the pro forma effects on earnings per share. He knows how to treat convertibles, but the banker needs the accountant's advice on the previously issued warrants. Finally, he mentions that he will offer his client the reporting accountant's phone number if any questions come up with regard to the general treatment of convertible debt.

Do the additional facts now require the reporting accountant to conclude that SAS 50 governs his response? Arguably, SAS 50 still does not cover the response to the banker because it will be relayed via the investment banker, and the reporting accountant continues to believe that the advice will not be considered an important factor the principal will use in reaching a decision.

Later, the contractor's assistant treasurer calls the reporting accountant. He questions the reporting accountant about the general earnings per share consequences of convertible debt, no actual terms having yet been decided. Is this a "covered request?" Possibly yes. Assume the principal tells the reporting accountant that he finds conversations such as these very helpful and that his own auditors take much too long to respond to questions on difficult financial instruments. Do SAS 50's performance standards require the reporting accountant to consult with the continuing accountant before responding?

Surprisingly, the answer is no. The transaction is still hypothetical because the terms of the security have not been established and consultation with the continuing accountants is required only with respect to specific situations. However, if the assistant CFO reviews the pro forma earnings per share calculation and asks the reporting accountant if he agrees with the way the *warrants* have been treated, the reporting accountant should consider whether this request is covered by SAS 50. If the reporting accountant concludes that his advice will be an important factor in reaching a decision, consultation on the warrants (rather than on the proposed convertible securities) is required.

Unscrambling the Scope Question—Why Bother?

The above illustrations point out the difficulties in literally applying SAS 50. However, a legalistic interpretation of the document is rarely worth the effort. It is difficult for the author to imagine that the performance standards of SAS 50

changed the steps CPAs took when answering questions on the application of accounting principles. Put another way, a CPA that had been cavalier enough to respond to pre-SAS 50 requests without taking the steps called for by the standard, would probably not feel constrained by its publication anyway.

At most, SAS 50 spotlighted on the "stage" of a formal standard, a requirement to consult that had been always in the profession's "wings" as an ethics interpretation.

Why Accountants Receive Requests Regarding the Application of Accounting Principles

Requests From Intermediaries

Intermediaries make many, if not most, requests for SAS 50-type reports on the application of accounting principles. The reasons are explained below.

Innovative Financial Instruments

During the last decade or so, Wall Street has developed a stunning array of financial instruments to help clients deal with volatile interest and currency rates and streamline leverage-sensitive balance sheets. According to a recent tally, over four out of every ten Emerging Issues Task Force (EITF) problems have dealt with financial instruments and off balance sheet financing [FASB, 1988]. Listed below are a few examples:

- Interest Rate Swaps—First employed in 1983, the notional amount of interest rate swaps aggregated $139 billion at mid-year 1987, according to a survey conducted by the International Swap Dealers Association.
- Convertible debt with a premium put—During its term, holders of this debt have a one-time opportunity to redeem it in excess of the debt's face amount.
- Put options on an issuer's stock—A mirror of stock purchase warrants, these put options enable investors to sell stock to the company at a stipulated price during the options' term.
- Interest only certificates (IO)—An investment in only the interest stream of a pool of mortgages; an IO's value can radically change based on market rates of interest and prepayment assumptions.

Financial intermediaries are virtually forced to seek an expert's advice when devising many of these instruments because generally accepted accounting principles are silent on their proper treatment. As a result, reporting accountants responding to these requests consider instruments with analogous features, e.g., the FASB's concepts statements and the accounting treatment followed by other companies, if discernible.

The Financial Accounting Standards Board is in the process of examining accounting principles for financial instruments. Any conclusions are several years away. In the meantime, accountants will likely continue to receive unending requests covering innovative instruments.

Routine Requests

Frequently, advice (usually oral) is sought on matters explicitly covered in the authoritative literature. Many investment bankers and attorneys have an

overall understanding of financial accounting. However, intermediaries often find it cost justified to consult with a CPA on the specific application of generally accepted accounting principles in areas such as lease accounting, earnings per share, pooling of interests criteria, and so on.

Education

CPAs struggle to remain current on financial accounting developments while intermediaries have even less opportunity to stay abreast. As a result, CPAs can teach intermediaries about emerging accounting standards such as income taxes, loan fees and so on, at times and locations convenient to the intermediary.

The publication of a new accounting standard forces intermediaries to revise the advice they have been giving to clients. Soon to be issued, for example, is a Financial Accounting Standard amending SFAS 13, "Accounting for Leases." Reporting accountants will receive many requests to help intermediaries understand the types of conditions that constitute a "penalty" at lease renewal dates.

Enhanced Credibility

In convincing a client to engage in a recommended transaction, investment bankers must overcome many obstacles. Is the transaction economically justified, do its advantages outweigh its disadvantages? If the company is unfamiliar with the transaction, the proper financial accounting treatment is another uncertainty. A reporting accountant's written report, accompanying the investment banker's proposal, can allay or reduce the "accounting uncertainty" and provide a starting point for the company's analysis of the accounting consequences.

Confidentiality

Investment bankers and other intermediaries place a high premium on the confidentiality of their advice, a premium that extends beyond the recent insider trading scandals. Advisory fees for newly innovated financial products are higher than those related to the so-called commodity products or "vanilla" transactions. Intermediaries seek to extend the proprietary nature of their ideas by restricting access only to trusted consultants, including a reporting accountant sensitive to their concerns.

Requests from Principals

Accounting Disagreements

The most sensitive request covered by SAS 50 occurs when a principal and its auditors disagree on the appropriate accounting treatment for a transaction. Occasionally, in such a situation the principal turns to another CPA for his or her views. Sometimes the cause of the disagreement is understandable. Authoritative standards do not eliminate alternative accounting principles for familiar topics; the development of new situations provides an ample opportunity for divergent views.

A good example occurs in a leveraged buyout (LBO). The threshold question is whether a highly leveraged takeover by a shell acquisition company

results in a purchase business combination, at fair value, or in a recapitalization of the target company, usually with a devastating effect on stockholders' equity.

The question was debated for over one year at eight different meetings of the EITF, indicating how difficult this fundamental issue is. Until the Task Force reached a consensus, a principal to an LBO and its auditors could legitimately disagree on the appropriate accounting treatment.

Shopping for Accounting Principles

Of course, accounting disagreements occur in other less "legitimate" circumstances. A company may seek a favorable accounting outcome not justified by a transaction's particular facts and circumstances—either by stretching its interpretation of authoritative standards or identifying inappropriate analogies. The danger is obvious; a threat that a company intends to seek other views may cause its auditors to acquiesce, or a reporting accountant may agree with the principal's views in an attempt to "curry favor" (usually hoping to win a client relationship). In either case, another step towards "lowest common denominator" accounting principles occurs. Understandably, accountants, regulators—particularly the SEC—Congress and others are concerned with reports on accounting principles that are responses to "shopping" requests.

SAS 50 will do little to alleviate the shopping problem, although other initiatives, discussed below, should be more effective. If the reporting accountant views the request as an opportunity to win a client, and this perception affects his conclusion, then the accountant's objectivity and independence are at question. However, as a result of its consultation provisions, SAS 50 should force a reporting accountant to consider the continuing accountant's reasoning process and prevent the reporting accountant from overlooking a fact pattern peculiar to the situation.

Other Initiatives

Audit Committee—The audit committee, with oversight responsibility for a company's financial statements, may provide a check on an aggressive management's view of accounting principles. As a result, firms that are members of the AICPA SEC Practice Section must regularly communicate with the audit committee or its equivalent. Among the topics the continuing accountant must cover are (i) accounting and auditing disagreements between the CPA and management (even if satisfactorily resolved) and (ii) SAS 50 opinions which the management obtained from the reporting accountants of which the continuing accountant is aware. Similar requirements are contained in a recently released statement on auditing standards (SAS 61).

Form 8-K Disclosures—Recently, the SEC strengthened the disclosure requirements in Form 8-K, filed when registrants change accountants. After the new rules take effect, companies will have to reveal accounting consultations that occurred in the two years preceding its auditor change.

The Contributions of SAS 50 Reports

It was noted earlier that the performance standards of SAS 50 only formalized the procedures that diligent reporting accountants employ in

responding to requests for non-audit clients. In the preceding section, it was observed that SAS 50, taken alone, will do little to prevent shopping for accounting opinions. What, then, do these reports contribute to the accounting principles process?

The answers to these questions, especially those dealing with hypothetical transactions, lie outside of the standard and in the SAS 50 report itself. Unarguably, financial instruments and complex transactions transcend promulgated guidance and strain the limits of the existing accounting framework. In this setting, a hypothetical report has the following advantages:

- Conclusions are reached without a materiality guideline. Because the discussion is hypothetical, the reporting accountant cannot dismiss an effect as "immaterial." A principal or its continuing accountants often focus on only significant items for accounting scrutiny.
- Incorrect advice is reduced. Financial intermediaries, with more expertise in financial or economic analysis, occasionally err in evaluating the reporting consequences of proposed transactions. Reports on hypothetical transactions serve as a screening mechanism.
- Objectivity. A report on a hypothetical transaction is usually prepared in the absence of a continuing audit relationship without the economic pressure perceived to influence the objectivity of the conclusions.
- Focused expertise is brought to bear. Many financial instruments, especially mortgage-related products and complex swaps, can only be developed by research and development teams incorporating computer modeling, financial analysis, tax, security law, regulatory and financial reporting expertise.

In short, SAS 50 reports are an inevitable feature of a volatile financial environment. They can serve as a helpful stopgap between financial intermediaries under intense competitive pressure to develop something new, something different, and the standard setters facing an equal pressure to deliberate carefully, prudently, and with extensive due process.

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Discussant's Response to "Reports on the Application of Accounting Principles—A Review of SAS 50"

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I thoroughly enjoyed reading this paper. It is well organized and clearly written. The author's extensive experience on Wall Street evaluating the accounting implications of often-exotic financial instruments makes him well-qualified to discuss the background and implications of SAS 50. The paper does a good job of illustrating how accountants may have difficulty determining whether the provisions of SAS 50 apply in various circumstances. I generally agree with the positions expressed in the paper, but disagree somewhat with respect to the likely significance of SAS 50.

Determining When SAS 50 Applies

A major portion of the paper is devoted to the issue of deciding whether the provisions of SAS 50 apply to various circumstances. The author provides some basic examples and a somewhat elaborate decision tree for making this determination. The paper gives an impression that the criteria for deciding whether SAS 50 applies are highly complex and non-intuitive.

On the contrary, I believe that the criteria for determining whether SAS 50 applies are rather simple, straightforward, and intuitively logical. In determining whether and how SAS 50 applies, the accountant needs to evaluate the following factors:

1. specificity of the communication (i.e., whether it addresses a specific situation or a hypothetical one);
2. whether the communication is a written report, oral advice, or a position paper (or speech), and
3. whether the communication is an important decision factor.

These factors are discussed below and shown in Table 1.

Specificity—One of the major provisions of SAS 50, which was described in the paper, is the requirement for an accountant who is not the financial statement auditor, but who issues a written or oral communication on the application of an accounting principle, to consult with the financial statement auditor under certain circumstances. An accountant's responsibility to consult with the financial statement auditor differs depending on whether the communication addresses a specific transaction (or a specific entity's financial statements) as distinguished from a hypothetical transaction. Quite understandably, if the communication relates to a "hypothetical transaction," which is defined as "not involving facts or circumstances of a particular principal," communica-

tion with the financial statement auditor would not be meaningful and is not required by SAS 50.

Oral Advice—For oral advice regarding a specific transaction or financial statements of a specific entity, SAS 50 applies and consultation with the auditor is required. However, if the oral advice relates only to a hypothetical transaction, consultation is not required, and SAS 50 applies only if the accountant is aware that his oral advice is intended to be used by a principal to a transaction as an *important decision factor.*

Position Papers and Speeches—SAS 50 does not apply to position papers or speeches unless they address specific transactions or financial statements of a specific entity audited by another accountant. Furthermore, consultation with the auditor is required if the position taken in the paper or speech is intended to be used by a principal to a transaction as an *important decision factor.*

Applying Table 1 to the Examples in the Paper

The author presents four illustrative examples and discusses how an accountant should decide whether SAS 50 applies and whether consultation with the current financial statement auditor is required. In the section of the paper with the heading, "Other Means of Proffering Advice," the author first describes a situation (I'll call it Situation A) in which an accountant forwards a position paper that addresses only hypothetical transactions. This situation fits in cell #6 of Table 1 and SAS 50 does not apply.

TABLE 1

DOES SAS 50 APPLY?

	SPECIFICITY	
	SPECIFIC	**HYPOTHETICAL** (Consultation not Required)
WRITTEN REPORT to Principal or Intermediary	#1 Yes—Consult	#2 Yes
ORAL ADVICE to Principal or Intermediary	#3 Yes—Consult	#4 SAS 50 applies only if advice is an important decision factor. (Situations C and D)
POSITION PAPER OR SPEECH	#5 Yes—SAS 50 applies. Consultation required only if position is an important decision factor. (Situation B)	#6 No (Situation A)

In the following situation (Situation B), the accountant uses facts of a specific transaction to illustrate a speech and apparently is aware that the position taken in the speech is likely to be an important decision factor for a principal of the transaction. This situation fits in cell #5 of Table 1, so SAS 50 applies and consultation with the financial statement auditor is required.

The next section of the paper, headed "Oral Advice," first describes a situation (Situation C) in which an intermediary (investment banker) asks for oral advice about a hypothetical transaction. This situation fits in cell #4 of Table 1 and SAS 50 applies only if the accountant concludes that a principal to a transaction would likely use the oral advice to the intermediary as an important decision factor.

Situation C is then modified to indicate that the advice is sought directly by the principal rather than the intermediary. This new situation (Situation D) would be treated in the same way as Situation C and not require consultation if the transaction being addressed is still hypothetical. However, consultation with the auditor would be required if the advice addresses either a specific transaction (completed or proposed) or the type of audit report to be issued on a specific entity's financial statements (cell #3).

I am not arguing that the judgments required by SAS 50 are easy, but only that the conceptual framework for making such judgments, as shown in Table 1, is in my opinion clear, reasonable, and logically consistent.

Related Research on Auditor Changes

Since SAS 50 addresses the issue of potential opinion shopping, a question arises as to the nature and extent of existing opinion shopping. Although definitive research is not available on this topic, a number of studies have addressed the topic and four recent studies seem particularly relevant. McConnell [1984] conducted a study concerning auditor changes and audit-related disagreements between management and the auditors. The study reported on the "relevant disagreement involvement rates experienced by both Big Eight and non-Big Eight firms as predecessors and successors to 748 auditor changes." The study showed that Big Eight firms had higher relative disagreement involvement rates and that statistically significant differences existed between Big Eight firms with respect to disagreement rates as both predecessor and successor auditors. The study may possibly signal potential opinion shopping situations, but the rate of disagreement involvement of particular firms as either predecessor or successor auditor, though interesting, does not provide conclusive evidence that a particular firm is more (or less) susceptible to opinion shopping. The results do provide promising hypotheses for further research on the topic.

Schwartz and Menon [1985] conducted a study of auditor switches by failing firms that gathered data for a sample of 132 failing (bankrupt) firms and a matched-pair sample of non-failing firms. Results indicated that failing firms had a greater tendency to switch auditors but that qualifications of audit opinions were not statistically associated with auditor displacement by the failing firms.

Chow and Rice [1982] studied the association between auditor "subject to" qualifications and auditor changes. Although their results implied an association between qualified opinions and auditor changes, they found that companies that

switched auditors were more likely to receive a qualified opinion in the subsequent year than those that did not switch.

In a follow-up to the research of Chow and Rice, Smith [1986] conducted a study that addressed the potential for opinion shopping related to one type of audit opinion, the "subject to" qualification related to continuation as a going concern. The study reported on 139 cases in which an auditor change followed a "subject to" opinion being issued the previous year. The successor also issued a qualified opinion in the subsequent year in 100 of the 139 cases. In 20 of the remaining 39 cases, the predecessor auditor subsequently reissued its report as being unqualified. Smith studied the remaining 19 cases and found that an apparent disagreement existed between the predecessor and successor auditor in five of the cases. Consequently, the study demonstrates the possibility that "successful" opinion shopping may have occurred in five of the 139 cases.

Conclusions Regarding the Contribution of SAS 50

I generally agree with most of the conclusions of the paper, but have a somewhat different assessment of the need for SAS 50 and its overall contribution. I agree with the author that providing reports and oral advice on complex accounting matters serves a useful function and that SAS 50 quite appropriately still allows these services.

I disagree with the author about the significance of SAS 50. The author implies that SAS 50 is perhaps of little significance, stating (page 92): "At most, SAS 50 spotlighted on the 'stage' of a formal standard, a requirement to consult that had been always in the profession's 'wings' as an ethics interpretation." I disagree on this point. First, addressing an important professional issue as a standard (SAS), rather than an interpretation, may in itself be appropriate and significant. Second, and more importantly, SAS 50 is much more explicit and complete than the superseded ethics interpretation in identifying specific performance, consultation, and reporting standards for reports on the application of accounting principles.

The topic of potential opinion shopping is an important issue that has been addressed by various SEC Commissioners, the Chief Accountant of the Enforcement Division of the SEC, the Treadway Commission, and numerous other speakers and writers who are concerned with the role of the auditor. Although the actual frequency of opinion shopping may be very low, the public perception that it may occur in certain marginal cases and not be disclosed could have a highly debilitating effect on capital markets.

Consequently, I regard as significant any action taken to control potential opinion shopping, to require disclosure of activities that could signal its occurrence, while at the same time allowing a healthy communication between the profession and the business and investment communities regarding emerging accounting and economic issues.

Finally, the issuance of SAS 50 should not be evaluated in isolation from recent related pronouncements. Such related pronouncements include (1) the SEC ruling (which became effective the day this paper was delivered) requiring disclosure of SAS 50 communications occurring within two years of an auditor change, and (2) the FASB proposed standard on financial instruments.

In summary, I believe that SAS 50 is a crucial and necessary element in the whole package of recent related actions of the Auditing Standards Board, the SEC, and the FASB that collectively provide a reasonable and cost-effective move toward controlling opinion shopping or at least disclosing actions that could signal its potential occurrence.

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6

Auditor Evidential Planning Judgments

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Abstract

The effectiveness and efficiency of an audit rests largely on the nature and extent of evidence gathered, yet there is little research on how auditors make such complex judgments required to plan audits. This study examines the evidential planning decisions of 21 experienced auditors in an experimental setting. The Analytical Hierarchy Process is employed to explicitly investigate the multi-attribute trade-offs made in such judgments.

The results indicate that auditors displayed strong consensus as to the relative importance of key criteria suggested in the professional literature to weigh evidential alternatives. Specifically, competence was considered of greatest concern, followed by sufficiency and costs of gathering the evidence. But in applying criteria to an audit case, the auditors reached quite different conclusions regarding the relative superiority of alternative procedures when evaluated along the various criteria. Differences were also observed concerning the appropriate allocation of audit time, suggesting substantial variations among auditors in the planned portfolio of procedures across engagements.

Introduction

Evidential planning regarding the nature, extent, and timing of procedures entails critical judgments that greatly impact audit effectiveness and efficiency. The audit planning process should result in a cost-effective portfolio of procedures which are likely to identify material errors at an acceptably low level of audit risk.[1] In deciding upon an appropriate plan, a number of broad categories of procedures, such as detailed tests, analytical review, and observation are normally available. These procedures vary qualitatively and quantitatively along a number of criteria such as competency, sufficiency and cost [SAS 31, AICPA, 1987]. The auditor's task is to select a combination of these procedures to conduct in order to gather sufficient, competent evidence to support an overall opinion on the financial statements. Therefore, evidential planning judgments represent complex, multiple-criteria decisions.

[1] Audit risk is the risk that the financial statements are materially misstated without the auditor's knowledge (SAS 47).

Despite the importance of these decisions, there has been little empirical evidence of how such judgments are made in practice. As a result, there are many unanswered questions, including: Do auditors explicitly consider and weigh evidential criteria? If so, how? What is the relative importance attached to various criteria? How are common procedures evaluated along criteria? What is the level of consensus among auditors in planning judgments? Research into these types of questions may suggest useful decision tools to assist the audit judgment process.

The purpose of this paper is to acquire a better understanding of the multi-attribute trade-offs made in evidential planning decisions. Specifically, the study addresses three implicit/explicit auditor judgments embodied in the planning process: (1) the weighting placed on widely-cited evidential criteria; (2) the evaluation of alternative audit procedures along these criteria; and (3) the resulting allocation of audit hours to the procedures. The level of consensus of each of these judgments is also explored.

To illustrate, assume an auditor considers three criteria to be important in selecting audit procedures: competency, sufficiency, and cost. The relative importance (weightings) of each of these criteria in a given situation will significantly impact the final evidential choices made. If competency is considered of primary importance, with sufficiency and cost of little concern, the auditor is likely to search for the evidence of highest quality (competence) with little regard for availability or costs. After evaluating competing procedures along each pertinent criterion, the final decision is to allocate available resources (e.g., audit hours) among the various procedures.

The next section of the paper contains an overview of evidential planning and the prior research in this area. The methodology and results of this study are then described, with the final section devoted to a discussion of the major results and their implications for future research and practice.

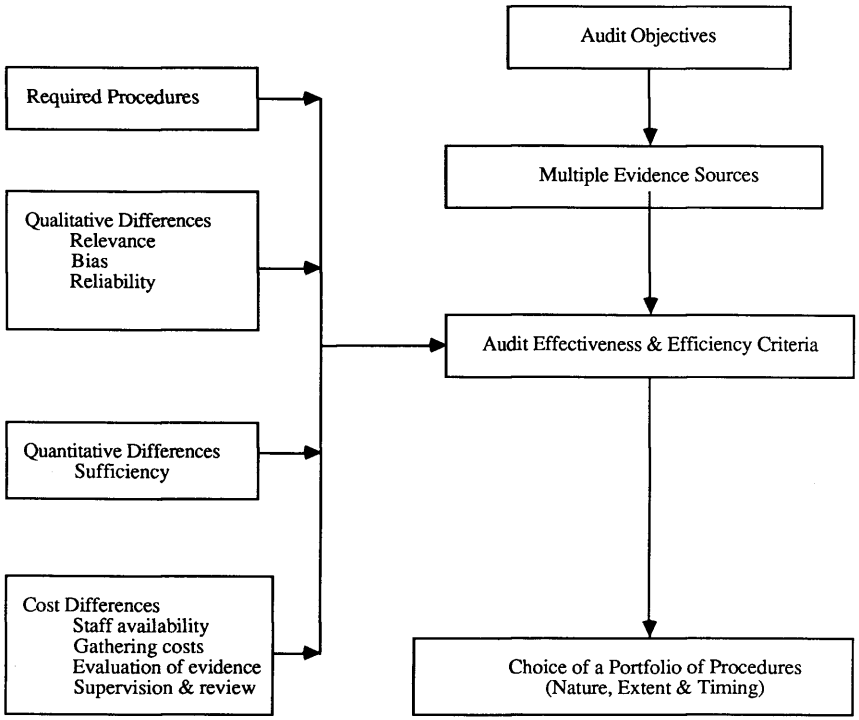
An Overview of Evidential Planning

Figure 1 provides a model of evidential planning factors and considerations. The auditor's overriding goal is to gather evidence through tests to address various audit objectives and thus be able to express opinions for both the accounts (micro-level) and for the overall financial statements (macro-level). As depicted in Figure 1, there are frequently several evidence sources to achieve a given audit objective. For example, the "existence" assertion of an accounts receivable may be tested by sending confirmations, examining subsequent cash receipts, or looking at shipping/sales documents. Auditors must decide which of these procedures to conduct, i.e., the "nature" of the tests. Of course, any or all of the procedures may be planned, since often some degree of corroborating evidence is sought. Once the choice of procedures is established, the auditor must determine the extent and timing of tests.

The choice of procedures is implicitly a multi-attribute judgment. Based on a review of SAS 31, a number of salient criteria for selecting audit procedures are given in Figure 1. There are a few required procedures from the professional standards, such as inventory observation and receivable confirmations. Such requirements are, however, minimal and most audit procedures performed on an engagement are the result of choosing among alternative

Figure 1

EVIDENTIAL PLANNING



procedures that may be available.[2] Further, even for required procedures, the auditor can vary the extent and/or timing of such tests.

Alternative procedures differ qualitatively, quantitatively, and in terms of cost. For example, several factors impinge on the cost of performing a procedure. Differing levels of skill are necessary to properly perform certain procedures, and staff availability is a consideration. There are also the direct costs of gathering and evaluating the evidence, as well as the indirect costs of supervising and reviewing the work. All of these factors come into play in evaluating the relative costs of performing alternative procedures. In addition to cost differences, procedures may differ in terms of their relevance to certain audit assertions and in terms of their reliability, bias, and sufficiency. In

[2] Procedures mandated by the particular CPA firm further constrain the choice of procedures on a given audit. However, it appears that auditors still have wide discretion in deciding upon the extent of such procedures as well as in tailoring procedures to particular client situations [Cushing and Loebbecke, 1986].

summary, in planning the nature, and subsequently the extent of procedures, the auditor is implicitly or explicitly weighing a number of multiple criteria.[3]

As discussed earlier, there has been limited empirical research on evidential planning. Lewis et al. [1983] asked auditors to allocate budgeted hours to various procedures. An experimental group was provided with a decision aid (Analytical Hierarchy Process—AHP) as a means of structuring the judgment process. The results indicated that the decision aid significantly affected planning decisions. The experimental (decision aid) group allocated more hours to analytical review and less to detailed tests than the unaided control group. This greater focus towards analytical review is consistent with the current trend in the auditing profession towards such tests as a cost-effective means of detecting material errors [Hylas and Ashton, 1982; SAS 56 *Analytical Procedures*, AICPA, 1988; Tabor and Willis, 1985].

Arrington et al. [1984] examined the choice of analytical review procedures, given explicit consideration of five criteria: effectiveness attributes—statistical performance, model robustness, and understandability; and efficiency attributes—cost and ease of application. Using AHP, three academicians who had published research in the area, and three experienced auditors evaluated five alternative analytical review approaches along these criteria. The attributes considered of greatest importance were statistical performance and model robustness. Subjects differed a great deal in their evaluations of each analytical review approach on several of the criteria, resulting in a lack of consensus as to preferences of approaches. In general, the practitioner preferences displayed a narrower range than those of academicians with a random-walk model favored overall. In contrast, academicians preferred a regression approach with random-walk being the second choice. Despite the small sample size employed, the lack of consensus in evidential preferences was perhaps the key finding of this study, and one of concern.

Other studies have examined evidential planning judgments in response to changes in risks. However, such studies have focused on the extent of testing judgments and have not explored the underlying multi-attribute considerations of such judgments. For example, Mock and Turner [1981] examined the sample size (extent) decisions of auditors in a realistic case for four procedures in the revenue cycle. They found a low level of consensus among subjects and the existence of a significant anchoring effect on the initial, planned sample size. Auditors were responsive to changes in the internal controls, planning larger samples when controls deteriorated. Joyce and Biddle [1981] also studied sample size decisions when controls varied. Consistent with Mock and Turner, the results indicated that auditors adapt samples to the controls. However, a significant control by order effect was present, suggesting that auditors recognize trends in controls and apply other heuristics from experience. For

[3] In many situations, the choice of tests may seem automatic or obvious given the audit objective. For example, to determine the existence of petty cash, a count of the fund is normally done by the auditor. Even though this procedure appears to be evident, various criteria are implicitly considered. That is, why even conduct the test unless it meets minimal standards as to relevance, reliability, etc.? Also, there usually are alternative tests that could be conducted; e.g., the custodian of the fund could be asked to sign a representation letter attesting to the fact that the petty cash fund in question does exist or merely be asked (inquiry) whether it exists.

example, when controls become stronger, there is a reluctance to reduce samples. However, deteriorating controls led to substantial increases in samples. Joyce and Biddle also found significant variation among participants in the planned levels of testing.

Although the research to date suggests that the evidential planning decisions of auditors are responsive to client and other risk changes, a concern is the low level of observed consensus in such judgments. Importantly, few of the prior studies examined the multi-attribute nature of these decisions, which is the focus here.

Methodology

Task

Twenty-one practicing auditors were presented with a comprehensive, realistic case ("Modern Appliances Manufacturing Co.") and were asked to evaluate alternative evidential sources along various key criteria for the inventory account.[4] Subjects then decided which evidence to focus on by allocating 150 available audit hours to three broad evidential areas: analytical review, physical observation, and detailed tests.

As a common frame of reference, the case provided illustrative audit programs for each evidential area. Since there are numerous procedures that may fall under each of these areas, it was believed that a benchmark program was necessary to reduce confusion and avoid serious confounding of the results. For example, what is "analytical review"? Different auditors may have various images about what constitutes necessary analytical review procedures for this case, e.g., ratios, regression, and/or industry comparisons. The programs provided were developed with the consultation of practicing auditors and were later pilot tested. The procedures appear to be representative of widely-used tests for a manufacturing client with strong controls, as in the case here. To maintain task simplicity and minimize required subject time, the study examined audit planning judgments for these major evidence areas rather than the selection of detailed individual audit procedures.

The Modern Appliances case contained extensive background information necessary to plan substantive tests. First, information on the client, including product lines and comparative financial statements, was provided. Second, the inventory/purchases internal control system was described in detail, reflecting an environment of strong controls. Compliance tests further revealed that controls were functioning properly.[5]

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[4] Due to the exploratory nature of this study, auditors evaluated evidence for each criterion as related to the overall audit objective that the inventory account was "fairly presented." In practice, evidence may be evaluated along these criteria for each detailed audit objective such as existence and valuation. As will be described later, incorporating specific audit objectives would have geometrically expanded the subject time needed and resulted in having to significantly narrow the scope of the research, perhaps to addressing only one detailed objective. Given the early state of our knowledge here, it was decided that a broader focus was appropriate. However, future research is needed to address specific audit objectives and verify the generalizability of the major results.

[5] A copy of the complete case may be obtained from the authors upon request.

The initial evaluation of evidence alternatives was based upon criteria cited in Statement on Auditing Standards (SAS) 31. Specifically, subjects were randomly assigned to two experimental groups, varying as to the number of criteria considered. The first group focused on three criteria (cost, sufficiency, and competence), while the second group examined five criteria (cost, sufficiency, relevance, reliability, and bias). The last three criteria are a finer partitioning of "competence." Placing the subjects into two groups provided the opportunity to examine whether evidential choices are affected by the number of criteria considered. Definitions of each criterion were provided to subjects from SAS 31, as indicated in Table 1.

In considering the criteria, auditors made two sets of judgments for the case: (1) establishing the relative importance of each criterion, and (2) evaluating the three evidential choices along the various criteria. For example, a subject would first assess the relative importance of the criterion , "cost of

Table 1

Evidential Criteria

	SET A
1. Cost:	The additional cost of obtaining the audit evidence which is being evaluated
2. Competency:	The overall quality of audit evidence, which is based on two general factors: a) accurate measurement (valuation) resulting from lack of bias (preparer influence) and reliability (accurate accounting system), and b) relevance: the pertinence of the evidence to the audit objective examined.
3. Sufficiency:	The quantity or "weight" of evidence relative to what is needed to satisfy audit objectives. Audit evidence is usually considered sufficient if it is persuasive rather than convincing.
	SET B
1. Cost:	The additional cost of obtaining the audit evidence which is being evaluated.
2. Bias:	The amount of error or misstatement in audit evidence which may result from preparer influence (e.g., management)
3. Reliability:	The amount of error in audit evidence which is a result of inaccuracies in measuring and compiling data.
4. Relevance:	The pertinence of the evidence to the audit objective examined.
5. Sufficiency:	The quantity or "weight" of evidence relative to what is needed to satisfy audit objectives. Audit evidence is usually considered sufficient if it is persuasive rather than convincing.

gathering the evidence" as compared to other criteria. Then, he would evaluate the merits of the audit procedures for each criterion. "In terms of *cost,* which evidence (analytical review, observation, or detailed tests) is preferable?" As will be described in a later section, subjects used the Analytical Hierarchy Process [Saaty, 1980] to arrive at both of these judgments.

Evidential planning decisions are, thus, viewed as a function of the relative weighting placed on key criteria and the judged superiority of alternative sources of evidence on each of these criteria. Finally, subjects planned the allocation of efforts (audit hours) for the three alternative procedure areas (evidence sources). Auditors were allowed to take whatever time was needed to complete the task and anonymity was guaranteed.

Subjects

Participants were from three of the Big Eight firms. Subjects were provided on the basis of time availability and, thus, do not represent a random sample. Table 2 reports demographic data on the participants. As indicated, auditors had, on average, over five years of public accounting experience and were primarily at the supervisory and managerial levels. Therefore, subjects had the extensive experience and background necessary for the tasks examined—the planning of substantive procedures and allocation of audit time. A one-way ANOVA revealed no significant differences ($p < 0.10$) between experimental groups as to years of audit experience. A Chi-square test also did not reflect significant differences in staff level.

Analytical Hierarchy Process (AHP)

Subjects made evidential judgments on a computer terminal in an interactive mode, utilizing the AHP developed by Saaty [1984, 1980, 1978]. AHP is a systematic, multiple criteria method for making unstructured decisions. A judgment is decomposed into a hierarchical framework—from the most general level to specific choices. The decision maker then evaluates criteria/alternatives at each level through a series of pairwise comparisons. For example, at the most general level the subject would be asked, "Which criterion is more

Table 2

Demographic Data on Subjects

Experimental Group	n	Mean Experience	Staff Level	Frequency
Three Criteria	11	5.4 Years (3-10 Years)	Seniors Supervisors Managers	9% 36% 55%
Five Criteria	10	5.5 Years (3-10 Years)	Seniors Supervisors Managers	10% 20% 70%

Note: Numbers in parentheses indicate range of experience.

important—cost or competence?'' The individual then indicates his or her degree of preference (weights) on a scale of one to nine (equal importance—absolute importance). The number of pairwise comparisons represents every combination of criteria. Thus, the three criteria group made six comparisons (three criteria taken two at a time) and the five criteria group made ten comparisons. Once these sets of comparisons were completed, subjects were asked to evaluate pairwise comparisons of the three evidence sources along each criterion; e.g., ''In evaluating cost, which procedure is cheaper—analytical review or detailed tests?'' A measure of the strength of preference was then obtained on a scale of one to nine, where one indicates very little preference and nine represents absolute preference.

Using matrix algebra, a maximum eigenvalue is calculated and a normalized eigenvector is derived from the weights. This eigenvector sums to 1.00 and measures the auditor's relative trade-offs at each level of the hierarchy on an interval scale. The approach entails a linear, additive, compensatory model.

AHP has been used in many decision settings and has several advantages: ease of understanding, high test/retest reliability, and ability to deal with complex decisions [Saaty, 1980]. A number of recent auditing studies have employed AHP [Lewis et al., 1983; Arrington et al., 1984; Lin et al., 1984; Boritz and Jensen, 1985]. The principal disadvantages of the approach are that AHP: (i) does not consider heuristics; (ii) it is a linear, additive model, while judgment may not be so; and (iii) although it provides adjustments, AHP does not present a normative way to deal with inconsistent responses.[6]

This study focuses on multi-attribute decision making and thus the pairwise comparisons made during the decision process are of greatest concern. The Analytical Hierarchy Process is, therefore, useful here as a vehicle to structure the decision process.

Results

Relative Importance of Evidential Criteria

Table 3 reports the frequency of preferences in pairwise criteria comparisons, suggesting the relative importance of each criterion. A frequency near 50 percent indicates wide disagreement in choice among auditors, while 100 percent reflects unanimity. The results suggest reasonably clear choices as to desired evidential criteria. For subjects in the three criteria group, the order of importance was competency, sufficiency, and (a distant third) cost. These preferences are in agreement with the professional literature (SAS 31); i.e., competence and sufficiency are paramount, with cost a secondary consideration.[7]

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[6] See Jensen [1983, 1984] for a review of the literature on AHP, and a critical analysis. The AHP program used in this study checks for consistency of responses and adjusts the values of the normalized eigenvector for inconsistent weights employing a method developed by Lusk [1976]. The data were further examined for the level of transitivity logic errors. The level of such errors was found to be quite low (9% for the three criteria group and 3% for the five criteria group), suggesting that consistency was not a problem for the auditors in the experiment.

[7] The low weighting of the cost criterion found also may be because auditors are aware that SAS 31 indicates that cost should be of lower importance, and they are responding in a normative manner, whereas on actual audits cost plays a more dominant role. Future empirical research would be needed to address the validity of this plausible alternative explanation.

Table 3

Pairwise Rankings of Evidential Criteria

Comparison	Criterion Preferred	% of auditors with Indicated Preference	Strength of Preference* (Mean)
Three Criteria Group:			
Cost vs. Sufficiency	Sufficiency	82	4.9
Cost vs. Competence	Competence	100	6.3
Suff. vs. Competence	Competence	82	5.2
Five Criteria Group:			
Cost vs. Sufficiency	Sufficiency	90	5.7
Cost vs. Bias	Bias	80	5.1
Cost vs. Reliability	Reliability	100	4.5
Cost vs. Relevance	Relevance	90	6.8
Sufficiency vs. Bias	Sufficiency	80	3.4
Suff. vs. Reliability	Sufficiency	60	3.0
Suff. vs. Relevance	Relevance	70	6.4
Bias vs. Reliability	Reliability	60	3.8
Bias vs. Relevance	Relevance	80	4.8
Reliability vs. Relevance	Relevance	70	6.1

* Scale of one (equal importance) to nine (absolute importance).

The order of significance for the five criteria group was: relevance, sufficiency, reliability, bias, and cost. Cost was again seen as least important. Sufficiency, reliability and bias were close choices, all perceived as of about equal, intermediate importance when compared to relevance. Therefore, the two groups displayed consistent responses reflecting relevance/competency as the most important evidential quality, while cost of gathering evidence was considered a secondary factor. Sufficiency fell in the middle.

AHP weightings in Table 4 also reflect this ordering. Competence was the primary criterion (mean weighting .63), with sufficiency (.26) and cost (.11) as secondary factors (three criteria group). For the five criteria group, relevance (.37) and sufficiency (.24) were considered the most important criteria; reliability (.19) and bias (.15) followed in importance. Cost (.05) was judged as a distant minor factor.

Evaluation of Evidential Alternatives

After judging the relative importance of evidential criteria, auditors were asked to evaluate the three procedure areas along each of the criteria studied. The results of these choices are shown in Table 5. For example, when auditors in the three criteria group compared analytical review to observation in terms of cost, 100 percent felt that analytical review was less costly.

However, in general, Table 5 reveals a lack of consensus among participants in applying the criteria to judge the quality of alternative evidence sources. This occurred despite the reasonably strong consensus described

Table 4

Relative Importance of Evidential Criteria
Measured by AHP Weightings

Three Critieria Group			Five Criteria Group		
Criterion	Mean*	Standard Deviation	Criterion	Mean*	Standard Deviation
Cost	.11	.09	Cost	.05	.03
Sufficiency	.26	.14	Sufficiency	.24	.16
Competence	.63	.17	Bias	.15	.12
			Reliability	.19	.15
			Relevance	.37	.18

* Represents AHP normalized weightings of relative importance; Scale zero to one.

earlier regarding the relative importance of the various evidential criteria. This lack of consensus is reflected in many of the pairwise comparisons. For example, for the three criteria group, four out of the nine comparisons indicated a lower than 65 percent level of agreement, while the five criteria group had nine out of 15 comparisons below 65 percent. In contrast, in evaluating the criteria, only one of 13 comparisons fell below 65 percent.

The overall ranking of evidential alternatives for the various criteria (Tables 5 and 6) also reflects the difficulties in achieving consensus. While both groups felt analytical review was the least costly to obtain, contradictory results appear in evaluating sufficiency. The three criteria group chose analytical review as superior regarding sufficiency, while subjects in the five criteria group ranked analytical review as of lowest quality along this criterion. The five criteria group could not reach any meaningful consensus in two cases (evaluating cost and relevance for observation and detailed tests) and demonstrated a lack of clear consensus on analyzing all evidence sources as to reliability and relevance. Recall that relevance was considered of greatest importance and yet an evaluation of procedures on this dimension produced great disagreement.

Table 6 indicates the AHP normalized weights for each of the three evidential sources as judged for the various evidential criteria. Both groups considered analytical review to be the least costly procedure to conduct. However, beyond this evaluation, a clear consensus is not present on all other evidential judgments. For example, for the five criteria group, the three forms of evidence are viewed as essentially equal in terms of relevance as measured by the mean weightings. Observation and detailed tests are ranked closely together on all five criteria. Further, the standard deviations of weightings evaluating analytical review are close to, or exceed, the mean on all criteria except cost for both groups, suggesting wide disagreement on the relative merits of this source of evidence.

In summary, despite strong agreement on the relative importance of various evidential criteria, auditors displayed low consensus in applying these

Table 5

Evaluation of Audit Procedures

Criterion	Pairwise Comparison	Choice	% of Subjects	Mean*	S.D	Choice	% of Subjects	Mean*	S.D
Three Criteria Group									
Cost	AR vs. OB	AR**	100%	5.9	3.0	OB	0%	—	—
	AR vs. DT	AR**	91	6.2	2.5	DT	9	5.0	0
	OB vs. DT	OB**	82	3.7	2.0	DT	18	3.0	2.8
Sufficiency	AR vs. OB	AR**	55	2.7	1.5	OB	45	6.2	2.7
	AR vs. DT	AR**	82	3.1	2.1	DT	18	5.0	0
	OB vs. DT	OB**	73	3.9	2.4	DT	27	3.3	0.6
Compe-tence	AR vs. OB	AR	36	5.8	2.5	OB**	64	5.0	2.0
	AR vs. DT	AR	36	3.0	1.8	DT**	64	3.6	2.2
	OB vs. DT	OB**	55	4.0	2.8	DT	45	5.2	2.0
Five Criteria Group									
Cost	AR vs. OB	AR**	90%	5.9	2.0	OB	10%	5.0	0
	AR vs. DT	AR**	100	5.0	2.6	DT	0	—	—
	OB vs. DT	OB	50	4.8	1.5	DT	50	2.8	1.1
Sufficiency	AR vs. OB	AR	20	6.5	2.1	OB**	80	5.5	2.0
	AR vs. DT	AR	20	3.5	0.7	DT**	80	5.4	2.1
	OB vs. DT	OB**	60	4.8	2.2	DT	40	4.3	2.5
Bias	AR vs. OB	AR	10	3.0	0	OB**	90	5.1	1.8
	AR vs. DT	AR	10	3.0	0	DT**	90	4.8	1.1
	OB vs. DT	OB	40	4.3	1.3	DT	60	4.7	2.0
Reliability	AR vs. OB	AR	40	3.8	1.0	OB**	60	5.3	1.6
	AR vs. DT	AR	40	3.8	2.5	DT**	60	5.2	1.8
	OB vs. DT	OB	40	3.3	1.7	DT**	60	3.3	2.1
Relevance	AR vs. OB	AR	40	4.3	2.5	OB**	60	4.0	2.8
	AR vs. DT	AR	40	2.5	1.3	DT**	60	4.3	2.9
	OB vs. DT	OB	50	2.6	1.7	DT	50	3.0	0.7

* Scale one (Equal Importance) to nine (Absolute Importance)
** Majority Preference
Note: Evidential Choices—AR - Analytical Review
OB - Observation
DT - Detailed Tests

criteria to evaluate the illustrative audit programs. Such disagreement is of concern since this result may suggest that, given the same facts, two auditors may plan a widely varying portfolio of audit procedures. This concern is

Table 6

Relative Quality of Evidential Sources

	Analytical Review		Observation		Detailed Tests	
Criterion	Mean*	S.D.	Mean*	S.D.	Mean*	S.D.
Three Criteria Group						
Cost	.65	.18	.21	.11	.14	.10
Sufficiency	.36	.25	.40	.22	.24	.20
Competence	.28	.25	.37	.26	.35	.24
Five Criteria Group						
Cost	.64	.19	.20	.18	.16	.12
Sufficiency	.20	.25	.43	.23	.37	.25
Bias	.15	.16	.39	.26	.46	.23
Reliability	.27	.23	.36	.24	.37	.18
Relevance	.29	.21	.34	.21	.37	.17

* Represents AHP normalized weightings of relative importance; scale zero to one.

addressed in the next section where the final planned allocations of audit hours are examined.

Allocation of Audit Hours—Final Evidential Judgment

After making criteria evaluations, auditors decided on the allocation of audit hours. Table 7 provides summary data on these judgments. A one-way ANOVA indicated no significant differences ($p < 0.10$) in the allocation of audit hours between the three and five criteria groups. The results here, however, reflect a relatively low level of consensus, consistent with prior studies of evidential planning (e.g., Mock and Turner, [1981]). This low consensus may be the result of the earlier findings, indicating that auditors displayed a high level of disagreement in applying evidential criteria to actually evaluate alternative evidential sources. This finding will be explored further in the final section of the paper.

Discussion

A significant finding in this study was that, although auditors were in close agreement as to the relative importance of various evidential criteria, there was not a strong consensus in applying these criteria to evaluate the merits of alternative procedures or in planning the allocation of audit hours. For example, subjects had widely disparate judgments regarding the effectiveness and sufficiency of analytical review.

The divergent allocation of audit hours among procedures found here is disturbing, since such widely varying audit plans suggest that, in practice, engagements may differ substantially in efficiency and/or effectiveness. Future

Table 7

Allocation of Audit Hours

Experimental Group	Mean Response (Audit Hours—150 total hours)		
	Analytical Review	Observation	Detailed Tests
Three Criteria	46 hours (19)	38 hours (14)	64 hours (29)
Five Criteria	39 hours (20)	39 hours (19)	72 hours (31)

Note: Numbers in parentheses indicate standard deviation.

research might consider the efficacy of various decision aids to assist auditors in program planning. For example, perhaps continued use of a multi-attribute method such as AHP may result in explicit consideration of evidence trade-offs and lead to greater consensus.

An additional extension to the current study is to focus on various audit objectives. Given the early state of the research in this area, this study looked at audit planning for the inventory account overall. The number of paired comparisons required, and hence subject time, grows very rapidly as additional audit objectives are considered. However, planning in practice is more complex and should explicitly consider needed evidence to address all the relevant audit objectives pertaining to an account. Are auditors evaluating alternative procedures to obtain cost-effective evidence for each objective? Is there a redundancy of tests on some objective(s) while little or no evidence on others?

The auditors in this study assessed evidential criteria and weighted alternative procedures along these criteria with respect to a specific audit case. Thus, corroborating findings, perhaps examining different account areas, evidence alternatives, and/or risk situations are needed to enhance the validity of the results.

The weak consensus in evaluating alternative procedures as to relevance, the criterion considered of greatest importance, is of concern. Perhaps auditors in practice have great difficulty, as suggested here, in appropriately considering this criterion. The evaluation of relevance is further complicated by the fact that audit procedures may address multiple objectives. For example, receivable confirmations provide evidence as to existence, valuation, and cut-off. Thus, future research may address how auditors can and do operationalize this important, yet difficult criterion in practice. For example, some accounting firms have developed program planning materials where various common procedures are ranked (e.g., strong, moderate, weak) with respect to relevance for each key audit objective for the account examined.

These questions illustrate the fact that, as noted earlier, we have little understanding of how evidential planning occurs in practice. Certainly, much more work is needed to begin to evaluate current practices and to identify tools to aid auditors in arriving at such complex, vital judgments. The results

reported here suggest that such tools appear needed for evidential planning and potentially offer significant returns in improving audit efficiency and effectiveness.

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Discussant's Response to "Auditor Evidential Planning Judgments"

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Arthur Young & Co.

It is indeed an honor for me to participate in this symposium as a discussant and a special pleasure to follow Professor Wright. Dr. Wright is Harold A. Mock Professor at The Northeastern University, which is, of course, located in Boston, my once and, I'm glad to say, future home.

Harold Mock was the managing partner of the Boston office of Arthur Young when I joined the firm in 1964. He was the consummate professional, an astute manager, a superb technician, and a man of the greatest personal and professional integrity. He was very good to this junior auditor and I remember him with great affection. It is good to see the professorship that carries Harold's name in the hands of so distinguished an academician.

This is my first experience as a discussant at an academic conference, so I have chosen to approach this assignment in a manner similar to that of a concurring partner on an audit, something with which I am familiar. As a result, however, my remarks focus more on the problems I had with the paper and the case study rather than on the good things accomplished and presented by the researchers in the paper. Actually, I really want to talk about only a few things related to this case study and paper. I want to discuss some possible causes of the results as well as the conclusions of the research.

Designing a case study to deal with as complex a matter as an inventory audit is a difficult task and Drs. Wright and Mock have done an excellent job. Nonetheless, the information is not, and probably could not be, complete. Accordingly, the auditor must answer a number of questions on his or her own, and these questions are not unimportant.

For example, why does a client with perpetual records and strong controls take a physical inventory every year? What has been the experience with the physical inventory? Are "book to physical" differences common or uncommon? How reliable are the perpetual records? How often are they reconciled to the financial records? Further, the case study does not address in detail how the physical inventory is to be compiled and priced, or provide the ability, except intuitively, to assess the risk of errors in compiling the inventory, errors in extension or footing, or the risk in incorrect prices being used. The auditor also needs to guess, in this case, how labor and overhead are applied to the inventory and whether the case includes auditing these components of the inventory.

As I said, the case study is excellent. If all the information were to be provided, the case would be unreadable. Nonetheless, when auditors need to make assumptions about the risks of certain types of errors (stated otherwise, about certain financial statement assertions), the auditors will, of course, differ and produce different audit approaches.

The Arthur Young audit decision support program, which has been in our practice for two years, contains numerous questions to help the auditor decide how to approach the determination of inventory quantities, from the purpose of the physical inventory to an assessment of risk of error in compiling, pricing and valuing the inventory. In fact, we approach a physical inventory as a "non-routine data process," our term for an activity that has many of the same attributes as a routine data processing activity, but that happens relatively infrequently. As a further complication, the audit program for inventory that is included in the case does not contain procedures that would appear to address the "net valuation" assertion.

Auditors would, in completing the case, have to either not approach that assertion or use one of the procedures provided to deal with the valuation assertion. The resultant audit programs could very well be very different.

I cannot resist talking about the 150 hour budget provided in the case for the audit. We CPAs in public practice are continually criticized for over-emphasizing budgets, and letting the budget dictate the procedures. Now I don't know whether the participants viewed 150 hours as a lot of, or a little, time to audit the inventories in the case study, but their view of the 150 hours would necessarily influence the procedures, and how the time is allocated. Would the allocation have been different if a fixed time budget had not been provided? I expect it would.

Of course, the lack of consensus in the procedures applied was predictable when considered with the inconsistent and inconclusive results of the pairwise comparisons of auditing procedures. Look at the difference between the views of the sufficiency of evidence provided by analytical procedures as opposed to observation and detailed tests! In one group, 82 percent believed that analytical review provided more sufficient evidence than detailed tests, while in the other group 80 percent believed detailed tests better met the sufficiency criterion. Now, how could something like that happen?

The fact is that all auditors solve planning problems and approach planning based on their education and their experience. Over the years, we pick up biases as a result of what we've been taught and our experience in other client situations. It's no secret that firms differ in their view of the usefulness of analytical review procedures. Some firms place great weight on the results of analytical review in deciding whether they have sufficient competent evidential matter, others will not. Of course, in almost every case the answer is situationally determined, depending on the risk of error and the results of the analytical review.

It is also interesting to note that there is no consensus of view between observation and detailed tests as to competence and sufficiency. This probably results from auditors' inability to check "it depends" on the account and the assertion; how somebody views this problem will also depend on the column in which one puts confirmation. However, I want to take the most issue with the authors' conclusion that the divergent allocation of audit hours among procedures is disturbing, since such widely varying audit plans suggest that engagements in practice may differ substantially in efficiency and/or effectiveness. While I agree that further refinement of a multi-attribute method such as Analytical Hierarchy Process may lead to greater consensus, I cannot agree that lack of consensus is necessarily bad.

In 1983, we at Arthur Young began the development of an expert system for audit planning as part of what has become known as AY/ASQ. The result is that AY/Decision Support has been in general use in our firm since 1986, and has been joined by a version tailored to the banking and thrift industries. In developing AY/DS, we had to address up front precisely what our objective would be. And while improved consistency was an objective, it was much less important than improved efficiency and better correlation of substantive procedures to the assessment of risk, especially control risk. Auditors need to feel free to develop an audit approach that they believe will be responsive to the needs of the particular audit engagement. We must recognize that engagement needs are driven not only by the characteristics of the account (or client) being audited, but by factors such as availability of evidence, reporting deadlines, and the people available to do the work.

For example, we might agree that application of analytical review procedures as substantive tests is enhanced if the person applying the procedures has more experience, in general, and more experience with the client and its industry, in particular. I submit that there is more than one audit approach in almost every situation that will produce an acceptable audit; that is, one that will reduce audit risk to an acceptable level, assuming, of course, that we could agree on that acceptable level of risk. So then, why worry if research confirms that different auditors would pick different approaches? After all, who cares which road the auditor takes, as long as the auditor arrives at his destination? It is also possible that there is more than one approach that is effective and is also efficient. In the case study, each auditor presumably believed that he or she had arrived at an effective audit approach that could be completed in 150 hours!

The Talmud states that there is more than one way to righteousness, and that each man must choose his own path. So it is for the auditor who sets out to do the best audit. He must choose his own path based on his knowledge, his experience, and the needs of the engagement. Of course, in the real world, his views will be subject to, and be tempered by, the review of others, generally with more experience. This review tends to have a leveling effect, bringing somewhat more consistency to audit plans.

This does not mean that audit planning is not a fertile ground for ongoing research. As the authors indicate, there is much that can be done in addressing how auditors relate procedures picked for one objective when considering approaches for other objectives. We can also consider further how auditors begin the planning process—the "jumping off point." In developing AY/Decision Support, we quickly learned that there were, for most accounts, certain procedures (for example, confirmation of receivables) that auditors almost always use, and often serve as the principal source of assurance for the data related assertions. When the auditor assesses control risk as low, and has tested controls accordingly, these principal procedures may be all the substantive procedures required for the data-related assertions.

This type of research can be invaluable not only in developing decision aids but also in helping train the auditors of tomorrow. We have much to learn about how audit judgments are made. Drs. Wright and Mock have moved this process ahead; their principal contribution, however, may be in giving us a way to go still further.

7

The Relative Importance of Auditing to the Accounting Profession: Is Auditing a Profit Center?

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Michael D. Doll
Price Waterhouse

This paper deals with certain aggregated financial, statistical, and other information relating to the US operations of the Big Eight firms—Arthur Andersen & Co., Arthur Young & Co., Coopers & Lybrand, Deloitte Haskins + Sells, Ernst & Whinney, Peat Marwick Main & Co., Price Waterhouse, and Touche Ross & Co.—primarily their accounting and auditing components. The Big Eight segment of the accounting profession was chosen because of its dominance in auditing publicly-held companies and because information concerning these firms was the most readily available.

Introduction

If you were to read the myriad of articles which have recently appeared in business publications and professional accounting and auditing journals, you might be led to believe that the outlook for the future and profitability of the auditing profession is rather dim. For example:

- The standard audit report is often viewed as a commodity. There are those who believe that there are few means to distinguish between auditing firms except on the basis of price.
- So-called competitive pricing for audit engagements is often punctuated by underbidding, or "low-balling." The perception is that an accounting firm "buys" the audit of a company in an attempt to obtain lucrative tax and management consulting work.
- Merger/acquisition activity has reduced the number of major publicly-traded companies. The recurring audit of these giant companies had been considered by many to be the "bread and butter" of the Big Eight firms.
- Firms in financial services and other commercial activities, often paying higher salaries, increasingly seem to attract the more capable undergraduate and MBA students who might otherwise choose auditing as a career. Many of these students view the work done by staff accountants (at least in their first several years) as repetitive and uninteresting. These prospective auditors do not relish the thought of sitting for a difficult examination after graduation in order to obtain a license as a CPA. At the same time, they perceive the work done in the arenas of finance and investment banking as both challenging and rewarding (mentally and financially).

- The supply of students who do choose accounting and auditing seems to be dwindling. From 1984 to 1986 (the most recent year for which we have information), the supply of accounting graduates from four major universities (which have traditionally been important recruiting sources for our firm and which are widely recognized for having outstanding accounting programs) declined, on average, fourteen percent.
- As shown in Table 1, accounting and auditing (A&A) revenue as a percentage of total revenue has been declining for the past five years for the Big Eight firms. This is a continuation of a trend that has been occurring for at least the past decade. On a percentage basis, average annual revenue growth for the Big Eight firms over the last several years has increased in tax and management consulting services (MCS) at significantly higher rates than in accounting and auditing (Table 2).
- Some observers argue that A&A is no longer the major profit center for the Big Eight (or at least will no longer be in the near future) and that tax and, especially, MCS have become the major profit centers. Others have gone so far as to predict that some of the Big Eight firms will eventually get out of the auditing market altogether, concentrating instead (they claim) on the more profitable tax and management consulting segments of the profession.

Despite the impact of these and other challenging issues, we believe auditing remains a significant, robust segment of the accounting profession. This paper discusses some recent statistics concerning auditing and gives our views on its future.

Problems/Issues Affecting the Relative Importance of Auditing

This section provides background data and additional information on several of the problems/issues affecting the relative importance of auditing to the accounting profession which were raised in the introduction.

Table 1

Average Fee Distribution* for the Big Eight Firms: 1983-1987

Activity	1983 (%)	1984 (%)	1985 (%)	1986 (%)	1987 (%)
Accounting & Auditing	63	62	59	58	56
Tax	22	22	23	23	24
Management Consulting Services	15	16	18	19	20

* Data were derived from Annual Reports to the SEC Practice Section of the AICPA Division for CPA Firms

Table 2

Average Percentage Increase in Revenue for the Big Eight Firms: 1983-1987

(Except for inflation rate, data were derived from the International Accounting Bulletin (IAB) and the Public Accounting Report (PAR)).

Activity	1983 (%)	1984 (%)	1985 (%)	1986 (%)	1987 (%)
Accounting & Auditing	8.8	9.0	8.8	10.6	13.9
Tax	15.2	13.6	13.3	12.3	21.5
Management Consulting Services	12.9	21.2	23.7	19.8	23.9
Total	10.8	12.0	12.5	12.8	17.6
Inflation Rate*	3.8	3.9	3.8	1.1	4.4

* Inflation rate is the Consumer Price Index, All Urban Consumers (Source: US Bureau of Labor Statistics)

Repeal of Ban on Solicitation and Advertising

In the late 1970s, under threat of anti-trust action from the Justice Department and the Federal Trade Commission, the AICPA eliminated, from its Code of Ethics the prohibitions against competitive fee bidding, solicitation of clients, advertising, and promotion of specialities. This effectively deregulated the accounting profession and led to increased competition among all accounting firms (especially the Big Eight).

The competition for audit clients in the US market has increased significantly since the ban was lifted, particularly so in the past five years. The market is now characterized by pervasive use of public relations and advertising. Each of the Big Eight firms has adopted advertising campaigns, many of which feature "tag lines" aimed at capturing the public's attention and increasing awareness of the sponsoring firm, both generally and in specific industries and services. For example, while Arthur Young & Company explains that "We take business personally" and Ernst & Whinney boasts "Ernst & Whinney . . . and results. They go together," our firm, Price Waterhouse, proclaims "Expect more from us." Some of the advertisements are audit-related in a broad sense, but many are aimed at special industries (e.g., health care, insurance, law firms, manufacturing) or special services (e.g., financial planning, budgeting, tax planning). For example, Deloitte Haskins + Sells features the slogan "The Competitive Edge in Health Care" in their advertisements to that industry.

Who is the target of all this marketing effort? Not surprisingly, to a significant degree there is vigorous pursuit of largely the same target markets in which many Big Eight firms see the greatest opportunity for profitable practice growth and development—in addition to those industries previously mentioned, in high technology, smaller businesses in high growth industries, and financial services.

A significant amount of direct solicitation of existing clients now occurs in

the form of telephone, direct mail campaigns, free seminars, and call programs. Software products, free consulting time, training aids, lower fees for current services—you name it—all are being offered by various Big Eight firms, sometimes with, but sometimes without, specific knowledge of the company's business operations and its possible needs.

The changes which have occurred in the auditing profession as a result of lifting the AICPA prohibitions against advertising and solicitation have forever altered the way public accounting is practiced in the US. One of the most significant changes—so-called "competitive pricing"—is discussed below.

"Competitive Pricing" of Audit Services

The U.S. market is characterized by deep discounting of fees—particularly for audit services. A recent article in *The Wall Street Journal* [Berton, 1985] contained the following introduction: "Attention, Corporate Treasurers: Think your outside audit is too expensive? Now may be a good time to get a bargain." The article went on to recite numerous examples of companies which had reduced their audit fees through competitive proposals. Discounts to existing clients, "low-balling" fees to gain new clients (in some instances with fees at less than 50% of standard billing rates), fixed fees covering three to five years, free work and the like are examples of the intensity of the competition which currently exists among the Big Eight firms in the US.

Some believe an accounting firm may have many justifications for bidding below standard billing rates to engage a client. An initial low bid may be justified on the grounds that a new client should not be charged for the high start-up costs that occur as the accounting team learns about the new client company and its industry. In addition, the marginal cost of serving a client during the off-season is very low and may justify a lower-than-normal bid. Other reasons for a significantly low bid may be the desire to gain industry experience, to attract a prestigious client that would be a good source of referrals, or to market other services such as tax planning or consulting [Dykes and Hermanson, 1985].

The economic decline experienced by the US economy in the late 1970s and early 1980s forced companies to critically review all discretionary and non-discretionary expenditures in their efforts to sustain financial well-being and ensure cost-effectiveness. Fees for professional services became a target for negotiation. Many companies began requesting multiple bids for their outside audits in an effort to cut costs. Accounting firms hoping to secure new work were increasingly willing to discount their fees; the incumbent firm often found it necessary to lower its fee to remain competitive. Once the "waters were tested," so to speak, and many companies found that fee concessions could be gained, the era of uncontested fees for quality services—if it ever really existed—was gone. The disconcerting element introduced, however, was that even where superior services were rendered at a fair price, companies were aware that services similar in name could most likely be obtained elsewhere at a lower price—the idea of the audit as a commodity.

The view that the audit is a commodity was institutionalized with the publication of the Cohen Commission Report in 1978. It stated (in part) that (Commission on Auditors' Responsibilities, 1978, p. 111) "When a product or service offered by different suppliers differs significantly to the user, or appears to differ significantly, it is easier for one of its producers to maintain a higher,

noncompetitive price. Public accounting firms go to considerable length to develop superior services for their clients, but there is little effective product differentiation from the viewpoint of the present buyer of the service, that is the management of the corporation." Thus, if a prospective client views professional accounting services—such as an audit opinion—primarily as a commodity, it will generally attempt to obtain the commodity at the lowest possible price.

Many executives view the Big Eight firms as essentially identical. Their view appears to spring from observable similarities among the Big Eight: depth of personnel sufficient for all practical purposes; domestic and foreign offices blanketing the globe; claims of special industry expertise tailored to the company's interests; availability of a full range of services in accounting, tax and management consulting; and auditing approaches said to promote optimum efficiency and effectiveness. All of the firms must comply with auditing standards set by the American Institute of Certified Public Accounts (AICPA), financial reporting standards set by the Financial Accounting Standards Board and regulations of the Securities and Exchange Commission (SEC). As members of the SEC Practice Section of the AICPA Division for CPA firms, each of the Big Eight firms must undergo triennial peer reviews and comply with numerous other requirements designed to promote high-quality practices. Therefore, the argument goes, a "clean" opinion expressed by any of the Big Eight would be acceptable. Using this reasoning, the "best" opinion is the one that costs the least. Many observers within the profession, and among our clientele, note that the basic attest function—the audit—is currently being bought and sold like a commodity, with price being the dominant factor.

Severe price competition has caused the audit function to become less profitable for the Big Eight firms, other things being equal. Bids below cost to attract new business have become fairly common. The audit is seen by some primarily as a "foot in the door" or "loss leader" to sell other services.

Auditor Changes Related to Fees

As reported in the *Public Accounting Report,* one of several publications which keeps track of changes in independent accountants of publicly-traded companies, there were 194 public companies that changed auditors in 1978. Over 700 publicly-traded companies changed auditors in 1987, a nearly 400% increase in the decade. Table 3 presents a summary of publicly-traded companies with auditor changes for each of the five years in the period from 1983 through 1987 and provides the most often cited reasons for the change.[1]

As can be seen from Table 3, the most often cited factor for the increase in auditor changes over the past three years—when nearly two thousand publicly-traded companies changed independent accountants—was fees. The next most often cited factor was service.

[1] The statistics for publicly-traded companies with auditor-changes presented in Table 3 should be viewed with "a grain of salt." Each company changing auditors is presented in Table 3 as an equal unit, no matter what the level of audit fees. Obviously, the loss of a single Fortune 500 client with $500,000-plus audit fee is of much greater concern than the loss of several clients each with an audit fee of $10,000.

Table 3

Number of Publicly-Traded Companies with Auditor Changes: 1983-1987

	Year				
	1983	1984	1985	1986	1987
Number of publicly-traded companies with auditor changes	480	523	542	737	719
Percentage of companies citing following reasons for change:					
Fees	36%	32%	33%	35%	29%
Service	24%	38%	37%	26%	15%

Note: Source of data is the Public Accounting Report (PAR).

Sharing of Fee Knowledge Among Multiple Parties

Over the last fifteen years or so, the contributions and responsibilities of audit committees have attracted an ever-increasing amount of attention. Audit committees typically are composed of outside directors. One of the committee's responsibilities is the selection of auditors for the company. (The actual selection generally is proposed by management, with the audit committee and the board of directors confirming management's selection. In many instances, the selection is ratified by the shareholders during the proxy process.) Many outside directors serve on multiple boards of directors and audit committees as well as on the board of directors of their own company. Thus, a three- or four-member audit committee may collectively have "fee knowledge" relating to the audits of many other companies. The sharing of this knowledge has frequently increased audit fee pressures on the Big Eight.

Sophistication of the Audit User Base

The audit user base has become much more sophisticated. Due to (i) increased public awareness of the accounting profession through the media, (ii) the large number of alumni of Big Eight firms employed by commercial enterprises, (iii) information obtained through service on audit committees, boards of directors and a variety of other sources, and (iv) the greater use of in-house personnel and internal auditors, the potential users of audit services have become far more sophisticated and discriminating in understanding what audit services are, how they are priced, and how they are performed. Although this can work in favor of the accounting profession, it has nevertheless contributed to opening up the audit market to competitive forces.

Maturing Demand for Audit Services

Another significant factor in the competitive evolution has been an indicated

reduction in the client population base itself. The last five years have seen a tremendous upsurge in the number of mergers and acquisitions (M&A) among U.S. companies, many of them occurring in the Fortune 1000 market, considered one of the primary markets for services among the Big Eight and other major accounting firms. This rash of mergers spurred additional audit fee competition as new parent companies dropped the auditor of one of the merged concerns (or decided to seek competitive bids from additional accounting firms). Following the merger of two large concerns (or the acquisition of one by another), the combined audit effort for future examinations is generally significantly less than is required to issue separate reports on the individual pre-merged companies. Accordingly, the fee for the post-merged company is generally much less than the combined pre-merger fees.

M&A activity slowed for a while after the October 1987 stock market crash but seems to be reviving rapidly. Many are predicting a continuation of this trend. The upshot of this activity is that the Big Eight, with basically similar strategic goals of growth and profitability, may be pursuing a shrinking base of potential service users. Hence, the initiation of vigorous efforts to seek and attain competitive advantage.

Is Auditing a Profit Center?

Up to this point, the paper has discussed certain problems and issues affecting the relative importance of auditing to the accounting profession. This section turns to the question of whether or not auditing is a profit center.

Statistics Available for Analysis

The easiest way to determine if auditing is a profit center for the Big Eight firms would be to have access to each of the firms' financial statements by discipline (i.e., accounting and auditing, tax, and management consulting services) for the past five or six years. Obviously, we have the Price Waterhouse financial statements for each of these years and are pleased to report that auditing has been, and remains, a major profit center for us. However, current and historical information on the profitability of the US operations of the remaining firms in the Big Eight (in the aggregate or by discipline) is not readily available.

The following information is either disclosed annually by each of the Big Eight firms or can be derived from other sources: total revenue, total number of partners/principals, total number of professional staff, revenue by discipline (accounting and auditing, tax, management consulting), number of partners/principals by discipline, and number of professional staff by discipline. This information has been used to prepare Tables 2, 4, 5 and 6.

Tables 4, 5, and 6 present selected average revenue data for the Big Eight firms as a group.[2] As might be expected, there were variances by discipline,

[2] The sources for the 1987 revenue amounts were the *International Accounting Bulletin* (IAB) and the *Public Accounting Report* (PAR). The revenue of Peat Marwick Main & Co. (resulting from the merger of Peat, Marwick, Mitchell & Co. and KMG Main Hurdman) is included in 1987. Revenue for 1983-86 includes only that of Peat, Marwick, Mitchell & Co. The source for 1985 and 1986 revenue amounts was PAR. Revenue data for previous years was taken from the respective Big

sometimes significant, among the various firms. However, the purpose of this paper is not to discuss the relative importance or profitability of auditing to any particular firm of the Big Eight, but to the Big Eight firms as a group.

Use of Revenue per Partner or Revenue per Professional Staff as Estimators of Profitability

For purposes of this paper, we have used "revenue per partner" and "revenue per professional staff" as estimators of profitability to examine the premise of whether or not auditing is a profit center. We acknowledge that these are somewhat inexact predictors of profitability but, in our view, these are reasonable approximations of profitability. We believe it is not unrealistic to use them as estimators of profitability since personnel costs represent the largest cost factor for accounting firms. We have assumed that, in general, personnel costs do not vary significantly by discipline for similar experience levels. (If anything, salary levels for A&A may have been somewhat less than those for tax and MCS thereby resulting in a more conservative estimate of audit profitability.)

Other important factors which impact the level of profitability of the Big Eight firms include billing rate realization, staff utilization, leverage (i.e., effect of the staffing pyramid), expense control, and speed of accounts receivable collection. Intuitively, we believe the effect of these factors varies among the Big Eight firms. This paper does not attempt to quantify the impact of these factors on Big Eight profitability.

Obviously, we have assumed that each of the Big Eight firms has, in fact, been profitable during the past five years. Based upon anecdotal evidence, and our own knowledge, this seems to be a reasonable supposition.

Table 4 illustrates the average revenue per partner for the Big Eight firms for each of the five years in the period from 1983 through 1987, in total and by discipline. The increase in average A&A revenue per A&A partner was very impressive over the five-year period—an increase of $253,000 per partner, or 38%. While not as great as the $337,000 (or 44%) increase in average MCS revenue per MCS partner over the same period, it did exceed the $241,000 (or 37%) growth in average tax revenue per tax partner.

Table 5 illustrates the average revenue per professional staff for the Big Eight firms for each of the five years in the period from 1983 through 1987, in total and by discipline. The comparative growth statistics for average revenue

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Eight firms' Dingell Subcommittee submissions when so disclosed, or prior estimates published by PAR as an alternative. (We have found the IAB/PAR revenue "estimates" to be uncannily accurate, for Price Waterhouse at least, leading us to believe that sources from inside the Big Eight firms supply the information to IAB/PAR.) Revenue by discipline was (1) obtained from Dingell Subcommittee filings or (2) derived by applying revenue composition percentages— reported in annual information summaries filed with the AICPA—to the total revenue amounts. The sources for the total professional staff counts, including partners, were (1) each Big Eight firm's annual information filing with the AICPA and (2) an informal staff count data base maintained on each of the other Big Eight firms by Price Waterhouse. The AICPA controls provided the control totals; personnel statistics by discipline for all years were calculated using relative staff composition percentages resident in the Price Waterhouse data base. We acknowledge that the data produced by this process is somewhat "soft" since our data base information is probably not completely accurate; however, we have no reason to believe that the information is biased in any particular way.

Table 4

Average Revenue Per Partner for the Big Eight Firms: 1983-1987
(Dollars in Thousands)

Activity	Year				
	1983	1984	1985	1986	1987
Accounting & Auditing	$663	$702	$750	$ 842	$ 916
Tax	648	711	763	821	889
Management Consulting Services	768	867	980	1009	1105
Total	670	722	781	863	942

Note: Sources of the data are the *International Accounting Bulletin* (IAB) and the *Public Accounting Report* (PAR).

Table 5

Average Revenue Per Professional Staff for the Big Eight Firms: 1983-1987
(Dollars in Thousands)

Activity	Year				
	1983	1984	1985	1986	1987
Accounting & Auditing	$74	$78	$80	$ 86	$ 91
Tax	88	93	92	94	103
Management Consulting Services	83	90	96	101	105
Total	78	82	84	90	97

Note: Sources of the data are the *International Accounting Bulletin* (IAB) and the *Public Accounting Report* (PAR).

per professional staff are very similar to those for average revenue per partner. Average A&A revenue per A&A professional staff increased by $17,000 (or 23%) over the five-year period. It exceeded the $15,000 (or 17%) increase in average tax revenue per tax professional staff but was less than the $22,000 (or 27%) increase in average MCS revenue per MCS professional staff.

Although average A&A revenue per A&A partner and average A&A revenue per A&A professional staff are both below average total revenue per partner and average total revenue per professional staff in each of the five years, neither is significantly so (less than 4% for average A&A revenue per A&A partner and less than 7% for average A&A revenue per A&A professional staff in any of the years shown). This indicates that while, on average, auditing may not be the *most* profitable service offered by the Big Eight firms, it

does generate significant revenue per partner and per professional staff. The charge that the audit is a loss leader, while possibly true in isolated instances, is clearly not true in the aggregate.

Increases in Audit Revenue

As noted earlier in this paper, the annual percentage growth for A&A revenue has been less than the percentage growth for tax, MCS, and total revenue for the Big Eight firms. It should be noted, however, that aggregate A&A revenue for the Big Eight firms has posted annual increases in absolute dollars and, as shown in Table 2, in percentage increases which are significantly greater than the corresponding rates of inflation.

Table 6 shows the average dollar increase in revenue for the Big Eight firms for each of the five years in the period from 1983 through 1987, in total and by discipline. We acknowledge that the dollar and percentage increases outside A&A have been impressive, particularly for MCS. But we also believe it is important to point out that A&A has posted significantly higher dollar increases in each of the five years than has either tax or MCS. Percentage increases for tax and MCS are more impressive partly because they are developed from a smaller revenue base than A&A. Further, there was a $25 million "spread" between the 1987 audit and MCS revenue increases. In the preceding four years, the average spread was $14 million. There was also a $24 million spread between audit and tax revenue increases. In the preceding four years, the average spread was $17 million.

One of the most significant aspects of the importance of auditing to the accounting profession that cannot be measured in terms of dollars and cents is that it allows Big Eight partners and managers direct access to the most important executives in corporate America. Proper execution of a difficult assignment provides the opportunity to impress those persons who ultimately make the decisions concerning the appointment of consultants for a multitude of other engagements. Notwithstanding arguments to the contrary, the fact

Table 6

Average Dollar Increase in Revenue for the Big Eight Firms: 1983-1987

(Dollars in Millions)

Activity	Year				
	1983	1984	1985	1986	1987
Accounting & Auditing	$29	$33	$35	$46	$ 66
Tax	18	18	20	21	42
Management Consulting Services	11	21	27	29	41
Total	58	72	82	96	149

Note: Sources of the data are the *International Accounting Bulletin* (IAB) and the *Public Accounting Report* (PAR).

that a Big Eight firm has performed in a quality manner on an audit engagement is often the most important reason the same Big Eight firm has been engaged to perform tax work and management consulting services. The cross-selling of additional services to existing clients is a primary source of new work for the Big Eight firms. The audit of a company can almost always be used as a "foot in the door," but we believe that foot-in-the-door tactics alone simply will not work over the long pull. Promises must be followed by delivery of constructive services—services perceived as solid values for the price paid.

The Audit as a Commodity—a Rebuttal

Some executives seem to regard auditing services as a commodity because the end result—the audit report—is tangible and straightforward. We believe this is akin to viewing the outcome of a jury trial—that is, a guilty or not-guilty verdict—in a similar fashion. From our perspective, neither the report of independent accountants nor the verdict of a jury is a commodity. Both are products of processes that are dependent upon *people.*

In response to the Cohen Report [1978, p. 111] claim that there is "little effective product differentiation from the viewpoint of . . . management of the corporation," we believe that it is the men and women representing the various Big Eight firms that provide audit product differentiation. The primary resources of the Big Eight are its people. Once the buyer of a service has made a selection, the spotlight shifts away from a firm with its litany of credentials to a handful of individuals with the levels of expertise and experience needed to get the job done in accordance with the promised specifications. It is individuals who deliver services, and whose actions either preserve and improve upon a firm's reputation, or damage it.

For example, one of the first and most critical success factors to an audit engagement is understanding the business and its related inherent risks. This understanding is the basis for all subsequent audit work. Obtaining this understanding is not a mechanical exercise. It is highly dependent upon people—not only the audit staff assigned to the engagement, but the client personnel as well. It is through discussions and interaction with client personnel, from the CEO on down, that the audit team gains the necessary understanding. The effectiveness and efficiency of this process, both from the auditor's and client's perspective, is dependent on the quality and expertise of the audit team members.

Is There A Shrinking Audit Market for the Big Eight?

We previously noted that merger and acquisition activity has reduced the number of *major* publicly-traded companies. In direct contrast, the large number of initial public offerings (IPOs) in recent years has provided major audit practice growth opportunities for the Big Eight firms. Weissburg, editor of *Going Public: IPO Reporter,* has reported (in a private communication) that the number of IPOs[3] (firm commitments) has ranged from a low of 354 in 1984 to a high of 719 in 1986.

[3] This information needs to be viewed in the same light as that contained in Table 3. Each initial public offering, no matter how large or small, is viewed as an equal unit. Obviously, a larger initial public offering implies a larger company and larger recurring audit fees.

The Securities Act of 1933 requires that registration statements (including those for initial public offerings) contain audited financial statements. Many filings under the Securities Exchange Act of 1934 (e.g., annual reports on Form 10-K) must also include audited financial statements. The importance of these requirements to the Big Eight firms cannot be over-emphasized. Public accountants have a monopoly on this work; the Acts specify that the financial statements be "certified by independent public accountants," without mention of the size of the auditing firm to do the work. However, it has been our experience that many underwriting firms encourage (often insist) that their clients engage one of the Big Eight firms to examine the financial statements included in registration statements even though the company going public may have had a satisfactory relationship with a non-Big Eight accounting firm until that time. The capital markets of the world rely on financial statements which have been certified by independent accountants. These markets also recognize the integrity and independence of the Big Eight firms.

Because of potential liability under the 1933 Act, audit examinations performed in connection with an initial public offering are generally considered to be more than a low level of risk. Accordingly, this type of work is normally performed at standard billing rates; these engagements tend to be very profitable for the Big Eight firms. Also, certain accounting and auditing fees associated with an IPO are generally considered part of the cost of issuance and distribution of the securities (along with legal fees and expenses, printing, etc.) and are deducted from the proceeds of the offering. Because of this factor, this type of work tends not to be as fee sensitive as a recurring audit.

An aspect of M&A activity which has not yet been discussed in this paper is that mergers, acquisitions, restructurings and leveraged buy-outs (LBOs) very often spawn additional accounting and auditing work for the Big Eight firms. As business units are spun-off or sold to partially repay debt incurred as a result of the merger/acquisition/restructuring/LBO, Big Eight firms are often engaged to assist in "carve out" work, opine on historical financial statements of former divisions or subsidiaries, etc. Following the transaction, many of these spun-off or sold units retain the Big Eight firm to perform their annual financial statement examination.

Although no empirical data are currently available to us, we believe the combination of the effects of the IPO market and the positive impact of M&A activity have provided significant A&A fees for the Big Eight firms during the 1983-1987 period. The significant dollar increases in average A&A revenue per A&A partner and average dollar increase in A&A revenue for this period would also seem to dispel the notion that there is a shrinking A&A market for the Big Eight firms.

Improving the Attractiveness of Auditing as a Career

In part because of the concerns of current and potential auditing students which were noted earlier in this paper, Price Waterhouse made a commitment last year to improve the attractiveness of auditing as a career path, both in fact and in perception. We made this commitment to enable us to better compete in the broad marketplace for the best college graduates. The obvious first step—and, by comparison, the simplest one—was increasing the compensation for all professional staff, current and prospective, to a level comparable to other

leading professional service firms and organizations seeking accounting and finance-trained graduates.

Raising compensation levels was a giant step for Price Waterhouse (as it would be for any of the other Big Eight firms). However, it was merely "catch up" when we compared ourselves to other alternatives open to graduates and as we realized how public accounting had not kept pace with contemporary pay scales. We believe it represented a fundamental first step in the right direction. It was costly, but the alternative—being non-competitive for quality people—was, in our view, not an option.

The task of defining and executing the next steps to raise the attractiveness of auditing as a career pursuit requires redoubling efforts in several areas. Some specific ones include:

- Providing information to high school guidance counselors about the nature and attractiveness of the accounting profession. As a practical matter, the profession does not have a vehicle such as *LA Law* or *St. Elsewhere* to provide the image of accountants and auditors as positive role models;
- Re-emphasizing to college administrators the importance of having talented A&A instructors at the university level to college administrators. In our view, academicians need to do a better job of attracting quality students to their A&A programs. The strong emphasis on research at some universities seems to have reduced the emphasis on teaching. We believe it is important that experienced instructors who are dynamic in the classroom teach at least some sections of "Principles of Accounting" as well as upper division electives;
- Fostering professional independence sooner in one's career;
- Providing early recognition to the best performers; and
- Loosening the lock step advancement policies evident in the Big Eight firms.

In addition, client expectations and today's business environment call for professionals who can be more than strict specialists or deep technical experts. Superior accounting and auditing skills alone are clearly insufficient. The situation calls for those who can acquire and apply a broader view of the world around them. These individuals must possess the ability to adapt, to grow, and to develop new skills over the span of their careers.

These are lofty goals which are somewhat long-term in nature. Three areas which we believe will improve the attractiveness of auditing as a career path over the short-term are (1) an emphasis on a risk-driven audit approach, which emphasizes understanding the business, risk assessment, and selection of responsive audit procedures; (2) the positive impact of technology on the audit process, and (3) increased use of audit professional assistants (i.e., paraprofessionals).

As previously stated, the first and most critical success factor to an audit engagement is understanding the business and its related risks. This represents a judgment-based approach proceeding "top-down" which directs the audit effort to the most challenging and risky areas. This is in contrast to the more traditional and mechanical "bottom-up" detailed approach. We believe the top-down approach is far more attractive to young professionals.

The effects of technology on the audit process should increase its

attractiveness as a career pursuit. The effects are multiple and varied—just to name a few:

(1) microcomputers play an increasingly important part in the Big Eight audit practice. They have the ability to replace many manual and tedious computations;
(2) expert systems are being developed that will help to audit smarter and faster. Expert systems will also result in greater emphasis being placed on the auditor's analytical skills—the profession will need people who can interpret, analyze and intelligently question the output from such systems; and
(3) micro-mainframe links have the potential to significantly enhance audit efficiency in retrieving and analyzing client data. Again, auditors will be able to spend more time putting their analytical skills to work.

Professional assistants (PAs) perform various low-risk audit tasks as well as certain administrative functions. The audit tasks performed by PAs are those which require minimal or no knowledge of accounting and auditing theory and practice, and do not require the exercise of audit judgment. The tasks are objective in nature, requiring the PA to perform specific procedures which have specific results. Of course, to the extent PAs assist in the conduct of an audit, their use and work must comply with generally accepted auditing standards. The tasks typically performed by PAs have been performed by staff accountants in the past and were among those tasks viewed by prospective auditors as the most repetitive and uninteresting. Assignment of such tasks to PAs frees staff accountants for more challenging work.

The Effects of Competitive Pricing on the Big Eight

Recent articles in the accounting and auditing journals infer that severe price competition, characterized by "low-balling," may be coming to an end. We certainly hope so, but retain our professional skepticism.

To a great extent, we view competition as a healthy development—a challenge to be met. It wakes us up and strips away any aura of complacency that inhibits progress. Competition forces us to examine critically the market for our services and to ensure that services offered are fully in tune with market needs. Responding to real-world needs is what professional services are all about. In terms of delivery of services, we believe the most important aspect—and, unfortunately, the most difficult to manage and guarantee—is providing the highest quality people for each and every engagement.

Whether the audit is perceived as a commodity, or is identified as a highly differentiated service, will depend on the skill of the Big Eight firm in making explicit the benefits derived by the client from the engagement. While attention to style of work, commitments to the task, and similar qualities can, of course, differentiate an otherwise standard service, the breakthrough in perception requires something more.

What is required is establishing clearly how the audit contributes to the discipline of the total financial information system of the client. The proposals contained in our 1985 white paper, *Challenge and Opportunity for the Accounting Profession: Strengthening the Public's Confidence,* suggest the need to broaden the focus of the audit. For example, it is suggested that the auditor

accept the responsibility to search for management fraud that might be material to the financial statements. In meeting this objective, expanding auditing standards are identified, including:

> Review and evaluate the system of management controls, including conducting an audit process to more adequately address the company's financial condition as well as its financial position. Such review and evaluation would be made without regard to the question of whether or not the auditor intends to rely on the system in developing audit tests. [Price Waterhouse, 1985, p. 19]

The point of this example is not to make a judgment about the proposal, but merely to illustrate a recommendation that is identifying a more sharply defined contribution that an audit might make to a client's overall effectiveness.

The integrity of the financial information system in any large organization is of critical importance to those who make company policy. No wise chief executive fails to appreciate what external auditors can contribute to the company. A wise chief executive officer is not going to opt for the cheapest, and possibly abbreviated, audit. Too much is at stake [Oliverio, 1986].

Peter Scanlon, chairman of Coopers & Lybrand, summed it up this way: "CPA firms that do audit work for low fees cannot sustain quality work. If a company only wants to pay peanuts, it may get monkeys looking at its business instead of thoughtful professionals." [Berton, 1985, p. 33]

Conclusion

The auditing segment of the Big Eight firms faces many challenges in the future, especially from the effects of competitive pricing. Despite these challenges, we believe that auditing continues to be a viable, desirable, and necessary business activity. Audits of publicly-held companies (and of those about to go public) are one of the keys to the confidence that investors place in the capital markets, both here in the US and internationally. Audits are a primary means of deterring fraudulent financial reporting. Auditing may or may not be the most profitable segment for the Big Eight firms but certainly generates significant revenue per partner and per professional staff. The A&A research and development work being done by the Big Eight firms (in areas such as microcomputers and audit methodologies) indicates that they believe auditing is a vibrant activity with a profitable future. Such investments would not be made in a declining business or "cash cow." We believe auditing remains a rewarding and challenging career path for those individuals choosing to pursue it.

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Discussant's Response to "The Relative Importance of Auditing to the Accounting Profession: Is Auditing a Profit Center?"

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> Oh, we still have a few national institutions of trust left . . . Lawrence Welk, Walter Cronkite, Roy Rogers, penicillin, Mary Tyler Moore, Price Waterhouse, and hot chicken soup. But everything is under scrutiny, including our own existence.[1]

The Walker and Doll paper discusses forces behind, and consequences of, increased competition in the audit services market, using the question—"Is auditing a profit center?" Some might find this question inappropriate, because it appears to undermine the profession's reason for existence. Others might find it curious to question the viability of a service over which the profession has a virtual monopoly. However, I found the question both interesting and useful, even before recent events made it timely.[2] In my opinion, scrutinizing the role of auditing in the Big Eight's scheme of services can enhance our understanding of the market.

My comments focus on two major areas. First, I comment on what appears missing or only implied in this discussion of competition, specifically some benefits of competition. Here, recognize that I am biased. I view competition as generally a good thing. Of course, this view comes easily since I am removed from the upheavals and uncertainties of life in the trenches. I sympathize with individuals facing difficulties imposed by competitive forces. And, I am curious to understand these forces. But I lack empathy towards laments for "the good old days of auditing"—days of excess demand and fundamental impediments to competition. My comments on the benefits of competition reflect these biases.

Second, my comments focus on issues raised by Walker and Doll relating to quality and pricing of audit services. The profession debates whether auditing is a commodity. Extant empirical research encompasses a similar question—"Are audit services homogeneous or differentiated?" My comments on quality and pricing of audit services reference insights from portions of this research.

Benefits of Competition

Increased efficiencies represent a major benefit of competition. Walker and Doll mention improvements in audit efficiencies, primarily through use of

[1] Bombeck, E., "Will America Regain Its Trust?" *Newsweek* (November 19, 1979), p. 138
[2] Berton, L., "Andersen Chief of Consulting Relieved of Role," *The Wall Street Journal* (May 19, 1988), p. 2

technology. However, their discussion of efficiencies occurs in the context of developments strengthening the career attractiveness of accounting and auditing. The discussion completely ignores any client benefits, including audit fee reductions, from increased efficiencies in auditing. Although Walker and Doll bemoan pressures to reduce fees, such pressures entail positive signs. To some extent, fee pressures reflect current efficiencies and promote future ones.

Regrettably, Walker and Doll (like others outside Big Eight firms) found cost and profit data unavailable for assessing the viability of auditing. Instead, the authors use revenue data. Rather than debate the merits of these data, let me address several issues not in the paper. First, casual evidence suggests that partner reductions in some Big Eight firms during 1983-1987 contributed to growth statistics when using an average revenue per partner measure (Table 4 in Walker and Doll paper). Such partner reductions reflect attempts to enhance efficiencies in audit practices because of competitive pressures (see PAR, April 1985).

Second, in discussing audit revenue growth, Walker and Doll identify segments of the market with expanding demand, particularly initial public offerings (IPO's). I realize that the paper focuses on Big Eight firms. Nonetheless, from a competitive standpoint, non-Big Eight firms comprise a significant portion of the IPO market. For example, based on data from approximately 3,600 IPO's, non-Big Eight firms had about 40% of the market throughout the period 1970-1985 [Palmrose, 1987]. In addition, both the type of underwriter and the terms of offerings seem to influence the choice of auditor [Simunic and Stein, 1987].

In addition to increased efficiencies, the availability of information on audit services and fees represents another benefit from changes in the competitive environment. Walker and Doll express some regret that audit committees not only have, but actually use this information. Frankly, I am encouraged that audit committees exercise their oversight responsibilities.

In summary, increased efficiencies and information, both beneficial to clients, represent consequences of competition in the audit services market. However, a fundamental concern regarding any adverse impact on audit quality as a by-product of increased competition remains. This leads to my second area of comments.

Quality and Pricing of Audit Services

Empirical research supports the existence of quality-differentiated audit services in the market as a whole. The evidence suggests not only that quality differences exist but also that higher quality services translate into higher audit fees [Francis and Simon, 1987; Palmrose 1986a].

However, evidence becomes problematic when comparing among Big Eight firms. Studies have found that market participants perceive differences among the Big Eight [Arnett and Danos, 1979; Shockley and Holt, 1983; Simunic and Stein, 1987]. Yet, evidence remains weak when using revealed behavior of market participants via measures including audit fees and auditor litigation. For example, I tested for pricing differentials among Big Eight firms with industry specializations and failed to detect any significant audit fee differences between

industry specialists and non-specialists [see Palmrose, 1986a][3]. Other studies identify one Big Eight firm [Simunic, 1980], or several Big Eight firms [Balachandran and Simon, 1988], with significantly different audit fees, although this evidence should be viewed as preliminary. Likewise, examination of litigation activities among Big Eight firms reveals some significant differences. However, results appear sensitive to the measure of litigation activities and, therefore, cannot be considered unambiguous [Palmrose, 1988a].

To summarize this area of research, evidence supports quality-differentiation in the audit services market as a whole. However, evidence does not provide clear indications of differentiation within the Big Eight.

Evidence on price cutting behavior represents a somewhat more fruitful area of research in terms of insights. Here the literature provides an economic explanation for low-balling consistent with competition in the market for audit services [see DeAngelo, 1981]. Furthermore, a recent study by Simon and Francis [1988, p. 255] contains the following findings on pricing with auditor changes:

- Significant fee reductions occur in the initial year of auditor change that average 24% of normal fee levels for ongoing engagements.
- In each of the next two years, fee reductions average 15%.
- By the fourth year, fees increase to normal levels for continuing engagements.

Perhaps the central issue in the Walker and Doll paper involves the effect of non-audit services on the pricing and quality of audit services. From the perspective of empirical research, several studies document that audit fees are higher when clients also purchase non-audit services from their auditor [Palmrose, 1986b; Simunic, 1984]. Although not the only interpretation for this result, higher audit fees are inconsistent with auditing as a loss leader for non-audit services.

Furthermore, in comparing the relative importance of audit and non-audit services to the Big Eight, Walker and Doll may be understating the vital role of audit clients in generating non-audit service revenues.[4] In a study of over 350 public and closely-held companies, nearly 80% of the companies purchased some non-audit services (tax or management consulting services) from their incumbent auditors, while only three percent of the companies purchased non-audit services exclusively from other public accounting firms [Palmrose, 1988b]. It appears that much of the Big Eight's non-audit service revenue is derived from services to audit clients.

However, this begs the question of whether market participants perceive auditor independence (quality) problems in conjunction with the growing importance of non-audit services to the Big Eight. Certainly, the perception of auditors marching to a beat of sell-sell-sell non-audit services while conducting audit engagements is troublesome.

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[3] Actually, this test involves intra-firm quality-differentiated audit services.

[4] My comments illustrate the economic benefits of joint supply of audit and non-audit services. These benefits include auditor reputation or brand name effects. In discussions at the Symposium, W. R. Kinney, Jr., emphasized the latter.

Concluding Remarks

There remains one, albeit minor, point made by Walker and Doll that requires some attention. It is the following:

> In our view, academicians need to do a better job of attracting quality students to their A&A programs. The strong emphasis on research at some universities seems to have reduced the emphasis on teaching. We believe it is important that experienced instructors who are dynamic in the classroom teach at least some sections of "Principles of Accounting" as well as upper division electives.

First, room for debate exists as to whether attracting students to accounting and auditing (A&A) careers represents a legitimate role for educators. I think not. Next, it is a myth that good researchers are in general not good teachers. Frequently, good research and good teaching occur together. Furthermore, the profession is mistaken in assuming that because good teaching will not guarantee tenure at "research institutions," these institutions do not emphasize good teaching. Nonetheless, these comments demonstrate that academicians can improve communication with the profession regarding the value ascribed to undergraduate education.

Improved communication between academics and the profession on teaching likewise extends to research. As my comments on Walker and Doll's paper scrutinizing the role of auditing in the Big Eight's scheme of services indicate, we are trying to understand the same issues. In conclusion, let me emphasize how much I appreciate the opportunity to participate in this Symposium to discuss some of these issues.

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8

Accounting Standards and Professional Ethics

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Over the years accounting standards and auditing practices have become sufficiently divorced that they almost seem to be in separate environments with only negligible overlap. While professional auditors continue to need to evaluate client applications of accounting standards, those auditors today are also frequently involved in seeking loopholes in the standards to exploit for client benefit. Auditors continue to be supportive of the accounting standard-setting process, but many times that support seems to flow more from a concern about the uncertainties associated with any revision to the current mechanism than from a residual satisfaction with recent and current FASB standards.

The increasing complexity of the world in which the auditor operates probably means that a separation of the establishment of accounting standards from the evaluation of their application was inevitable. Greater specialization arises when the environment becomes increasingly complex. Even so, the rather marked change in how auditors seem to approach the evaluations of the application of standards today, as compared to simpler times, appears to be more an attitudinal change than the necessary consequence of greater complexity, better technology, or increased specialization.

Thus, the relationship between accounting standards and the professional auditor may be less direct today than in the past. A brief look at how this relationship has changed may sharpen the focus of the current relationship. First, it may be useful to consider why accounting standards are developed today in the manner in which they are, rather than in some alternative procedure. We should recognize that when Congress created the Securities and Exchange Commission in 1934 it authorized the Commission to articulate accounting standards. Over the next few years, the SEC was fully occupied in getting organized and in dealing with many inherited problems flowing from the trauma in the stock markets over the preceding four or five years. The need to develop accounting standards did not reach a high enough level of priority for the SEC to undertake any productive activity.

At the same time, many of the leaders on the practicing side of the accounting profession were concerned about the potential ramifications of having accounting standards established by a governmental agency. Leaders of the profession, who, at that time, were also generally the top technical partners in the several leading firms, approached the SEC through the offices of the American Institute of CPAs to offer to assume the authority for the development of accounting standards. After considerable discussion, and a very close vote within the Commission itself, the Commission authorized the AICPA to

proceed with the development of accounting principles. The Commission retained both an oversight responsibility and the right to intervene should the AICPA develop an inappropriate standard or fail to deal with an issue that the Commission felt required attention.

It is interesting to note that Congress, neither in 1938 nor subsequently, has authorized the transfer of the responsibility for the development of accounting standards from the SEC to a private sector entity. The reasons for the SEC conveying authority to issue accounting standards to the AICPA are difficult to glean from the evidence available. However, it is likely that the difficulties of the task in relation to the other obligations of the Commission at that time, combined with the stature of those professionals who represented the AICPA in the discussions that led to the decision, played an important role in the SEC decision. While the accounting profession was young at that time, it had established a reputation for acting in the public interest. Practicing CPAs had consistently emphasized their independence in dealing with client concerns as well as their role in assuring users of financial statements that those statements, accompanied by an unqualified auditor's report, could be relied upon as being fair representations of an entity's results of operations and financial condition.

The AICPA retained jurisdiction over this standard-setting process from 1938 until 1972. At that time, a number of concerns about the performance of the Accounting Principles Board led to a broad review of the standard-setting process and a decision to create an independent entity to assume the authority that had been delegated to the Accounting Principles Board. The result is that for the past 15 years accounting standards have been articulated by an independent entity, one that is not a part of the accounting profession, the preparer community, nor any other professional, business, or commercial group. Recent initiatives by the Financial Executives Institute to have increased representation from within its ranks at the Board level, within the Advisory Council, and among the Trustees of the Financial Accounting Foundation suggest that the movement of this process away from the accounting profession is continuing and may proceed even further. The ramifications of an ongoing move in this direction would be interesting to speculate upon, but that speculation has to be left for another day.

With that brief historical background I would like to make some observations about the perspective of standard setters in undertaking their responsibilities and on the role of practicing CPAs, who are responsible for evaluating how the standards that are adopted have been applied by clients. Practicing CPAs are also increasingly involved in consulting with investment bankers and others on how accounting standards affect proposed transactions.

Early on, the members of the FASB undertook the development of a conceptual framework, in part so that the FASB could develop standards that had a logical cohesion and, in part, so that the results of its deliberations could be evaluated to assess whether the resulting standards flowed from logical premises or may have been the result of lobbying activities or pressure politics. While that effort has been less fruitful than many had envisioned, certain parts of the framework are likely to stand the test of time.

Among the qualitative characteristics of the Board's conceptual framework was that of neutrality. While one can argue that no one of the qualitative

characteristics is more important than any other quality on the Board's deliberations, the fact remains that the notion of neutrality is crucial to the Board's process and to the widespread acceptability of its resulting standards. The notion of neutrality within the Board's conceptual framework is that in resolving issues, the Board will attempt to reach conclusions that result in reliable and relevant information and not conclusions that favor one segment of society to the detriment of one or more of the other segments. Stated differently, the Board does not view itself as a resource reallocator in the standard-setting process. While it recognizes that resource reallocations may flow from the decisions that it reaches, and the applications of the standards that it adopts, the notion of neutrality emphasizes that in developing the standard the Board is striving to achieve reliable and relevant information and is not overtly striving to reallocate resources for the benefit of one group to the detriment of others.

Thus, at an early stage, the Board tried to emphasize that it would deal in a fair and equitable manner with various competing interests in its development of standards. This policy has a high ethical tone and, in my view, the Board deserves high marks for its 15-year history of avoiding allegations that its standards are designed to favor any given segment of our society.

Furthermore, the Board adopted an open process in which to deliberate prior to reaching its conclusions. The process is a lengthy one and invites contributions from all interested parties both in writing and orally at public hearings. Furthermore, decisions on all phases of the Board's projects are made only in open public meetings. Board policies preclude decision making of any kind behind closed doors. Again, this policy is designed, in part, to prevent allegations of improper or unethical behavior. In essence, the standard setters created an operating policy that would minimize the potential for allegations that its conclusions favored any particular constituency. Each Board member is expected to reach his conclusions on the issues under consideration only after a careful personal evaluation of the competing alternative views. A Board member is expected to assess the extent to which a given possible solution is consistent with the conceptual framework and with other standards that may be in existence. He is expected to evaluate whether the given alternatives are capable of practical application in a fair and evenhanded manner. Finally, the Board member is expected to assess whether the results that will flow from the practical application of a standard will be sensible and fair depictions of the underlying economic phenomena with which the standard is dealing.

The decisions of the Board would be easier to make if the members were immune to any lobbying activities, if the Board could be unconcerned about the reactions of constituent groups, or if the decisions could be made in private rather than in public. However, standard setting is not that simple and probably benefits greatly from the process that is in existence. That process does subject the Board members to lobbying activities, does subject the Board members to criticism from constituents who prefer alternative solutions, and does require Board members to speak up in open public meetings to express their conclusions and the reasons for them.

Given the actual environment in which standards are set, one would expect that out of 98 standards, some would reflect the effects of the lobbying and bargaining processes. The fact is, of course, that some standards do, but on

balance many of the standards fare well when evaluated against the Board's conceptual framework. Some examples of standards that appear to have been influenced, possibly unduly, by outside forces include Statement No. 13 (and its follow-on interpretations and amendments) dealing with leases, Statement No. 15 dealing with the restructuring of troubled debt, Statement No. 87, dealing with the accounting for pension plans, and, no doubt, the standard that will be forthcoming within the next few years, dealing with post-retirement benefits.

My assessment is that, given the imperfections of the world within which the FASB operates, its standards reflect more the judgments of seven independent individuals than they do the accumulated effect of influences brought to bear on those individuals by pressure groups and lobbying activities. In fact, it may very well be that current initiatives that would alter the make-up of the Board or the manner in which it operates are very much the result of frustrations experienced by lobbying groups or special interests, frustrations over their inability to have more influence over the process. Some preparers have expressed this frustration by suggesting they would do better if the standards were set by a governmental agency. After all, they have experience in lobbying elected officials and those responsible to elected officials.

Practicing CPAs have played a significant role in the standard-setting process, a role that has changed somewhat over the years. Practicing CPAs are in a difficult position insofar as developing positions on accounting standards is concerned. On the one hand, they have responsibilities to clients and on the other, responsibilities to the public. Public expectations are high that the practicing CPA is looking out for the public's interest when reporting on financial statements of its clients. To the extent the practicing CPA focuses more on one or several clients' special interests in the development or application of standards, expectations of other constituencies may not be met. In time, those expectations may change, as would also the public perception of the practicing CPAs' role.

From 1938 until 1972, the practicing profession was in the position of having to apply standards that were developed by an arm of the profession. The standard-setting process was a part of the profession, probably the most visible part. It was natural that practitioners would feel a sense of obligation, a sense of moral duty, to apply standards in a professional manner since those standards had been developed within their own profession's framework. Even so, increasing competition within the accounting profession gradually increased pressures on auditors to find solutions to accounting issues that were not always consistent with the standards adopted. By 1972, many were concerned that the standard setters (the APB) were being unduly influenced by particular client desires. In fact, the increasing initiatives by practitioners to structure an APB Opinion to meet clients' desires or to stretch APB Opinions to meet client needs was probably a key factor in the creation of the FASB.

The move away from professional application of standards accelerated further in 1972 when the FASB was created. Now the standard-setting process is outside the profession. More and more frequently, we find practicing CPAs talking about 'us' and 'them,' with the 'them' being the FASB. Any obligation that professional practitioners may have felt prior to 1972 to seek to apply well, or fairly, the standards developed by their own professional organization may well have been dissipated somewhat, and possibly increasingly so, over the

years of FASB involvement. No longer are the standards the profession's standards. They are those of an independent entity to which practitioners feel no particular loyalty.

The evidence is substantial and increasing that practitioners today often seek to find loopholes in the standards issued by the FASB and try to expand upon such loopholes. While 'loopholeism' is not new, it is surely more extensive and refined than it was prior to the creation of the FASB. The process almost seems to be a game in which the role of the practitioner is to seek the shortcomings in the standard and exploit them rather than to seek the objectives within the standard and attempt to achieve them. Initiatives to seek out loopholes and exploit them most often originate from clients of practitioners or other advisers, either attorneys or investment bankers, who may be very useful to a practitioner in generating new business.

Let me give you some examples of matters that have been considered by the FASB, or that have been proposed in one form or another either by practitioners or preparers, which demonstrate attempts to avoid the application of a particular standard.

Statement of Financial Accounting Standards No. 13, paragraph 15, provides that when a rental agreement specifies an increasing level of rentals over the period of the lease, the lessee should determine the aggregate lease rentals under the agreement and charge those rentals to income on a straight-line basis over the period involved. Many of the provisions of Statement 13 are equivocal in nature, but this particular provision seems to be abundantly clear. Even so, for whatever reasons, the practice evolved, particularly in the department store industry, of disregarding this provision and accounting for the rentals on an increasing rental arrangement on a cash basis. That is, the amounts paid under the rental arrangement were expensed as paid, and the provision that the rentals were to be expensed on a straight-line basis over the period of the lease was ignored. This issue came to the attention of the Board's Emerging Issues Task Force, a group comprised mostly of practitioners. That group could not agree that paragraph 15 was clear (but also could not identify the points of lack of clarity), and the FASB was ultimately forced to issue Technical Bulletin 85-3 which took several paragraphs to, in effect, state that paragraph 15 of Statement 13 meant what it said. Had the accounting profession applied the standard, this issue would never have required the time and effort of the Emerging Issues Task Force, the staff at the Board, and the Board itself to clarify.

In 1986, the Board was embroiled in a controversy involving a savings and loan association and its financial statements to be filed with the Securities and Exchange Commission. The association involved needed additional capital. It proposed to increase that capital by issuing a kind of certificate that was styled as a "permanent income capital certificate." The label clearly was designed to lead one to conclude that the certificate was an equity certificate rather than a debt-type of obligation. The savings and loan involved was supported by its auditors in arguing that this certificate should properly be classified as equity. Analysis of the terms of the certificate, however, led the Board to conclude that the certificate had more attributes of a liability than it did of equity. It was not, in fact, a permanent certificate at all. Resolution of this matter required many meetings involving the FASB staff, the various regulatory authorities in

Washington, to say nothing of the time and effort of the entity involved and its auditors.

Within that same year, another example arose that was initiated by the Federal Home Loan Bank Board. That Board suggested that when savings and loans sold mortgages for less than their carrying amounts, the resulting debit should be classified as an asset to be amortized over a period of 10, 15 or 20 years. Around the FASB, that suggestion became known as creating assets out of losses. The argument made was that it was in the best interest of the savings and loans, and of our economy, for savings and loans to package and dispose of their "underwater" mortgages, but that if they did so and had to recognize losses they would have insufficient capital to continue in business under the capital adequacy requirements of the Federal Home Loan Bank Board. The Bank Board was proposing to overcome the failure to meet the capital adequacy guidelines by redefining the nature of an asset. The FASB concluded, however, that entities following such a practice could not classify their losses as assets if they expected to get an unqualified auditor's report.

In 1987, the FASB issued Statement No. 92 that set forth the criteria that would have to be met by a rate-regulated company if it were properly to defer costs under a phase-in plan adopted by its regulator. A phase-in plan is adopted by a rate making agency when the normal approach to rate making would require what is perceived to be too great an increase in electric rates in any one year. By phasing in that increase over several years, the regulators would dampen or delay the impact of the higher rates on electricity consumers. When a rate-making agency adopted a phase-in plan after the release of Statement 92 that did not meet the criteria in that standard, the utility would not be permitted to defer the costs in question. Under Statement 92, in that situation, the utility would be expected to charge off those costs as incurred, a procedure that would have a negative impact on both its earnings and shareholders' equity. One utility facing such a phase-in plan, a plan that did not meet the criteria of Statement 92, proposed to account for that phase-in plan as if it were a qualifying plan. Its auditors agreed to give an unqualified opinion on financial statements that embodied that accounting even though such accounting was at variance from that provided for in Statement 92. The company then approached the Federal Energy Regulatory Commission and obtained an order from it that specified that the utility should account for the phase-in plan in its regulatory statements as ordered by its regulatory agency rather than as provided for in Statement 92. With that regulatory order in hand, the utility approached the Securities and Exchange Commission requesting that it accept its financial statements with the clean auditor's report. At this point, the resolution of that request is unresolved. Should the SEC agree with the position taken by FERC, Statement 92 would be rendered ineffective.[1]

In 1987, the Board issued Statement 94 which provides that an entity that prepares consolidated financial statements shall include all subsidiaries within those consolidated statements unless it does not have control of the subsidiary or expects to hold it only on a temporary basis. Statement 94 is clear in its

[1] The SEC subsequently denied the registrant's request, and Statement 92 appears to be working as the FASB intended.

intent. That intent was to require the consolidation of all subsidiaries except in the very limited instances of temporary control. One accounting firm has suggested that a neat way to avoid the requirements of Statement 94 would be for a company to change the fiscal year of its subsidiaries so that the fiscal year of the subsidiary was more than 93 days away from the fiscal year end of the parent company. The time interval is important because the SEC has a rule that precludes a subsidiary from being included in a consolidated statement based on its year-end results if the fiscal year ends more than 93 days from the fiscal year end of the parent company. While this suggestion is unlikely to achieve its objective, it demonstrates again that practitioners spend a great deal of time attempting to develop loopholes in FASB standards; loopholes that subvert the application of the standard from the objective that the Board sought to achieve.

The overriding question in connection with this type of behavior is whether the public interest is being served well by those who are practicing public accounting when those practitioners seem more interested in seeking out and exploiting loopholes than they do in attempting to achieve accomplishment of the objectives articulated by the standard setters.

This is probably not the time or place to speculate on the reasons why this change in attitude has evolved. Some would assert the FASB is at fault because it has insisted on writing masses of detailed rules that seem designed more to anticipate or cure abuses than to achieve some clearly articulated objective. The argument then runs that "cure the abuse" standards simply invite the development of new abuses, the seeking of loopholes. Others might argue that the principal cause of this change is the increase in commercialism, and the consequent reduction in professionalism, that has evolved within the accounting profession for a variety of reasons. This view suggests that a practitioner is not serving his client well unless he is seeking out loopholes in, and favorable interpretations of, the standards issued by the FASB. Regardless of the principal cause, searching for loopholes encourages more detailed standards to try to circumscribe abuses, and detailed, and often, arbitrary rules issued by standard setters virtually invite initiatives to seek out the defects in the standard setters.

One question that arises as a result of this changing behavior is, who is looking out for the public interest? Do those in the profession who seek out loopholes and approve the embodiment of them in their client's financial statement serve the public interest well, or are they serving well only their individual clients' interest? The issue is an attitudinal one. It might be expressed as follows: With what mind set should a practitioner approach his responsibilities in the application of accounting standards? Should he be an advocate of his clients in the sense of striving to achieve the most favorable interpretation of a given standard insofar as his client's interests are concerned, or should he be mindful of his responsibilities to the public by striving to apply the standard in the manner that best meets the objectives articulated in the standard? Should the practitioner be independent of the desires of his client and strive in his interpretation of the standards to apply them in the manner in which he believes the Board intended for those standards to be applied?

During my somewhat abbreviated tenure on the Board, I suggested, on several occasions, the following initiative to try both to improve the quality of an FASB standard and to alter the attitudinal behavior of those who were

applying it. I suggested that on a given topic, only one and as an experiment, the Board decide in advance that it would limit its standard to no more than three pages. The first paragraph of the standard would articulate as clearly as the Board could, the objective or objectives that the Board felt the given standard should achieve. The next several paragraphs would set forth the standard, and the final paragraph, prior to the implementation and effective date, would specify that the burden was on corporate preparers and independent auditors to evaluate their applications of the standard to determine whether the approach they were contemplating best met the articulated objectives set forth in the first paragraph of the standard. I was advised that such an approach simply would not work. Of course it will not, especially if it is not even attempted.

At some point, I believe many will come to realize that the FASB will be unsuccessful in a dual role of writing accounting standards and preventing abusive behavior. Accounting standards should be broad in scope rather than detailed as are today's standards. The burden for fair application should rest on preparers and their auditors. The changes in attitudes and behavior that would be required to implement this notion are enormous and not likely to be accomplished over any short period. The alternative, however, is to proceed with increasingly detailed rules that invite searching for loopholes and that place severe burdens on those practitioners who are motivated by high ethical standards.

One critical question is whether the accounting profession today has met sufficiently well its responsibilities for establishing and applying accounting standards to warrant continuation of the existing current private sector arrangement for setting standards. Surely, the SEC would never have delegated the authority for setting accounting standards in 1938 to a group perceived to place one or more special interests above the public interest. It is ironic that the public accounting profession today may be better understood than it was fifty years ago, may be more highly regarded in our society, and yet is meeting less well than it did fifty years ago, the qualities of professionalism that are crucial to the retention of its status as a highly regarded profession.

I hope that by this point, you have an understanding of the general drift of my concerns. Before I stop, however, let me pose some questions for your consideration. Can accounting standard setting survive in the private sector under the present structure? The basis for the existence of standard setting in the private sector today is to achieve fairness of financial presentation in the public interest. When practicing CPAs approach the application of standards issued with the objective to seek out and exploit loopholes, is it not probable that initiatives will arise to alter the institutional standard-setting arrangements? Does the accounting profession merit its designation as a profession if the central thrust of its application of standards is to exploit loopholes for the benefit of special interests and to the detriment of the broader interest?

These are matters that, I believe, leaders of the profession should be considering as we undertake various initiatives designed to minimize the expectation gap and enhance understanding of the role of professional auditors in our society.